APPENDIX A

WESTCHESTER COUNTY RESOLUTIONS FOR PROPOSED ACTION
THE HONORABLE BOARD OF LEGISLATORS
THE COUNTY OF WESTCHESTER

Your Committee has received a communication from the County Executive recommending approval of an Act which, if adopted, would authorize the County of Westchester (the "County"), acting by and through its Department of Public Works and Transportation (the "Department"), to apply for and enter into a grant agreement for funding from the Federal Aviation Administration (the "Act") for capital project A042B - Stormwater Management Program ("A042B").

Your Committee is further advised that the Act would authorize the County to enter a grant agreement with the Federal Aviation Administration ("FAA") to accept funds for A042B in the amount of approximately $475,000. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $25,000, equivalent to 5% of the estimated project cost, from existing appropriations. The grant would be used to fund preliminary design of improvements to the stormwater collection and detention facilities at the Westchester County Airport.

The Planning Department has advised that, based on its review, the above referenced capital project is classified as a "Type II" action pursuant to the State Environmental Quality Review Act ("SEQRA") and its implementing regulations, 6 NYCRR Part 617. Your Committee has reviewed the annexed SEQRA status sheet prepared by the Planning Department and concurs with this conclusion.

The Department has advised that a copy of the completed grant application will be submitted to the Chairs of the Board of Legislators' Committees on Budget and Appropriations, and Public Works, Parks, Labor and Transportation or their successor committees after the Department has submitted the application to the FAA. In addition, the Department has advised that a copy of the executed grant agreement will be forwarded to said committees following execution of the grant agreement.
Your Committee has carefully considered this matter and has concluded that it is in the best interest of the County to adopt the Act to authorize the County to apply for and enter into a grant agreement with the FAA. Accordingly, your Committee recommends the adoption of the proposed Act.

Date: 12/12/2011
White Plains, New York

[Signatures]

Committee on Budget & Appropriations

Committee on Public Works, Fire, & Transportation
FISCAL IMPACT STATEMENT

CAPITAL PROJECT: A042B  □ NO FISCAL IMPACT PROJECTED

CAPITAL BUDGET IMPACT
(To be completed by Finance Department and Budget Department)

A) □ GENERAL FUND  ● AIRPORT  □ SPECIAL REVENUE FUND (Districts)

EXPENSES AND REVENUES
Source of County Funds (check one):  □ Current Appropriations
□ Capital Budget Amendment

B) BONDING AUTHORIZATIONS
Total Principal  PPU  Anticipated Interest Rate
Anticipated Annual Cost (Principal and Interest)
Total Debt Service (Annual Cost X Term)

THIS LEGISLATION IS TO ENTER INTO A GRANT AGREEMENT TO ACCEPT FUNDS FROM THE FEDERAL AVIATION ADMINISTRATION

Finance Department:

C) IMPACT ON OPERATING BUDGET (exclusive of debt service)
(To be completed by Operating Department and reviewed by Budget Department)

Potential Related Expenses: Annual  $ 0
Potential Related Revenues: Annual  $ 0
Anticipated Savings to County and/or Impact on Department Operations
(Describe in detail for current and next four years.):

NA

D) Employment: As per Federal Guidelines each $92,000 of appropriation funds one FTE job
Number of jobs funded: 0 — Preliminary Design

Prepared by: Patricia Chemka
Title: Deputy Commissioner
Department: DPW&T
Date: 11/17/11

Reviewed By: [Signature]
Budget Department
Date: 11/17/11

If you need more space, please attach additional sheets.
SEQR STATUS SHEET

PROJECT:  Stormwater Management Program (A042B)

DEPARTMENT:  Public Works and Transportation

Description

This project provides for the control of the flow of stormwater downstream from the Airport to prevent flooding and property damage and to maintain water quality.

Authority is being requested to apply for and execute a grant agreement with the Federal Aviation Administration (FAA), which would fund preliminary design of improvements to the stormwater collection and detention facilities to further reduce the flow of stormwater to the Blind Brook. The local share will be provided by the Airport Special Revenue Fund (ASRF). No bonding is required.

SEQR Status

Type II. The preliminary design of improvements under this project is classified as a Type II action pursuant to Section 617.5(c)(21), “conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action.”

WCDP
September 2011
Revised November 2011
ACT NO. 207-2011

AN ACT to authorize the County to apply for and enter into a grant agreement with the United States of America, acting through the Federal Aviation Administration ("FAA"), for capital project A042B – Stormwater Management Program ("A042B").

BE IT ENACTED by the Board of Legislators of the County of Westchester as follows:

Section 1. The County of Westchester is hereby authorized to apply for and enter into a grant agreement with the FAA in the amount of approximately $475,000.00 for capital project A042B. The County, using Airport Special Revenue Funds, shall contribute matching funds in the amount of approximately $25,000, equivalent to 5% of the estimated project cost, from existing appropriations. The grant will be used to fund preliminary design of improvements to the stormwater collection and detention facilities at the Westchester County Airport.

§ 2. The County Executive, or his duly authorized designee, is hereby authorized and empowered to take such actions and to execute and deliver such instruments as may be necessary and appropriate to accomplish the purposes hereof.

§ 3. This Act shall take effect immediately.
CAPITAL PROJECT FACT SHEET

Project: A042B Stormwater Management Program
Category: Airport
Legislative District: 6

Overall Project Description: The Airport Stormwater Management Program provides for the control of the flow of stormwater downstream from the Airport to prevent flooding, property damage and to maintain water quality.

☑ Revenue ☑ Security ☑ Other

FIVE-YEAR CAPITAL PROGRAM (in thousands)

<table>
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<tr>
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Expended/Obligated Amount (in thousands) as of 11/17/11: $0

Current Request / Description: Funding is requested to undertake preliminary design of improvements to the stormwater collection and detention facilities to reduce the flow of stormwater to the Blind Brook.

Financing Plan for Current Request:
Non-County Shares: $475,000
Bonds/Notes: 0
Cash: 25,000
Total: $500,000

Bond Amount Requested: N/A
PPU: N/A
SEOR Classification: Type II

Comments: No bonding is required for this request. The action being requested is legislation to apply for and execute a grant agreement for preliminary design from the Federal Aviation Administration (FAA). The FAA has indicated that they will fund up to 95% of this phase of the project; consequently, a local share of 5% of the cost of the project will be required. The local share is to be provided by the Airport Special Revenue Fund (ASRF).

Energy Efficiencies: N/A

Appropriation History (in thousands):
2009 $300 Design - Subject to stormwater study
2010 $3,000 Construction - Subject to stormwater study
Total: $3,300

Financing History (in thousands):
NONE
Total: $0

Recommending By:
Lorraine Yazzetta (GKG2) 9/14/11
Budget Department

Robert Abbamont 09/13/2011
Department of Public Works and Transportation

Edward J. Hoffmeister 9/13/11
Department of Planning

Patricia Chemka 09/16/2011
WC DPW&T Airport

Date submitted: 8/29/11
Department: Public Works/Transportation
<table>
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**Current Year Appropriation**

The impact on the Airport Special Revenue Fund is the debt service associated with bond issuance.

**Impacted on Current Year Budget**

There is no current year request.

**Appropriation History**

The Appropriation History is subject to storm water study.

**STORMWATER MANAGEMENT PROGRAM**

The goal of the Stormwater Management Program initiated in 1997 was to effectively control the flow of storm water in the Blad Brook and to reduce the flow of storm water into the Blad Brook and other downstream areas.

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<tr>
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**FIVE YEAR CAPITAL PROGRAM (IN THOUSANDS)**

<table>
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<tr>
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**Appropriation History**

The Appropriation History is subject to storm water study.

**Current Year Appropriation**

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**Impacted on Current Year Budget**

There is no current year request.

**Appropriation History**

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STATE OF NEW YORK  

WESTCHESTER COUNTY  

I HEREBY CERTIFY that I have compared the foregoing Act, Act No. 207 - 2011, with the original on file in my office, and that the same is a correct transcript therefrom, and of the whole, of the said original Act, which was duly adopted by the County Board of Legislators, of the County of Westchester on December 12, 2011, and approved by the County Executive on December 23, 2011.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of said County Board of Legislators on this 27th day of December, 2011.

Tina Seckerson  
The Clerk of the Westchester County  
Board of Legislators  

County of Westchester, New York
THE HONORABLE BOARD OF LEGISLATORS
THE COUNTY OF WESTCHESTER

Your Committee has received a communication from the County Executive recommending approval of an Act which, if adopted, would amend Act 207-2011 which authorized the County of Westchester (the “County”), acting by and through its Department of Public Works and Transportation (the “Department”), to apply for and enter into a grant agreement for funding from the Federal Aviation Administration (the “Act”) for A042B – Stormwater Management Program (“A042B”). Also transmitted herewith is an Act which would amend the County’s 2012 Capital Budget for capital project for capital project A042B (the “Capital Budget Amendment”).

Your Committee is further advised that Pursuant to Act 207-2011, the County was authorized to apply for and enter into a grant agreement with the Federal Aviation Administration (“FAA”) to accept funds for A042B in the amount of approximately $475,000. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $25,000, equivalent to 5% of the estimated project cost, from existing appropriations to fund preliminary design of improvements to the stormwater collection and detention facilities at the Westchester County Airport.

The Department has since been advised that 49 U.S.C. § 47109 was modified by the FAA Modernization and Reform Act of 2012 (H.R. 658) which was signed by the President on February 14, 2012, so that the Federal share of airport projects under the Airport Improvement Program has been reduced from 95% to 90%. Thus, the Act attached hereto would modify Act 207-2011 to increase the County’s matching funds to 10% or approximately $50,000 and decrease the federal share to 90% or approximately $450,000 of the estimated project cost.

Your Committee is further advised by the Budget Department that a Capital Budget Amendment is necessary to amend the County’s 2012 Capital Budget for A042B by decreasing the non-county share by $15,000 and increasing the County’s cash contribution by $15,000.

The Planning Department has advised that, based on its review, the above referenced capital project is classified as a “Type II” action pursuant to the State Environmental Quality Review Act.
(“SEQRA”) and its implementing regulations, 6 NYCRR Part 617. Your Committee has reviewed the annexed SEQRA status sheet prepared by the Planning Department and concurs with this conclusion.

In addition, section 167.131 of the County Charter mandates that a Capital Budget Amendment that introduces a new Capital Project or changes the location, size or character of an existing Capital Project be accompanied to the Board of Legislators by a report of the County Planning Board in respect to the physical planning aspects of the project. The Planning Department has advised that the Planning Board has previously reviewed this project and issued a report, and that since there is no change in the scope of the work and this is simply a change in the financing plan, no further action by the Planning Board is necessary at this time.

The Department has advised that a copy of the completed grant application will be submitted to the Chairs of the Board of Legislators’ Committees on Budget and Appropriations, and Public Works, Parks, Labor and Transportation or their successor committees after the Department has submitted the application to the FAA. In addition, the Department has advised that a copy of the executed grant agreement will be forwarded to said committees following execution of the grant agreement.
Your Committee has carefully considered this matter and has concluded that it is in the best interest of the County to adopt an Act to amend the County’s 2012 Capital Budget and an Act to apply for and enter into a grant agreement with the FAA to accept funds in connection with A042B. Pursuant to the Laws of Westchester County, an amendment to the County’s Capital Budget must be by an affirmative vote of two-thirds of the members of your Honorable Board, while the affirmative vote of a majority of your Honorable Board is required to adopt the Act to apply for and enter into the grant agreement. Accordingly, your Committee recommends the adoption of the proposed Act and the Capital Budget Amendment.

Date: July 3, 2012

White Plains, New York.

[Signatures]

COMMITTEE ON

C:MLG-6.1-12

Government Operations

Committee on Budget & Appropriations
FISCAL IMPACT STATEMENT

CAPITAL PROJECT:  A042B  □ NO FISCAL IMPACT PROJECTED

CAPITAL BUDGET IMPACT
(To be completed by Finance Department and Budget Department)

A) □ GENERAL FUND  □ AIRPORT  □ SPECIAL REVENUE FUND (Districts)

EXPENSES AND REVENUES

Source of County Funds (check one):  □ Current Appropriations

□ Capital Budget Amendment

B) BONDING AUTHORIZATIONS

Total Principal $  PPU  Anticipated Interest Rate

Anticipated Annual Cost (Principal and Interest)

Total Debt Service (Annual Cost X Term)

NO BOND AUTHORIZATION IS BEING REQUESTED
Finance Department:

C) IMPACT ON OPERATING BUDGET (exclusive of debt service)
(To be completed by Operating Department and reviewed by Budget Department)

Potential Related Expenses:  Annual $  N/A

Potential Related Revenues:  Annual $  N/A

Anticipated Savings to County and/or Impact on Department Operations
(Describe in detail for current and next four years.):

Additional cost of $15,000 to the Airport Special Revenue Fund

D) Employment: As per Federal Guidelines each $92,000 of appropriation funds one FTE job
Number of jobs funded: 0 FTE

F) Expected Design Work Provider: □ County Staff  □ Consultant

Prepared by:  Patricia Chemka
Title:  Deputy Commissioner
Department:  DPW&T
Date:  6/1/12

Reviewed By:  [Signature]
Budget Director
Date:  [Signature]
PROJECT: Stormwater Management Program (A042B)

DEPARTMENT: Public Works and Transportation

Description

This project provides for the control of the flow of stormwater downstream from the Airport to prevent flooding and property damage and to maintain water quality.

The current project is to undertake preliminary design of improvements to the stormwater collection and detention facilities to further reduce the flow of stormwater to the Blind Brook.

SEQR Status

Type II. The preliminary design of improvements under this project is classified as a Type II action pursuant to Section 617.5(c)(21), “conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action.”

WCDP
May 2012
Memorandum

Department of Planning

432 Michaelian Office Building
White Plains, NY 10601

To:       The Westchester County Planning Board

From:     Patrick Natarelli
          Chief Planner

Date:     June 1, 2012

RE:       Capital Budget Amendment for Capital Projects:

A042B Storm Water Management Program
A054A Rehabilitation of Various Taxiways
A0071 Airport Planning Studies

The County Executive will be sending Capital Budget Amendments to the Board of
Legislators to modify the funding of each of the above projects.

The Capital Budget Amendments will change the financing plan for the request since the
Federal Aviation Administration funding has been reduced from 95% to 90%. A Capital
Budget Amendment is being requested to increase the local share to reflect the 10% local
share now required. The local share will be provided by the Airport Special Revenue
Fund.

The Planning Board adopted a report on each of these projects at its meetings on the
following dates:
August 4, 2009 for A042B Storm Water Management Program
July 13, 2010 for A054A Rehabilitation of Various Taxiways
August 2, 2011 for A0071 Airport Planning Studies

There is no change to the physical planning aspects of these projects as reviewed by the
Board; therefore, no further action by the Board is necessary.

cc:       Edward Buroughs, AICP, Commissioner
          James Robertson, Assistant Chief Deputy County Attorney
          David Kvinge, Director, Environmental Planning
          Edward J. Hoffmeister, Secretary to the Capital Projects Committee
ACT No. 2012

AN ACT amending the 2012 County Capital Budget Appropriation for Capital Project A042B – Storm Water Management Program

BE IT ENACTED by the Board of Legislators of the County of Westchester as follows:

Section 1. The Capital section of the 2012 County Budget is hereby amended as follows:

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<tr>
<th>Previous 2012 Appropriation</th>
<th>Change</th>
<th>Revised 2012 Appropriation</th>
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</thead>
<tbody>
<tr>
<td>I. APPROPRIATION</td>
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<tr>
<td>Capital Project A042B</td>
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<tr>
<td>Storm Water Management Program</td>
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<td>$3,300,000</td>
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Section 2. The estimated method of financing in the Capital Section of the 2012 Westchester County Capital Budget is amended as follows:

II. METHOD OF FINANCING

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<th>Change</th>
<th>Revised</th>
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<td>+/- $0</td>
<td>$3,300,000</td>
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Section 3. This ACT shall take effect immediately.
CAPITAL PROJECT FACT SHEET

Project: A042B Stormwater Management Program  Date Submitted: 6/1/2012
Category: Airport  Department: Public Works/Transportation
Legislative District: 6

Overall Project Description: The Airport Stormwater Management Program provides for the control of the flow of stormwater downstream from the Airport to prevent flooding, property damage and to maintain water quality.

- Best Management Practices
- Energy Efficiencies
- Infrastructure
- Life Safety
- Project Labor Agreement
- Revenue
- Security
- Other

FIVE-YEAR CAPITAL PROGRAM (in thousands)

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<td>0</td>
<td>0</td>
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<td>15</td>
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Expended/Obligated Amount (in thousands) as of: $0

Current Request / Description: Funding is requested to undertake preliminary design of improvements to the stormwater collection and detention facilities to reduce the flow of stormwater to the Blind Brook.

Financing Plan for Current Request:
- Non-County Shares: $450,000
- Bonds/Notes: 0
- Cash: 50,000
- Total: $500,000

Bond Amount Requested: N/A  PPU: N/A  SEQR Classification: Type II

Comments: The action being requested is an amendment to Act 207-2011. On February 14, 2012, the President of the United States signed H.R.658 The FAA Modernization and Reform Act of 2012. Furthermore, United States Code 49, Section 47109 was modified so that the federal share of airport projects under the Federal Aviation Administration’s (FAA) Airport Improvement Program has been reduced from 95% to 90%. As a result, the amendment requested is legislation to apply for and execute a grant agreement for preliminary design with the FAA. The FAA will fund up to 90% of this phase of the project; consequently, a local share of 10% of the cost of the project will be required. A Capital Budget Amendment is also being requested to amend the financing of the project to increase the local share by $15,000 to reflect the 10% local share required and decrease the Non-county share by $15,000. This amount is shown in the Under Review column. The local share is to be provided by the Airport Special Revenue Fund (ASRF).

2009-10 Appropriations: 3,300,000
90% FAA Share: 2,970,000
10% Local Share: 330,000
2009-10 Cash Appropriated: 315,000
Increase in County Cash Share: 15,000

Energy Efficiencies: N/A

Appropriation History (in thousands):

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<tr>
<th>Year</th>
<th>Amount</th>
<th>Description</th>
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</thead>
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</tr>
</tbody>
</table>

Total: $3,300

Financing History (in thousands):

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$315</td>
<td>Cash</td>
</tr>
</tbody>
</table>

Total: $315
CAPITAL PROJECT FACT SHEET

Recommended By:

Lorraine Yazzetta (GKG2) 6/1/12
Budget Department Date

Patrick Natarelli 6/1/12
Department of Planning Date

Robert Abbamont 06/01/2012
Department of Public Works and Transportation Date

Patricia Chemka 6/1/12
WC DPW&T Airport Date
STORM WATER MANAGEMENT PROGRAM  
( A042B )

User Department : Airport/DOT  
Managing Department(s) : Airport/DOT ;  
Estimated Completion Date: TBD  
Planning Board Recommendation: Project approved in concept but subject to subsequent staff review.  

FIVE YEAR CAPITAL PROGRAM (in thousands)  

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Gross</td>
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<td>3,300</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Non County Share</td>
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<td>(2,985)</td>
<td></td>
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<td></td>
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<tr>
<td>Total</td>
<td>315</td>
<td>315</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Project Description  
The goal of the Storm Water Management Program initiated in 1993 was to effectively control the flow of storm water in the Blind Brook as it left the Airport to the level it was at in 1987. The program was initiated as mitigation for the diversion of storm water run off from the Rye Lake Watershed to the Blind Brook Watershed and to accommodate future impervious surface development at the Airport within the guidelines of the 1987 Master Plan Update. A 2007 analysis indicates that the projects undertaken to date have not been fully successful in controlling water flow during heavy storms and that a second phase program is necessary to achieve the original goal. This project will design and construct storm water collection and detention facilities to further reduce the flow of storm water in Blind Brook as measured at the confluence of the east and west branches of the Blind Brook just downstream of the Airport.

Current Year Description  
There is no current year request.

Impact on Operating Budget  
The impact on the Airport Special Revenue Fund is the debt service associated with bond issuance.

Appropriation History  

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>300,000</td>
<td>Design - STUDY COMPLETE; IN DESIGN.</td>
</tr>
<tr>
<td>2010</td>
<td>3,000,000</td>
<td>Construction - STUDY COMPLETE; IN DESIGN.</td>
</tr>
<tr>
<td>Total</td>
<td>3,300,000</td>
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Prior Appropriations  

<table>
<thead>
<tr>
<th></th>
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<th>Collected</th>
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</thead>
<tbody>
<tr>
<td>Federal Funds</td>
<td>2,985,000</td>
<td>2,985,000</td>
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<tr>
<td>Funds Revenue</td>
<td>315,000</td>
<td>315,000</td>
<td></td>
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<tr>
<td>Total</td>
<td>3,300,000</td>
<td>315,000</td>
<td>2,985,000</td>
</tr>
</tbody>
</table>
THE HONORABLE BOARD OF LEGISLATORS
THE COUNTY OF WESTCHESTER

Your Committee has received a communication from the County Executive recommending approval of an Act which, if adopted, would authorize the County of Westchester (the “County”), acting by and through its Department of Public Works and Transportation (the “Department”), to apply for and enter into a grant agreement for funding from the Federal Aviation Administration (“FAA”) for capital project A042A – Storm Water Management Program (the “Act”).

Your Committee is advised that the Act would authorize the County to apply for and enter into a grant agreement with the FAA to accept funds for A042A in the amount of approximately $90,000, equivalent to 90% of the estimated project cost. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $10,000, equivalent to 10% of the estimated project cost. The grant would be used to fund design services in connection with water quality improvements at Outfall #7.

The Planning Department has advised that, based on its review, the above referenced capital project is classified as a “Type II” action pursuant to the State Environmental Quality Review Act (“SEQRA”) and its implementing regulations, 6 NYCRR Part 617, which is an action determined not to have a significant effect on the environment and therefore does not require further environmental review. Your Committee has reviewed the annexed SEQRA status sheet prepared by the Planning Department and concurs with this conclusion.

Your Committee has carefully considered this matter and has concluded that it is in the best interest of the County to adopt an Act to apply for and enter into a grant agreement with the FAA to
accept funds in connection with capital project A042A. Pursuant to the Laws of Westchester County, an affirmative vote of a majority of your Honorable Board is required to adopt the Act to apply for and enter into the grant agreement. Accordingly, your Committee recommends the adoption of the proposed Act.

Date: March 7, 2013
White Plains, New York

[signature]

COMMITTEE ON

[Signatures]

[Signatures]
FISCAL IMPACT STATEMENT

CAPITAL PROJECT: A042A  ☒ NO FISCAL IMPACT PROJECTED

Note: DPWT is entering into grant agreement with FAA

CAPITAL BUDGET IMPACT
(To be completed by Finance Department and Budget Department)

A) ☐ GENERAL FUND  ☒ AIRPORT  ☐ SPECIAL REVENUE FUND (Districts)

EXPENSES AND REVENUES

Source of County Funds (check one): ☐ Current Appropriations
☐ Capital Budget Amendment

B) BONDING AUTHORIZATIONS

Total Principal
PPU
Anticipated Interest Rate

Anticipated Annual Cost (Principal and Interest)

Total Debt Service (Annual Cost X Term)

Finance Department:

C) IMPACT ON OPERATING BUDGET (exclusive of debt service)
(To be completed by Operating Department and reviewed by Budget Department)

Potential Related Expenses: Annual $ 0

Potential Related Revenues: Annual $ 0

Anticipated Savings to County and/or impact on Department Operations
(Describe in detail for current and next four years.):

NA

D) Employment: As per Federal Guidelines each $92,000 of appropriation funds one FTE job
Number of jobs funded: n/a

F) Expected Design Work Provider: ☐ DPW Engineering Staff  ☒ Private Consultant

Prepared by: Jorge R. Marmol, P.E.
Title: Associate Engineer
Department: Public Works and Transportation
Date: March 29, 2013

Reviewed By: Budget Director
Date: [signature]

If you need more space, please attach additional sheets.
SEQR STATUS SHEET

PROJECT: Stormwater Management Program (A042A)

DEPARTMENT: Public Works and Transportation

Description

This project provides for the control of the flow of stormwater downstream from the Westchester County Airport to prevent flooding and property damage and to maintain water quality.

The project previously funded the consolidation of outfalls 8, 9 and 10, which discharged stormwater directly to Blind Brook, and the redirection of this stormwater to Detention Basin B at the Airport.

The current project is to undertake the design of improvements to enhance the quality of the water at Outfall #7, which discharges to Rye Lake.

SEQR Status

Type II. The design of the improvements at Outfall #7 is classified as a Type II action pursuant to Section 617.5(c)(21), “conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action.”

WCDP
April 2013
ACT NO. 91-2013

AN ACT to authorize the County to apply for and enter into a grant agreement with the United States of America, acting through the Federal Aviation Administration ("FAA"), for capital project A042A – Storm Water Management Program ("A042A").

BE IT ENACTED by the Board of Legislators of the County of Westchester as follows:

Section 1. The County of Westchester is hereby authorized to apply for and enter into a grant agreement with the FAA in the amount of approximately $90,000 for capital project A042A, equivalent to 90% of the estimated project cost. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $10,000, equivalent to 10% of the estimated project cost. The grant will be used to fund design services in connection with water quality improvements at Outfall #7.

§ 2. The County Executive, or his duly authorized designee, is hereby authorized and empowered to take such actions and to execute and deliver such instruments as may be necessary and appropriate to accomplish the purposes hereof.

§ 3. This Act shall take effect immediately.
CAPITAL PROJECT FACT SHEET

Project: A042A Storm Water Management Program

Date Submitted: 2/7/2013

Category: Airport

Department: Public Works/Transportation

Legislative District: 6

Overall Project Description: The Airport Stormwater Management Program provides for the control of the flow of storm water downstream from the Airport to prevent flooding, property damage and to maintain water quality.


☐ Revenue ☐ Security ☐ Other

FIVE-YEAR CAPITAL PROGRAM (in thousands)

<table>
<thead>
<tr>
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<td>1,360</td>
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<tr>
<td>Less Non-County Shares</td>
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<td>950</td>
<td>0</td>
<td>720</td>
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<td>80</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Expended/Obligated Amount (in thousands) as of 4/9/13: $359

Current Request / Description: Funding is requested to undertake design of water quality improvements at Outfall #7.

Financing Plan for Current Request:

Non-County Shares: $90,000
Bonds/Notes: 0
Cash: 10,000
Total: $100,000

Bond Amount Requested: N/A

PPU: N/A

SEOR Classification: Type II

Comments: No bonding is required for this request. The action being requested is legislation to apply for and enter into a grant agreement with the Federal Aviation Administration ("FAA") for the design of this project. The FAA has indicated that they will fund up to 90% of this phase of the project; consequently, a local share of 10% of the cost of this phase of the project will be required. The local share is to be provided by the Airport Special Revenue Fund (ASRF).

This project will be under one FAA grant agreement with the request from capital project A042B Storm Water Management Upgrades for improvements to the storm water collection and detention facilities at Detention Basins A & B (two fact sheets have been submitted for that project).

Energy Efficiencies: N/A

Appropriation History (in thousands):

2007 $360 Elimination of discharge from Blind Brook, outfalls 8, 9, 10 to Basin B
2011 $1,000 Design and Construction of Outfall 7 discharge to Rye Lake improvements

Total: $1,360

Financing History (in thousands):

$410 Cash

Airport Special Revenue Fund (ASRF)

Total: $410

Recommended By:

Lorraine Yazzetta  3/25/13
Budget Department

Robert Abbamont  03/22/2013
Department of Public Works and Transportation

Patrick Natorelli  3/22/13
Department of Planning

Patricia Chemka  03/25/13
WCDPW&T Airport
### Appropriation History

<table>
<thead>
<tr>
<th>Year</th>
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<th>Description</th>
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</thead>
<tbody>
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<td>New county share (1670)</td>
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<tr>
<td>2013</td>
<td>67</td>
<td>Estimated completion date: TBD</td>
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<tr>
<td>2013</td>
<td>4,160</td>
<td>TB and Department: Planning/ DOT</td>
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</tbody>
</table>
| 2013 | 490 | Manpower Department(s): 
| 2013 | 80 | Support/ DOT: 
| 2015 | 67 | Public Works: 
| 2016 | 720 | 

**FIVE YEAR CAPITAL PROGRAM (in thousands)**

- Project approved in concept but subject to subsequent staff review.

**Total**

<table>
<thead>
<tr>
<th>Year</th>
<th>Total (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>700,000</td>
</tr>
<tr>
<td>2013</td>
<td>4,160</td>
</tr>
<tr>
<td>2015</td>
<td>490</td>
</tr>
<tr>
<td>2016</td>
<td>80</td>
</tr>
</tbody>
</table>

**Description**

- Design & construction of outlet discharge to dry lake improvements - IN DESIGN
- Elimination of discharge from Blind Brook outlet B, 10 to basin B - IN CONSTRUCTION

**Impact on Operating Budget**

- There is no current year required.

**Storm Water Management Program**

- This project is the continuation of the storm water management program.
I HEREBY CERTIFY that I have compared the foregoing Act, Act No. 91 - 2013, with the original on file in my office, and that the same is a correct transcript therefrom, and of the whole, of the said original Act, which was duly adopted by the County Board of Legislators, of the County of Westchester on May 20, 2013, and approved by the County Executive on May 29, 2013.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of said County Board of Legislators on this 31st day of May, 2013.

Tina Seckerson
The Clerk of the Westchester County Board of Legislators

County of Westchester, New York
THE HONORABLE BOARD OF LEGISLATORS
THE COUNTY OF WESTCHESTER

Your Committee has received a communication from the County Executive recommending approval of an Act which, if adopted, would authorize the County of Westchester (the “County”), acting by and through its Department of Public Works and Transportation (the “Department”), to amend the County’s 2013 Capital Budget for capital project A042B – Stormwater Management Program (“A042B”) (the “Capital Budget Amendment”).

Your Committee is advised that the Capital Budget Amendment would amend the County’s 2013 Capital Budget for A042B by decreasing the local share of the project by $17,335 and increasing the non-county share by $17,335.

Your Committee is further advised that on September 4, 2012, the New York State Department of Transportation (“NYSDOT”) notified the County of its eligibility for a State grant which matches the Federal Aviation Administration’s (“FAA”) Federal Fiscal Year 2012 Airport Improvement Program (“AIP”) grant #3-36-0123-104-12. NYSDOT will fund up to 5% of the local share of this project. Consequently, the local share of 10% of the cost of the project will be reduced to 5%. The Capital Budget Amendment would change the financing of the project to decrease the local share of the project by $17,335 to reflect the 5% local share required for A042B and increase the non-county share by the same amount. The grant would fund the preliminary engineering and environmental review phase of the project.

Section 167.131 of the County Charter mandates that a capital budget amendment that introduces a new capital project or changes the location, size or character of an existing capital project be accompanied to the Board of Legislators by a report of the County Planning Board in respect to the physical planning aspects of the project. The Planning Department has advised that the Planning Board has previously reviewed this project and issued a report, and
that since there is no change in the scope of the work and this is simply a change in the financing plan, no further action by the Planning Board is necessary at this time.

The Planning Department has further advised that, based on its review, the above referenced capital project is classified as a "Type II" action pursuant to the State Environmental Quality Review Act ("SEQRA") and its implementing regulations, 6 NYCRR Part 617. Your Committee has reviewed the annexed SEQRA status sheet prepared by the Planning Department and concurs with this conclusion.

Your Committee has carefully considered this matter and has concluded that it is in the best interest of the County to adopt an Act to amend the County 2013 Capital Budget. Pursuant to the Laws of Westchester County, an amendment to the County's Capital Budget must be by an affirmative vote of two-thirds of the members of your Honorable Board. Accordingly, your Committee recommends the adoption of the proposed Act and the Capital Budget Amendment.

Date: May 21, 2013
White Plains, New York

[Signatures]

COMMITTEE ON GOVERNMENT
Call for OPERATIONS
Bernice Spreckman
Affairs
Mary Jane
Michael Brook
William
Shirley Harroff
SEQR STATUS SHEET

PROJECT: Stormwater Management Program (A042B)

DEPARTMENT: Public Works and Transportation

Description

This project provides for the control of the flow of stormwater downstream from the Westchester County Airport to prevent flooding and property damage and to maintain water quality.

The current project is to undertake the design of improvements to the storm water collection and detention facilities at Detention Basins A and B at the Airport to reduce the flow of storm water to the Blind Brook.

SEQR Status

Type II. The design of the improvements to Detention Basins A and B is classified as a Type II action pursuant to Section 617.5(c)(21), "conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action."

WCDP
April 2013
Memorandum

Department of Planning

432 Michaelian Office Building
White Plains, NY 10601

To: The Westchester County Planning Board

From: Patrick Natarelli
Chief Planner

Date: March 28, 2013

RE: Capital Budget Amendments for Capital Projects:
A042B Stormwater Management Program
A054A Rehabilitation of Various Taxiways
A056C Heavy Equipment Acquisition (2011-2016)
A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
A0071 Airport Planning Studies

The County Executive will be sending Capital Budget Amendments to the Board of Legislators to modify the funding of the above projects.

The Capital Budget Amendments will change the financing plan for each of the projects as additional non County funding has become available.

The Planning Board adopted reports on these projects at the following meetings:
August 4, 2009 - A042B Stormwater Management Program
July 13, 2010 - A054A Rehabilitation of Various Taxiways,
A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
August 2, 2011 - A0071 Airport Planning Studies
July 24, 2012 - A056C Heavy Equipment Acquisition (2011-2016)

There are no changes to the physical planning aspects of these projects as reviewed by the Board; therefore, no further action by your Board is necessary.

cc: Edward Buroughs, AICP, Commissioner
David Kvinge, Director, Environmental Planning
Edward J. Hoffmeister, Secretary to the Capital Projects Committee
To: Robert P. Astorino, County Executive
   Lawrence Soule, Budget Director

From: Edward Buroughs, AICP Commissioner

Re: Notification to the County Planning Board for Capital Budget Amendment:
   A042B Stormwater Management Program
   A054A Rehabilitation of Various Taxiways
   A056C Heavy Equipment Acquisition (2011-2016)
   A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
   A0071 Airport Planning Studies

Date: April 4, 2013

Attached is a memo from the Planning Department to the County Planning Board advising the Board of the proposed Capital Budget Amendments (CBAs) to modify the funding of the above projects.

The Capital Budget Amendments will change the financing plan for these requests as additional non County funding has become available for these projects.

This is a financing change only and there is no change to the project scope or to the physical planning aspects of the project. Therefore, as stated in the memo, no further action by the Planning Board is required.

EEB/PPN

Attachments

cc: Kevin Plunkett, Deputy County Executive
    George Oros, Chief of Staff
    William Mooney, Senior Assistant to the County Executive
    Joseph Kenner, Assistant to the County Executive
    Jay Pisco, Commissioner of Public Works and Transportation
    James Robertson, Assistant Chief Deputy County Attorney
    Jeffrey Goldman, Assistant County Attorney
    Michelle Greenbaum, Assistant County Attorney
Patrick Natarelli, Chief Planner
Edward J. Hoffmeister, Secretary to the Capital Projects Committee
ACT No. 97 - 2013

An Act amending the 2013 County Capital Budget Appropriations for Capital Project A042B Stormwater Management Program

BE IT ENACTED by the Board of Legislators of the County of Westchester as follows:

Section 1. The Capital section of the 2013 County Budget is hereby amended as follows:

<table>
<thead>
<tr>
<th>Previous 2013 Appropriation</th>
<th>Change</th>
<th>Revised 2013 Appropriation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Appropriation</td>
<td>$3,300,000</td>
<td>$0</td>
</tr>
</tbody>
</table>

Capital Project (number and name)

Section 2. The estimated method of financing in the Capital Section of the 2013 Westchester County Capital Budget is amended as follows:

II. METHOD OF FINANCING

<table>
<thead>
<tr>
<th>Bonds and/or Notes</th>
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</thead>
<tbody>
<tr>
<td>Non County Shares</td>
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<td>$17,335</td>
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<tr>
<td>Cash</td>
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<td>-$17,335</td>
</tr>
<tr>
<td>Total</td>
<td>$3,300,000</td>
<td>$0</td>
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</tbody>
</table>

Section 3. The ACT shall take effect immediately.
**FISCAL IMPACT STATEMENT**

**SECTION A - CAPITAL BUDGET IMPACT**
To Be Completed by Budget

- [ ] GENERAL FUND
- [X] AIRPORT FUND
- [ ] SPECIAL DISTRICTS FUND

**Source of County Funds (check one):**
- [ ] Current Appropriations
- [X] Capital Budget Amendment

Capital Budget Amendment to change financing for receipt of NYS funds

**SECTION B - BONDING AUTHORIZATION**
To Be Completed by Finance

<table>
<thead>
<tr>
<th>Total Principal</th>
<th>PPU</th>
<th>Anticipated Interest Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Anticipated Annual Cost (Principal and Interest):**

**Total Debt Service (Annual Cost x Term):**

$ -

**Finance Department:**

**SECTION C - IMPACT ON OPERATING BUDGET** (exclusive of debt service)
To Be Completed by Submitting Department and Reviewed by Budget

**Potential Related Expenses (Annual):**

$ -

**Potential Related Revenues (Annual):**

$ -

**Anticipated savings to County and/or impact of department operations**
(describe in detail for current and next four years):


**SECTION D - EMPLOYMENT**
As per Federal guidelines each $92,000 of appropriation funds one FTE Job

**Number of Full Time Equivalent (FTE) Jobs Funded:**

N/A

**SECTION E - EXPECTED DESIGN WORK PROVIDER**

- [ ] County Staff
- [X] Consultant
- [ ] Not Applicable

**Prepared by:** Jorge R. Marmol, P.E.

**Title:** Associate Engineer

**Department:** Public Works and Transportation

**Date:** April 16, 2013

**Reviewed By:**

**Budget Director**

**Date:**
CAPITAL PROJECT FACT SHEET

Project: A042B Stormwater Management Program

Category: Airport

Legislative District: 6

Overall Project Description: The Airport Stormwater Management Program provides for the control of the flow of stormwater downstream from the Airport to prevent flooding, property damage and to maintain water quality.

- Best Management Practices
- Energy Efficiencies
- Infrastructure
- Life Safety
- Project Labor Agreement
- Revenue
- Security
- Other

FIVE-YEAR CAPITAL PROGRAM (in thousands)

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Gross</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
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<td>0</td>
<td>0</td>
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<td>0</td>
<td>(17)</td>
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</table>

Expended/Obligated Amount (in thousands) as of 4/16/2013: $339

Current Request / Description: Funding is requested to undertake preliminary engineering and environmental review for improvements to the storm water collection and detention facilities at Detention Basins A & B in order to reduce the flow of storm water to the Blind Brook.

Financing Plan for Current Request:
- Non-County Shares: $329,363
- Bonds/Notes: 0
- Cash: 17,335
- Total: $346,698

Bond Amount Requested: N/A

PPU: N/A

SEQR Classification: Type II

Comments: The action requested is a Capital Budget Amendment (CBA). On September 4, 2012, the State of New York Department of Transportation ("NYSDOT") notified the County of its eligibility for a State Grant Agreement which matches the Federal Aviation Administration's ("FAA") FFY2012 Airport Improvement Program ("AIP") grant #3-36-0122-104-12. The cost of the first phase of the project, "preliminary engineering and environmental review," came in less than was originally appropriated for; consequently, the change in financing requested reflects actual project costs. NYSDOT will fund up to 5% of the local share of the first phase of the project; therefore, the local share of 10% of the cost of the first phase of the project will be reduced to 5%. Ultimately, a CBA is being requested to change the financing of the project to decrease the local share by $17,335 to reflect the 5% local share required for this phase of the project and increase the Non-county share by $17,335. This amount is shown in the Under Review column.

This is a multi-phase project. This is the first phase of an overall project for improvements to the storm water collection and detention facilities to reduce the flow of storm water to the Blind Brook. A separate fact sheet is also being submitted under A042B to request funding to undertake the second phase of the project for improvements to Detention Basins A and B, "full design."

Energy Efficiencies: N/A

Appropriation History (in thousands):
- 2009 $300 Design - Stormwater Study complete
- 2010 $3,000 Construction - Stormwater Study complete
- Total: $3,300

Financing History (in thousands):
- $330 Cash - Airport Special Revenue Funds (ASRF)

Recommended By:
- Lorraine Yazzetta 3/26/13
- Patrick Natasselli 3/26/13
- Robert Ababon 03/22/2013
- Robert Ababon 03/22/2013
- Dept. of Public Works & Transportation 03/22/2013
- Patricia Chemka 03/26/13
- Dept. of Public Works & Transportation - Airport 03/26/13
THE HONORABLE BOARD OF LEGISLATORS
THE COUNTY OF WESTCHESTER

Your Committee has received a communication from the County Executive recommending approval of an Act (the "Act") which, if adopted, would authorize the County of Westchester (the "County"), acting by and through its Department of Public Works and Transportation (the "Department"), to apply for and enter into a grant agreement for funding from the Federal Aviation Administration (the "FAA") for capital project A042B – Stormwater Management Program ("A042B").

Your Committee is advised that the Act would authorize the County to apply for and enter into a grant agreement with the FAA to accept funds for A042B in the amount of approximately $360,000, equivalent to 90% of the estimated project cost. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $40,000, equivalent to approximately 10% of the estimated project cost. The grant would be used to fund costs associated with the second phase of A042B including design of improvements to the storm water collection and detention facilities at Detention Basins A and B in order to reduce the flow of storm water to the Blind Brook.

The Planning Department has advised that, based on its review, the above referenced capital project is classified as a "Type II" action pursuant to the State Environmental Quality Review Act ("SEQRA") and its implementing regulations, 6 NYCRR Part 617. Your Committee has reviewed the annexed SEQRA status sheet prepared by the Planning Department and concurs with this conclusion.
Your Committee has carefully considered this matter and has concluded that it is in the best interest of the County to adopt an Act to authorize the County to apply for and enter into a grant agreement with the FAA. Your Committee is advised that the affirmative vote of a majority of your Honorable Board is required to adopt the Act. Accordingly, your Committee recommends the adoption of the proposed Act.

Date: May 21, 2013
White Plains, New York

Dated: May 28, 2013

[Signatures]

Committee on
# FISCAL IMPACT STATEMENT

**CAPITAL PROJECT #:** A042B  
**NO FISCAL IMPACT PROJECTED**

## SECTION A - CAPITAL BUDGET IMPACT
To Be Completed by Budget

- [ ] GENERAL FUND  
- [X] AIRPORT FUND  
- [ ] SPECIAL DISTRICTS FUND  

**Source of County Funds** (check one):  
- [ ] Current Appropriations  
- [ ] Capital Budget Amendment  

Enter into an agreement with the FAA to accept grant funds.

## SECTION B - BONDING AUTHORIZATIONS
To Be Completed by Finance

<table>
<thead>
<tr>
<th>Total Principal</th>
<th>$</th>
<th>PPU</th>
<th>Anticipated Interest Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipated Annual Cost (Principal and Interest):</td>
<td>$</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Debt Service (Annual Cost x Term):</td>
<td>$</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Finance Department:

## SECTION C - IMPACT ON OPERATING BUDGET (exclusive of debt service)
To Be Completed by Submitting Department and Reviewed by Budget

- Potential Related Expenses (Annual): $ -  
- Potential Related Revenues (Annual): $ -  

Anticipated savings to County and/or impact of department operations  
(describe in detail for current and next four years):

A request to enter into an agreement with the FAA.

## SECTION D - EMPLOYMENT
As per Federal guidelines each $92,000 of appropriation funds one FTE Job  

| Number of Full Time Equivalent (FTE) Jobs Funded: | N/A |

## SECTION E - EXPECTED DESIGN WORK PROVIDER

- [ ] County Staff  
- [X] Consultant  
- [ ] Not Applicable

**Prepared by:** Jorge R. Marmol, P.E.  
**Reviewed By:** Budget Director  
**Title:** Associate Engineer  
**Department:** Public Works and Transportation  
**Date:** April 16, 2013
SEQR STATUS SHEET

PROJECT: Stormwater Management Program (A042B)

DEPARTMENT: Public Works and Transportation

Description

This project provides for the control of the flow of stormwater downstream from the Westchester County Airport to prevent flooding and property damage and to maintain water quality.

The current project is to undertake the design of improvements to the storm water collection and detention facilities at Detention Basins A and B at the Airport to reduce the flow of storm water to the Blind Brook.

SEQR Status

Type II. The design of the improvements to Detention Basins A and B is classified as a Type II action pursuant to Section 617.5(c)(21), “conducting concurrent environmental, engineering, economic, feasibility and other studies and preliminary planning and budgetary processes necessary to the formulation of a proposal for action, provided those activities do not commit the agency to commence, engage in or approve such action.”

WCDP
April 2013
Memorandum

Department of Planning

432 Michaelian Office Building
White Plains, NY 10601

To: The Westchester County Planning Board

From: Patrick Natarelli
Chief Planner

Date: March 28, 2013

RE: Capital Budget Amendments for Capital Projects:
A042B Stormwater Management Program
A054A Rehabilitation of Various Taxiways
A056C Heavy Equipment Acquisition (2011-2016)
A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
A0071 Airport Planning Studies

The County Executive will be sending Capital Budget Amendments to the Board of Legislators to modify the funding of the above projects.

The Capital Budget Amendments will change the financing plan for each of the projects as non County funding has become available.

The Planning Board adopted reports on these projects at the following meetings:
August 4, 2009 - A042B Stormwater Management Program
July 13, 2010 - A054A Rehabilitation of Various Taxiways,
A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
August 2, 2011 - A0071 Airport Planning Studies
July 24, 2012 - A056C Heavy Equipment Acquisition (2011-2016)

There are no changes to the physical planning aspects of these projects as reviewed by the Board; therefore, no further action by your Board is necessary.

cc: Edward Buroughs, AICP, Commissioner
David Kvinge, Director, Environmental Planning
Edward J. Hoffmeister, Secretary to the Capital Projects Committee
Memorandum
Department of Planning

To: Robert P. Astorino, County Executive
Lawrence Soule, Budget Director

From: Edward Buroughs, AICP Commissioner

Re: Notification to the County Planning Board for Capital Budget Amendment:
A042B Stormwater Management Program
A054A Rehabilitation of Various Taxiways
A056C Heavy Equipment Acquisition (2011-2016)
A066C Miscellaneous Restoration and Rehabilitation (2011-2015)
A0071 Airport Planning Studies

Date: April 4, 2013

Attached is a memo from the Planning Department to the County Planning Board advising the Board of the proposed Capital Budget Amendments (CBAs) to modify the funding of the above projects.

The Capital Budget Amendments will change the financing plan for these requests as additional non County funding has become available for these projects.

This is a financing change only and there is no change to the project scope or to the physical planning aspects of the project. Therefore, as stated in the memo, no further action by the Planning Board is required.

EEB/PPN

Attachments

cc: Kevin Plunkett, Deputy County Executive
George Oros, Chief of Staff
William Mooney, Senior Assistant to the County Executive
Joseph Kenner, Assistant to the County Executive
Jay Pisco, Commissioner of Public Works and Transportation
James Robertson, Assistant Chief Deputy County Attorney
Jeffrey Goldman, Assistant County Attorney
Michelle Greenbaum, Assistant County Attorney
Patrick Natarelli, Chief Planner
Edward J. Hoffmeister, Secretary to the Capital Projects Committee
ACT NO. 98-2013

AN ACT to authorize the County to apply for and enter into a grant agreement with the United States of America, acting through the Federal Aviation Administration ("FAA"), for capital project A042B – Stormwater Management Program ("A042B")

BE IT ENACTED by the Board of Legislators of the County of Westchester as follows:

Section 1. The County of Westchester is hereby authorized to apply for and enter into a grant agreement with the FAA in the amount of approximately $360,000 for capital project A042B, equivalent to 90% of the estimated project cost. The County, using Airport Special Revenue Funds, would contribute matching funds in the amount of approximately $40,000, equivalent to approximately 10% of the estimated project cost. The grant will be used to fund costs associated with the second phase of A042B including design of improvements to the storm water collection and detention facilities at Detention Basins A and B in order to reduce the flow of storm water to the Blind Brook.

§ 2. The County Executive, or his duly authorized designee, is hereby authorized and empowered to take such actions and to execute and deliver such instruments as may be necessary and appropriate to accomplish the purposes hereof.

§ 3. This Act shall take effect immediately.
CAPITAL PROJECT FACT SHEET

Project: A042B Storm Water Management Program
Date Submitted: 2/7/2013
Category: Airport
Department: Public Works/Transportation
Legislative District: 6

Overall Project Description: The Airport Stormwater Management Program provides for the control of the flow of storm water downstream from the Airport to prevent flooding, property damage and to maintain water quality.

- ☑ Best Management Practices
- ☑ Energy Efficiencies
- ☑ Infrastructure
- ☑ Life Safety
- ☑ Project Labor Agreement
- ☑ Revenue
- ☑ Security
- ☑ Other

FIVE-YEAR CAPITAL PROGRAM (in thousands)

<table>
<thead>
<tr>
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<tr>
<td>Less Non-County Shares</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

Expended/Obligated Amount (in thousands) as of 4/16/13: $339

Current Request / Description: Funding is requested to undertake design for improvements to the storm water collection and detention facilities at Detention Basins A & B in order to reduce the flow of storm water to the Blind Brook.

Financing Plan for Current Request:
- Non-County Shares: $360,000
- Bonds/Notes: 0
- Cash: $40,000
- Total: $400,000

Bond Amount Requested: N/A
PPU: N/A
SEQR Classification: Type II

Comments: No bonding is required for this request. The action being requested is legislation to apply for and enter into a grant agreement with the Federal Aviation Administration (“FAA”) for the second phase of this project, “full design.” The FAA has indicated that they will fund up to 90% of the second phase of the project; consequently, a local share of 10% of the cost of the second phase of the project will be required. The local share is to be provided by the Airport Special Revenue Fund (ASRF). This action is related to a previous piece of legislation for the first phase of the project, but is a separate action.

This is a multi-phase project. This is the second phase of an overall project for improvements to the storm water collection and detention facilities to reduce the flow of storm water to the Blind Brook. A separate fact sheet is also being submitted under A042B to request a change in financing for the first phase of the project, “preliminary engineering and environmental review,” as the County has offered New York State funding to offset the local share of that phase of the project.

This project will be under one FAA grant agreement with the request from capital project A042A Storm Water Management Upgrades for Outfall #7 (separate fact sheet has been submitted for that project).

Energy Efficiencies: N/A

Appropriation History (in thousands):
- 2009: $300 Design
- 2010: $3,000 Construction
Total: $3,300

Financing History (in thousands):
- Cash: $330
- Airport Special Revenue Fund (ASRF)

Total: $330

Recommended By:
Lorraine Yazzetta 3/25/13  Robert Abbamont 03/22/2013
Budget Department Department of Public Works and Transportation

Patrick Natarelli 3/26/13  Patricia Chemka 03/25/13
Department of Planning WCDPW&T Airport
### Appropriation History

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th>Description</th>
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<tbody>
<tr>
<td>2016</td>
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<tr>
<td>2015</td>
<td>2,970'000</td>
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<td>2014</td>
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<td>2013</td>
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<td>Received</td>
</tr>
<tr>
<td>2012</td>
<td>3,000'000</td>
<td>Total</td>
</tr>
</tbody>
</table>

### Appropriation Description

- **Construction - Study Complete in Design**
- **Design - Study Complete in Design**
- **Total**

### Impact on Operating Budget

- **There is no current year impact.**

### Current Year Impacts

The impact on the Airport Special Revenue Fund is the debt service associated with bond issuance.

### Project Description

- **Five Year Capital Program (in thousands)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>330'000</td>
</tr>
<tr>
<td>2015</td>
<td>330'000</td>
</tr>
<tr>
<td>2014</td>
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<tr>
<td>2013</td>
<td>330'000</td>
</tr>
<tr>
<td>EXP</td>
<td>330'000</td>
</tr>
</tbody>
</table>

### Project Details

- **Funding Source:** U.S. Department of Transportation
- **Project Name:** Storm Water Management Program
- **Project Number:** 94.042B
STATE OF NEW YORK

WESTCHESTER COUNTY

I HEREBY CERTIFY that I have compared the foregoing Acts, Act No's. 97, 98 - 2013, with the original on file in my office, and that the same is a correct transcript therefrom, and of the whole, of the said original Acts, which was duly adopted by the County Board of Legislators, of the County of Westchester on June 3, 2013, and approved by the County Executive on June 13, 2013.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Corporate Seal of said County Board of Legislators on this 21st day of June, 2013.

Tina Seckerson

The Clerk of the Westchester County Board of Legislators

County of Westchester, New York
APPENDIX B

AGENCY CORRESPONDENCE AND DOCUMENTATION
April 17, 2013

Jessie Morgan
T R C
7 Skyline Drive
Hawthorne, NY 10532

Dear Mr. Morgan:

In response to your recent request, we have reviewed the New York Natual Heritage Database with respect to an Environmental Assessment for the Proposed Upgrades to Stormwater Management – Phase I at Westchester County Airport, site as indicated on the map you enclosed, located in Harrison, North Castle and Rye Brook.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities, which our database indicates occur, or may occur, on your site or in the immediate vicinity of your site. For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

The enclosed report may be included in documents that will be available to the public. However, any maps displaying locations of rare species are considered sensitive information, and should not be included in any document that will be made available to the public, without permission from the New York Natural Heritage Program.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

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

Sincerely,

Jean Pietrusiak, Information Services
NYS Department Environmental Conservation

Enc.
cc: Reg. 3, Wildlife Mgr.
The following state-listed animals have been documented at your project site, or in its vicinity.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed or are candidates for federal listing. The list may also include significant natural communities that can serve as habitat for Endangered or Threatened animals, and/or other rare animals and rare plants found at these habitats.

For information about potential impacts of your project on these populations, how to avoid, minimize, or mitigate any impacts, and any permit considerations, contact the Wildlife Manager or the Fisheries Manager at the NYSDEC Regional Office for the region where the project is located. A listing of Regional Offices is at http://www.dec.ny.gov/about/558.html.

The following species and habitats have been documented at or near the project site, generally within 0.5 mile. Potential onsite and offsite impacts from the project may need to be addressed.

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>SCIENTIFIC NAME</th>
<th>NY STATE LISTING</th>
<th>FEDERAL LISTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedge Wren</td>
<td>Cistothorus platensis</td>
<td>Threatened</td>
<td></td>
</tr>
<tr>
<td>Breeding</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This report only includes records from the NY Natural Heritage databases. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage’s Conservation Guides at www.guides.nynhp.org, and from NYSDEC at http://www.dec.ny.gov/animals/7494.

Information about many of the rare plants and animals, and natural community types, in New York are available online in Natural Heritage’s Conservation Guides at www.guides.nynhp.org, and from NatureServe Explorer at http://www.natureserve.org/explorer.
United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Field Office
3817 Luker Road
Cortland, NY 13045
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo

Document Control Number: 130437

To: Jessie Morgan

Date: Apr 12, 2013

Regarding: Stormwater management upgrades - Phase 1

Town/County: Towns of Harrison & Northcastle and Village of Rye Brook / Westchester County

We have received your request for information regarding occurrences of federally-listed threatened and endangered species within the vicinity of the above-referenced project/property. In an effort to streamline project reviews, species lists may now be obtained from our website at http://www.fws.gov/northeast/nyfo/es/section7.htm. Please go to this site and follow the step-by-step instructions to obtain an official list request response.

As a reminder, Section 9 of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) prohibits unauthorized taking* of listed species and applies to federal and non-federal activities. Additionally, threatened and endangered species and their habitats are protected by Section 7(a)(2) of the ESA, which requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (Service), to ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of designated critical habitat. An assessment of the potential direct, indirect, and cumulative impacts is required for all federal actions that may affect listed species.

For projects not authorized, funded, or carried out by a federal agency, we provide technical assistance to individuals and other non-federal entities to assist with project planning to avoid the potential for "take," or when appropriate, to provide assistance with their application for an incidental take permit pursuant to Section 10(a)(1)(B) of the ESA.

Project construction or implementation should not commence until all requirements of the ESA have been fulfilled. If you have any questions or require further assistance regarding threatened or endangered species, please contact the Endangered Species Program at (607) 753-9334. Please refer to the above document control number in any future correspondence.

*Under the Act and regulations, it is illegal for any person subject to the jurisdiction of the United States to take (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt any of these), import or export, ship in interstate or foreign commerce in the course of commercial activity, or sell or offer for sale in interstate or foreign commerce any endangered fish or wildlife species and most threatened fish and wildlife species. It is also illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken illegally. "Harm" includes any act which actually kills or injures fish or wildlife, and case law has clarified that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.
Consultation Tracking Number: 05E1NY00-2013-SLI-0507
Project Name: Westchester County Airport-SWM Upgrades Phase I

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This list can also be used to determine whether listed species may be present for projects without federal agency involvement. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list. If listed, proposed, or candidate species were identified as potentially occurring in the project area, coordination with our office is encouraged. Information on the steps involved with assessing potential impacts from projects can be found at: http://www.fws.gov/northeast/nyfo/es/section7.htm

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects...
should follow the Services wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment
Official Species List

Provided by:

NEW YORK ECOLOGICAL SERVICES FIELD OFFICE
3817 LUKER ROAD
CORTLAND, NY 13045
(607) 753-9334
http://www.fws.gov/northeast/nyfo/es/section7.htm

Expect additional Species list documents from the following office(s):

NEW ENGLAND ECOLOGICAL SERVICES FIELD OFFICE
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
(603) 223-2541
http://www.fws.gov/newengland

LONG ISLAND ECOLOGICAL SERVICES FIELD OFFICE
340 SMITH ROAD
SHIRLEY, NY 11967
(631) 286-0485

Consultation Tracking Number: 05E1NY00-2013-SLI-0507

Project Type: Land - Drainage

Project Description: (1) Full depth expansions of existing storm water Detention Basins A and "B" in the southwest portion of the Airport through excavation; reconstruction of earthen spillways; raising the elevations of the spillway crests; reconstruction of basin outlet structures and embankment slopes, and (2) construction of two bioretention basins for treatment of storm water runoff from portions of Airport operational areas adjacent to the Airport maintenance garage, located at the north end of the Airport.
Project Location Map:

**Project Coordinates:** MULTIPOLYGON (((-73.7162136 41.0815853, -73.7126087 41.0819088, -73.6943268 41.0596493, -73.7034249 41.0551836, -73.7073731 41.0613967, -73.7188744 41.0599082, -73.7193121 41.0663797, -73.7169947 41.0681916, -73.7165655 41.0712976, -73.7174238 41.0738212, -73.712522 41.0775092, -73.716308 41.0809383, -73.7162136 41.0815853)))

**Project Counties:** Fairfield, CT | Westchester, NY
Endangered Species Act Species List

Species lists are not entirely based upon the current range of a species but may also take into consideration actions that affect a species that exists in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Please contact the designated FWS office if you have questions.

Bog Turtle (*Clemmys muhlenbergii*)
- Population: northern
- Listing Status: Threatened

Indiana bat (*Myotis sodalis*)
- Population: Entire
- Listing Status: Endangered

New England Cottontail rabbit (*Sylvilagus transitionalis*)
- Listing Status: Candidate
Consultation Tracking Number: 05E1LI00-2013-SLI-0113  May 01, 2013

Project Name: Westchester County Airport-SWM Upgrades Phase I

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the
human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment
United States Department of Interior
Fish and Wildlife Service
Project name: Westchester County Airport-SWM Upgrades Phase I

Official Species List

Provided by:
LONG ISLAND ECOLOGICAL SERVICES FIELD OFFICE
340 SMITH ROAD
SHIRLEY, NY 11967
(631) 286-0485

Expect additional Species list documents from the following office(s):
NEW ENGLAND ECOLOGICAL SERVICES FIELD OFFICE
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
(603) 223-2541
http://www.fws.gov/newengland

NEW YORK ECOLOGICAL SERVICES FIELD OFFICE
3817 LUKER ROAD
CORTLAND, NY 13045
(607) 753-9334
http://www.fws.gov/northeast/nyfo/es/section7.htm

Consultation Tracking Number: 05E1LI00-2013-SLI-0113

Project Type: Land - Drainage
Project Description: (1) Full depth expansions of existing storm water Detention Basins A and "B" in the southwest portion of the Airport through excavation; reconstruction of earthen spillways; raising the elevations of the spillway crests; reconstruction of basin outlet structures and embankment slopes, and (2) construction of two bioretention basins for treatment of storm water runoff from portions of Airport operational areas adjacent to the Airport maintenance garage, located at the north end of the Airport.
Project Location Map:

**Project Coordinates:** MULTIPOLYGON (((-73.7162136 41.0815853, -73.7126087 41.0819088, -73.6943268 41.0596493, -73.7034249 41.0551836, -73.7073731 41.0613967, -73.7188744 41.0599082, -73.7193121 41.0663797, -73.7169947 41.0681916, -73.7165655 41.0712976, -73.7174238 41.0738212, -73.7172522 41.0775092, -73.716308 41.0809383, -73.7162136 41.0815853)))

**Project Counties:** Fairfield, CT | Westchester, NY
Endangered Species Act Species List

Species lists are not entirely based upon the current range of a species but may also take into consideration actions that affect a species that exists in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.
Morgan, Jessie

From: Dodd, Kimberly <kimberly_dodd@fws.gov>
Sent: Thursday, April 11, 2013 11:56 AM
To: Morgan, Jessie
Subject: Letter received for Westchester County Airport Stormwater Management Upgrades

Jessie,

We received your letter and will forward it to U.S. Fish and Wildlife Service, New York Field Office located at 3817 Luker Rd, Cortland, NY 13045. Their number is 607-753-9334.

I am sorry, but we only cover the New England region.

Kimberly J. Dodd
Office Automation Assistant
New England Field Office
U.S. Fish and Wildlife Service
70 Commercial St., Ste 300
Concord, NH 03301
Tel. 603/223-2541 Fax 603/223-0104
www.fws.gov/newengland

This email has been scanned by the Symantec Email Security.cloud service.
For more information please visit http://www.symanteccloud.com
Consultation Tracking Number: 05E1NE00-2013-SLI-0163

Project Name: Westchester County Airport-SWM Upgrades Phase I

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having
similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

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http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm;
http://www.towerkill.com; and

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

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LONG ISLAND ECOLOGICAL SERVICES FIELD OFFICE
340 SMITH ROAD
SHIRLEY, NY 11967
(631) 286-0485

Consultation Tracking Number: 05E1NE00-2013-SLI-0163
Project Type: Land - Drainage
Project Description: (1) Full depth expansions of existing storm water Detention Basins A and "B" in the southwest portion of the Airport through excavation; reconstruction of earthen spillways; raising the elevations of the spillway crests; reconstruction of basin outlet structures and embankment slopes, and (2) construction of two bioretention basins for treatment of storm water runoff from portions of Airport operational areas adjacent to the Airport maintenance garage, located at the north end of the Airport.
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Project Counties: Fairfield, CT | Westchester, NY
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Species lists are not entirely based upon the current range of a species but may also take into consideration actions that affect a species that exists in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.
APPENDIX C

AUGUST 2010 HABITAT ASSESSMENTS

AIRPORT WILDLIFE MANAGEMENT PLAN
Preliminary Wetland Delineation and Assessment of Basin A and Basin B
Westchester County Airport
22 September 2010

The two stormwater detention basins (Basin A and Basin B) at Westchester County Airport were created as mitigation wetlands. Relevant concerns about the potential impacts to the basins due to proposed improvements include not only their function as stormwater control facilities, but also as habitat for wetland-dependent plants and animals. This assessment considers the functions of the basins as natural wetlands and focuses on their value as habitat, as well as on water quality values.

Methods

In performing this assessment, I reviewed aerial photographs from online sources (Google Earth, Bing Maps), the federal (US Fish & Wildlife National Wetlands Inventory) and state (NYSDEC) wetland maps, and the latest topographic survey and basin improvement drawings provided by TRC Engineers, Inc. (TRC). I also inspected both basins and their environmental context at ground level on July 15, 2010. I observed evidence of wetland conditions (vegetation and visible signs of hydrology) on the ground in and around the basins, and drew the wetland boundaries on hard copies of the topographic surveys for the basins. In addition to my observations and field notes, I employed quantitative information (e.g. elevations, slopes) from the topographic surveys to determine the delineations. I used vegetation and hydrology for habitat assessment as well.

I used the following criteria to determine elevational constraints on physical conditions supporting wetlands: maximum and minimum elevations of the tops of berms; elevations of controlled drainage devices, including pipes and overflows; elevations of peripheral areas or structures of concern (service roads, receiving streams, channels, wetlands and other natural habitats), and; gradients within and near the basins. Other considerations included direction of water flow and potential pooling areas (depressions and flat ground).

The following assumptions inform these delineations: 1) flooding is short-term and does not influence wetland boundaries; 2) basin soils are reasonably permeable, and 3) basin berm walls are also reasonably permeable but not so porous as to “leak.” I am assuming greater accumulations of water in winter with intermittent melting of snow and ice, and occasional freezing of basin bottoms in conditions of saturation or shallow flooding.

Please note that the drawn wetland boundaries provided as part of this assessment provided are preliminary in nature. A more detailed delineation, based on field flagging and survey of the wetland limits, will be required for permitting purposes.

Hydrology

Both basins were at or near minimum water levels at the time of my field inspection. Basin A appeared to have no standing water, while Basin B had standing water in the deeper southeast center of the basin. I did not observe any water flowing into Basin B at the time of my inspection. Because of the low water levels, I relied primarily on vegetation to determine wetland boundaries.
Vegetation

Plants in both basins were mostly native, herbaceous species with a lesser number and cover of shrubs and small trees. This is consistent with the creation of the basins as mitigation wetlands and indicative of successful natural recovery and persistence after planting and seeding.

Vegetation at the time of inspection can be described as a mosaic of areas dominated by one or a few plant species, including cattails (*Typha* spp.), grasses, sedges and rushes (graminoid plants), and broad-leaf herbs including smartweeds (*Polygonum* spp.), bur-marigolds (*Bidens* spp.). Basin B had a deep are with deep-water emergent plants such as arrowheads (*Sagittaria* spp.), arrow arum (*Peltandra virginica*) and beggarticks (*Bidens* spp.). Transitions to upland vegetation on inner slopes were abrupt, generally within a foot of elevation on steeper inner basin slopes. Along moderate slopes transitions were not so abrupt, but transition zones appeared to be consistent in elevation around the inner circumference of each basin. Inner berm slopes were well vegetated (with upland herbaceous species) and showed no signs of erosion or subsidence. Upper slope breaks also appeared to be stable.

Comparisons between basins

Differences between the two basins include drainage control infrastructure, variations in the elevation of each berm, and slope of the bottom. Similarities include steepness of inner side slopes, proximity to airport roads and mowed areas, and proximity to areas of natural vegetation. Water levels in both basins vary greatly, with maximum levels during and following precipitation events, and minimal levels during drought. Constructed to contain and release water quickly and efficiently, both basins have similar contours, with steep inner walls and sufficient depth to prevent frequent overflows. Though wetland conditions near the basins are not confined to the basins themselves, I found no evidence that the basins contribute significant amounts of water to adjacent wetlands. There is a natural wetland immediately bordering the west berm of Wetland B, but the main source of water is clearly outside the basin. Overflow at the low west berm of Basin B is prevented by the sub-basin and pipes-and-valve system facilitating water release during extreme flooding events.

Potential impacts of construction

I observed nothing to suggest that the construction of the proposed basin improvements will affect the stormwater control function of the basins. The changes are more likely to improve stormwater retention and controlled release. Nor should the basin alterations affect drainage patterns and hydrologic conditions around the basins.

Disturbance of basin substrates and vegetation will likely have impacts on resident plants and animals – direct disturbance of bottom including removal of plants, disturbance of berms and soil falling into basin, damaging or burying existing plants. Some temporary disturbance effects could be longer-lasting than others. For example, disturbance or removal of the roots of plants could kill the plants, whereas cutting the tops would likely not kill plants. Regrowth of tops would follow cutting in the same growing season or the next.

Recommendations

There is reason for concern regarding the condition of the basins as natural wetlands. Construction will disturb basin interiors, with consequent loss of some existing vegetation. Though revegetation will proceed naturally even without replanting, exposed soils will be subject to competition between plants remaining in the basins and seeds from outside sources, including those of invasive plant species. No matter how temporary the disturbance, seeds of invasive plants will inevitably get in.
There are several possible ways to eliminate or at least reduce the incursion of invasive plants after basin reconstruction. If tops of plants can be cut, leaving the roots, this will facilitate quick recovery of the existing vegetation, more effectively locking out incoming plants, including non-native species, from outside sources. Alternatively, plants removed from basins to facilitate construction could be “stockpiled” and replanted in the basins as the final step in basin reconstruction. However, stockpiling would seem to require removal of plants from the stockpiling area, recreating the same “invitation” to invasive plants in a new location. Short-term stockpiling in temporary containment over mowed areas might be a viable solution to this dilemma.

An alternative solution would be to schedule planting and seeding by a native plants nursery immediately after basin reconstruction to minimize time-exposure of disturbed soils to volunteer seeds from random sources. Although some invasive plants would probably get started in the recovery areas, the native plantings might prove more competitive. As an added precaution a knowledgeable botanist or native plant gardener could be engaged to monitor and weed the invasives at intervals during the first growing season after reconstruction.

The widely fluctuating hydrology of the basins will eliminate some invasive species even if they become established. For example, Japanese knotweed or Asiatic bittersweet cannot tolerate frequent or long-term flooding. Some species considered undesirable in special native wetlands (e.g. bogs, fens, some marshes) such as common reed and purple loosestrife, should not ordinarily be considered problems in mitigation wetlands. Many native wildlife species use these non-native species for various purposes, including nesting sites, shelter and food. Japanese stilt grass could be aggressive enough to crowd out desired species, and should be monitored and removed by hand. This grass does not set seed until the late season, so seed-setting might be prevented by frequent mowing after midsummer where mowing is feasible. Common reed (*Phragmites*) need not be removed, but should be monitored for fast-growing runners creeping up berm walls.
TRC WCA surveys

Habitat Assessments for Species of Conservation Concern

Bog turtle (*Glyptemys muhlenbergii*)

Bog turtle requires freshwater wetland with stable hydrology and low, herbaceous vegetation (Klemens 1993, Morrow et al. 2001). Trees and shrubs are usually present where bog turtles occur, but copious sunlight is necessary for thermoregulation (New York State Department of Environmental Conservation, 2010). Female turtles nest in dry situations within their home wetlands rather than traveling to neighboring uplands as most turtles do. Nest sites are typically sedge tussocks with dead centers where the female can excavate a depression and deposit her eggs (U.S. Fish and Wildlife Service, 2010).

Although bog turtles occur in small wetland patches, large wetlands support bog turtle more effectively. When good habitat becomes unsuitable as trees and shrubs increase, turtles will move to suitable habitat within the same wetland. Beavers can be important in creating new bog turtle habitat by damming and flooding forested swamps, killing the trees. When the beavers abandon an area, the dam collapses, leaving a shallow, herbaceous wetland suitable for bog turtles (Tesauro and Kiviat 2009).

Urbanization has contributed to bog turtle decline and extirpation through habitat fragmentation, carving large wetlands into small, isolated fragments and forcing evacuation of turtles if the habitat becomes unsuitable (Bury 1979). Traffic accidents and the absence of nearby suitable habitat has led to extirpation of bog turtle where the species once occurred (Klemens, 2001). The stronghold of bog turtle in New York is the Harlem Valley (Columbia and Dutchess Counties) and to a lesser extent Western Orange and Sullivan Counties (Kiviat 1997). These areas are essentially rural, with large tracts of undeveloped land and relatively few high-traffic roads. In rural areas bog turtles are less threatened by human presence. Passive agriculture such as pasturing actually helps to maintain the open character of bog turtle habitat (Tesauro 2001, Herman 1999).

The vicinity of Westchester Airport is a patchwork of large and small roads, intensely developed areas, lightly developed areas, and undeveloped natural areas. The airport itself is surrounded by high-traffic roads, local roads, residential developments and relatively small patches of natural vegetation, mostly forested. The only wetlands on the airport property with vegetation resembling that of bog turtle habitat are the artificial wetlands of Basins A and B, which have sedges and cattails, two plants associated with bog turtles in New York. However, the hydrology of stormwater retention basins (deep flooding alternating with periods of no standing water) is unsuitable for bog turtle, which requires a stable regime of shallow but persistent patches of standing water or rivulets (numerous small channels within the wetland) (U.S. Fish and Wildlife Service, 2010). Typically the stable water regimes of bog turtle habitats are maintained by groundwater springs, for which I found no evidence at the airport. The hydrology of the stormwater basins – deeply filled after high precipitation and without standing water in dry periods – makes them necessarily unstable and therefore unsuitable for bog turtle (Brennan et al, 2001).

I am entirely confident that bog turtle does not and could not occur at Westchester Count Airport. The habitats most similar to suitable bog turtle habitat are small, isolated, and created in the building of the airport. Examination of aerial photos of the area surrounding the airport, with which I also have some experience on the ground, revealed no areas of potentially suitable habitat within reach of any neighboring bog turtle populations. In any case, vehicular traffic in the area would almost certainly prevent itinerant bog turtles from reaching the airport lands.
References cited


TRC WCA surveys

Habitat Assessments for Species of Conservation Concern

Indiana bat (*Myotis sodalis*) NYS Endangered, federally Endangered

The distribution of Indiana bat is restricted to geographic areas within less than 100 miles of hibernacula (overwintering sites, typically caves or mines). There are eight hibernacula currently known in New York, in Albany, Essex, Warren, Jefferson, Onondaga and Ulster Counties (NYSDEC 2008). The summer range of Indiana bat extends a considerable distance from the nearest hibernaculum.

In summer females disperse to breeding areas to raise their young, congregating in nursery colonies. The bats roost at night under the loose bark of dead trees, or living trees with sheltering ark such as shagbark hickories and large black locusts. Forest tracts along streams or lakes are preferred because of the foraging opportunities for insects over open waters.

Westchester airport is potentially within the summer range of the Indiana bat overwintering site near Kingston in Ulster County. Though the airport has no caves for hibernacula, the airport has forested areas, and potential foraging areas nearby at Rye Lake and Kensico Reservoir. However, tree species known to provide summer roosting habitat for Indiana bat are few. Shagbark hickory was rare in airport forests, and nearly all the trees I saw were too small to have developed large flakes of bark to provide shelter for bats. Black locust was common in some forests, but again the trees were relatively small without bark shelters. There may be more suitable forest habitat for summer roosting bats closer to Rye Lake and Kensico Reservoir. Based on my observations Indiana bat is unlikely to use the airport forests. In any case no significant disturbance to the airport’s forested areas is contemplated for the current project. Federal regulations for site development require only that potential roosting trees not be cut during the summer, when Indiana bats may be in residence.

References cited


TRC WCA surveys

Habitat Assessments for Species of Conservation Concern

Large twayblade (*Liparis liliifolia*) NYS: Endangered (S1), not federally listed

Large twayblade is a wild woodland orchid found from New Hampshire through southern Ontario, west to Minnesota, south to eastern Oklahoma and east to Georgia. It is listed as Endangered in Connecticut, New York and Rhode Island, and listed as Threatened in Connecticut and Vermont. New York Natural Heritage Program data show 7 extant and 19 historic occurrences in the state. The species is not federally listed, and is regarded as secure in the United States.

In New York Large Twayblade occurs in a variety of upland and wetland habitats, including red maple swamps, dry limestone woods, wooded talus slopes, sandy woods, rich mesic woods, mixed conifer-hardwood growth, old logging roads, pine plantations, thickets and floodplains (New York Natural Heritage Program 2009). This plant “appears to prefer a small window of succession after aggressive weeds have declined and before the canopy provides too much shade” (Mattrick 2004).

The Northeast range of large twayblade has shrunk in the last several decades as forests have matured, replacing successional habitats. About the middle of the last century, with the growth of suburbs and big highways came an increase in aggressive, early-successional invasive plants. If the wave of invasives is not overwhelming large twayblade may gain a foothold and become established, competing successfully against the weeds. However, as a successional forest matures, increasing shade seems to reduce and even eliminate large twayblade (Mattrick 2004). Deer browsing is another factor contributing to decline. Mattrick lists black swallowwort (*Cynanchum* sp.), barberries (*Berberis thunbergii, B. vulgaris*, winged spindle-bush (*Euonymus alatus*), and Asiatic bittersweet (*Celastrus orbiculatus*), as potential threats in New England, where several large populations have declined or disappeared in as little as ten years.

Habitat assessment for large twayblade

I base my assessment of habitats for large twayblade at Westchester County Airport mostly on NYNHP descriptions of habitats where the plant has been found in New York and New England. One description of a habitat in Delaware is similar to a forest at the airport, and seemed suggestive for southeastern New York in terms of climate and proximity to the Atlantic coast. This is the woods in the southwest corner of the airport bordering Purchase College. This is a mesic (moderately moist) forest with tuliptree, northern red oak, black oak, red maple, Norway maple and black birch. Although I found black locust, Norway maple, multiflora rose, winged spindle bush, barberry and garlic mustard at the edge of the mowed verge of the airport service road and runway, these invasives declined away from the maintained grounds.

Another rich forest surrounding a wetland bordering NYS Rt. 120 at the west periphery fence had tuliptree, sugar maple, red maple, bitternut hickory, pignut hickory, northern red oak, slippery elm and black birch with spicebush, maple-leaf viburnum, hazel and gray dogwood shrubs. Herbs included native zig-zag goldenrod, white wood aster and enchanter’s nightshade. Asiatic bittersweet and Garlic mustard were present but not abundant.

A red maple swamp west of the mowed margin of the service road had large red maple and black gum trees; spicebush and highbush blueberry shrubs; and skunk cabbage, jewelweed, halberd-leaved tearthumb, lady’s
thumb, boneset, manna grass, clearweed, and beggarticks in the herb layer. Invasive plant species were scarce here, too.

A comparison of plant species at Westchester County airport with the NYNHP list of plant species associated with large twayblade in New York (see Appendix A) shows that 40% of species on the list are present at the airport. In terms of associated species alone this suggests that large twayblade could occur at the airport. However, the habitats with the fewest invasive plants are also the most mature, shadiest forests. Forests with more light have dense shrubs or vines, including invasive ones such as multiflora rose, non-native bush honeysuckles and Asiatic bittersweet, a known threat to large twayblade. These dense shrubs cast more shade than the trees in most of these more disturbed forest patches. For example, an area just northeast of the red maple swamp had nearly 100% cover of Asiatic bittersweet under the sparse tree canopy of black locust. Thickets in the forest along the east perimeter fence added considerably to the shade of trees, cutting out over 90% of potential light to the ground.

The light regimes in these forest areas (probably 80-85% of the forested portion of the airport) do not appear to provide the opportunity for large twayblade to become established after non-native pioneering plants begin to decline and trees mature to shade over the ground. In fact, it is more likely that the opportunity never arose because the invasives have not declined to a significant degree. The two mature forests described above, with trees over 60 cm diameter at breast height (dbh) were already mature and well shaded at least 50-70 years ago. It is unlikely that large twayblade plants would still be surviving there, if any had become established in the past.

I saw no orchids at Westchester County Airport, not even the introduced “weedy” orchid broadleaf helleborine (*Epispastics helleborine*), not typically abundant but tolerant of many disturbed situations, even shaded waste ground in urban areas.

I very much doubt that large twayblade occurs at Westchester County airport considering the lack of viable habitat. If any twayblade plants are present it is unlikely that disturbance associated with planned modifications or construction would have significant impacts on these plants. The areas where large twayblade might occur are not close enough to construction areas to be affected. The habitats where twayblade might occur are mostly in the water quality buffer area, which is being carefully protected and managed to preserve and ensure water quality in the area surrounding the airport.

**References cited**


Appendix A

Plant species associated with large twayblade in New York (from NYNHP)
* species observed at Westchester County Airport. (16 out of 40 = 40%).

- Red Maple (*Acer rubrum*) *
- Speckled Alder (*Alnus incana*)
- American Groundnut (*Apios americana*)
- Lady Fern (*Athyrium filix-femina*)
- Yellow Birch (*Betula alleghaniensis*) *
- Beggarticks (*Bidens*) *
- False Nettle (*Boehmeria cylindrica*) *
- Cuckooflower (*Cardamine pratensis*)
- Bristly-stalk Sedge (*Carex leptalea*)
- Rosy Sedge (*Carex rosea*) *
- Devil's-bit (*Chamaelirium luteum*)
- Mountain Woodfern (*Dryopteris campyloptera*)
- Crested Shield-fern (*Dryopteris cristata*)
- Black Ash (*Fraxinus nigra*)
- Green Ash (*Fraxinus pennsylvanica*)
- Blunt-leaf Bedstraw (*Galium obtusum*)
- Canada Manna-grass (*Glyceria canadensis*)
- Inkberry (*Ilex glabra*)
- Spotted Jewelweed (*Impatiens capensis*) *
- Red Cedar (*Juniperus virginiana*)

- Rice Cutgrass (*Leersia oryzoides*)
- Spicebush (*Lindera benzoin*) *
- Bog Buckbean (*Menyanthes trifoliata*)
- Cinnamon Fern (*Osmunda cinnamomea*)
- Royal Fern (*Osmunda regalis*)
- Virginia Creeper (*Parthenocissus quinquefolia*) *
- Halberd-leaf Tearthumb (*Persicaria arifolia*) *
- Black Chokeberry (*Photinia melanocarpa*)
- Eastern White Pine (*Pinus strobus*) *
- Christmas Fern (*Polystichum acrostichoides*) *
- Swamp Azalea (*Rhododendron viscosum*)
- Dwarf Red Blackberry (*Rubus pubescens*)
- Hooded Skullcap (*Scutellaria galericulata*)
- Skunk Cabbage (*Symplocarpus foetidus*) *
- Early Meadow-rue (*Thalictrum dioicum*)
- Marsh Fern (*Thelypteris palustris*) *
- Eastern Poison Ivy (*Toxicodendron radicans*) *
- Poison Sumac (*Toxicodendron vernix*)
- Slippery Elm (*Ulmus rubra*) *
- Highbush Blueberry (*Vaccinium corymbosum*) *
TRC WCA surveys

Habitat Assessments for Species of Conservation Concern


New England cottontail has been described as “an early successional species.” A bewildering variety of habitats are described for this species, including shrublands, thickets, second-growth forests, mountain conifer forests, northern boreal forests, ridgetop barrens, and lowland swamps. It is historically known in New York and New England from both conifer and hardwood forests at a wide range of elevations and moisture conditions. New England cottontail has suffered a long decline in the Northeast, starting in the 1960s or 70s. This decline appears to be continuing as evidenced by intensive regional surveys. A recent inventory of cottontail rabbits in New England and eastern New York found New England cottontail to be found in isolated habitat patches naturally recovering from past disturbance, including old fields, forest edges and even brushy margins of highways (Litvaitis et al. 2006).

New England cottontail is listed as threatened or endangered in New Hampshire, Connecticut, Maine and New York, and is believed extirpated in Vermont. The reasons for the decline of this rabbit are unclear, though many factors have been proposed. Probable causes include habitat loss and fragmentation, excess predation, and competition from the more common eastern cottontail (*S. floridanus*). Most authorities agree that all these factors have contributed to the species’ decline.

Behavioral differences between the two sibling species have also been cited as giving the eastern cottontail a competitive advantage in areas where the two species come in contact. Such contact is probably more frequent in and near human communities, where eastern cottontail thrives. The disappearance of New England cottontail has followed in time and geography the spread of eastern cottontail, which was introduced as a game animal throughout the northeast in the mid-twentieth century (New York Natural Heritage Program. 2009). Eastern cottontail is said to be less timid and more aggressive than New England cottontail, and each species seems to have different ways of avoiding predation. New England cottontails are said to be reclusive and reluctant to venture into areas perceived to be threatening. This way of avoiding predators allows eastern cottontails, bolder, quicker and more alert, to take over more and more New England cottontail territory (Olmstead1970).

For many decades studies were hampered by the difficulty of visually distinguishing the two cottontail species in the field. The recent discovery that the two species can be distinguished by DNA analysis of fecal samples has made detection of New England cottontail much easier (Litvaitis and Litvaitis 1996).

The periphery of Westchester County Airport contains habitats that appear suitable for New England Cottontail. This has little ecological significance given the broad range of habitats described as suitable for this species. Some of the forested areas of the airport have dense thickets of shrubs and vines, and a greater proportion of such dense forest undergrowth than is typical for Westchester County. The literature on New England cottontail suggests that such habitats could support the species. In conversation airport [job title] Joe Fitzgerald, my guide in surveying the airport environment, reported coyotes are more commonly observed than deer. I attribute this to the presence of the perimeter fence, a barrier to deer, but perhaps not to coyotes, which are smaller and perhaps able to find their way under the fence. Deer tend to browse away undergrowth, leaving the forest floor with sparse vegetation providing little concealment for small animals. Much of Westchester County is in this condition, as I have observed first hand. The abundance of undergrowth at the airport may be due to the low number of deer there.
I would not rule out the possibility of New England Cottontail at Westchester Airport. Since the species is identifiable from genetic material in its fecal pellets the question of its occurrence could be settled by collecting and subjecting rabbit droppings to a DNA test.

If the species does occur at the airport, the impacts of modifications and expansion might be minimal or nonexistent. If brushy forested areas are avoided or only minimally disturbed there should be no significant impacts. If areas of potential habitat are to be disturbed it might be prudent to create new habitat equal to the area of habitat taken. Temporary disturbance of small areas of habitat would probably not cause significant impact to a resident New England cottontail population provided the disturbed areas were left to recover.

Also potentially beneficial to New England cottontail would be restoration or establishment of viable corridors between areas of suitable habitat in a context of isolated patches of habitat or isolated subpopulations (Tash and Litvaitis. 2007). If New England cottontail does occur at the airport it should be checked for in suitable habitats in the surrounding area. A cooperative effort to protect and improve Eastern Cottontail habitat in Westchester County might help to slow or halt species decline. Partners in such an effort might include Westchester County parks, New York City Department of Environmental Protection, Westchester County Airport and local landowners. It would be prudent to engage a biologist with proven expertise and experience with this species to advise on matters of development planning, construction and habitat restoration.

References cited


Abstract of Litvaitis et al. 2006

The abundance and distribution of New England cottontails (NEC; *Sylvilagus transitionalis*) have been declining for several decades. Remnant populations in some regions are known to be vulnerable to extirpation but little is known about the status of populations in most areas. We conducted a survey of the historic range (ca. 1960) of NEC to determine the current distribution and relative status of extant populations. Because NEC were sympatric with eastern cottontails (*S. floridanus*) and snowshoe hares (*Lepus americanus*) in much of their historic range, identity of resident lagomorphs was based on DNA extracted either from tissue of captured cottontails or from fecal pellets of free-ranging lagomorphs. We searched 2,301 patches of suitable habitat and detected NEC in 162. We identified 5 disjunct populations in approximately 14% of the historic range. Forest maturation and fragmentation are the most plausible explanations for the widespread decline of NEC. Contraction of the historic distribution was toward eastern and southern edges where a variety of anthropogenic disturbances (e.g., brushy edges of highways and railroad corridors and idle portions of agricultural fields) provided habitat. Land-ownership patterns (dominated by small acreages) and land-use activities (expanding development and limited forest management) within the currently occupied range of NEC suggest a continued decline of suitable habitats. As a result, we recommend efforts to enhance remaining populations of NEC that include responses at 2 spatial scales. At the population or landscape scale, current land uses should guide habitat manipulations that expand existing populations. At the regional scale, we recommend consideration should be given to increasing dispersal among remnant populations, possibly by generating "stepping stones" of suitable habitat. In addition to improving long-term viability of NEC, other species of conservation concern that are dependent on early successional habitats will benefit from these efforts.

Abstract of Tash and Litvaitis 2007

Since 1960 the range occupied by New England cottontails (NEC, *Sylvilagus transitionalis*) in the northeastern United States has declined dramatically. Populations in some regions are known to be vulnerable to extirpation, but little was known about the status of populations in most areas. A recently conducted (2000–2004) range-wide survey identified five disjunct populations within approximately 14% of the historic range of NEC. We incorporated the results of this survey into a geographic information system to examine habitat features associated with remnant populations of NEC at two spatial scales. The regional scale characterized habitats within our survey sample units, 7.5 min topographic quadrangles (quads, ~40 × 10 km) that were occupied by NEC or vacant. The landscape scale described habitats within a 1-km radius of occupied patches and an equivalent sample of vacant patches. At the regional scale, northeastern and southeastern populations were associated with human-dominated habitats with a greater abundance of developed and disturbed lands, less forest coverage, more edge habitats, and less snowfall than unoccupied quads. Landscapes occupied by NEC in these regions were characterized by a greater abundance of potential dispersal corridors than unoccupied landscapes. In contrast, quads occupied by NEC in the southwestern portion of the historic range were in rural areas that were dominated by forests and agricultural fields. At the landscape scale, southwestern populations were affiliated patches of habitat surrounded by more agricultural lands than patches that were not occupied by NEC. Logistic regression models were then developed to identify habitats suitable for restoration or translocation within each region. We suggest that initial restoration efforts be directed toward expanding existing populations of NEC. Next, habitat connections should be developed among these populations. Finally, new populations should then be established via translocation in portions of the historic range that are vacant. In addition to promoting New England cottontails, management of early-successional and shrub-dominated habitats in the northeastern United States will benefit other taxa of conservation concern that are dependent on these habitats.
Habitat Assessments for Species of Conservation Concern

**Sedge wren (Cistothorus platensis) NYS: Threatened, Federal: Migratory Nongame Bird of Management Concern**

Sedge wrens have suffered severe declines throughout the northeastern United States. The species is listed as endangered in Maine, New Hampshire, Massachusetts, and Connecticut, and threatened in Vermont, Pennsylvania, Maryland, Virginia, and New York (New Jersey Division of Fish and Wildlife 2003).

In New Jersey, sedge wrens have been found to breed in a variety of wetland habitats, including wet meadows, freshwater marshes, bogs, and brackish coastal marshes. In New York, sedge wrens seem to be more selective, avoiding cattail and common reed, and favoring lower vegetation with sedges, grasses, and rushes. Sedge wrens may abandon nesting sites that are too wet or too dry, or that become overgrown with shrubs or trees. Areas such as hayfields and abandoned wet pastures are acceptable to sedge wren for breeding and overwintering. But even if the habitat remains stable, these birds may use the fields sporadically rather than year after year (Cornell Lab of Ornithology 2010).

Previously listed as a species of special concern, the sedge wren is now considered a threatened species in New York State. Breeding records are mostly from the St. Lawrence Valley and the Lake Ontario Plain (NYSDEC 2009). The nearest breeding records are 2 “probables” from the Town of New Paltz, Ulster Co. and the Town of Northeast, Dutchess Co. according to New York Breeding Bird Atlas 2000-2005 data (McGowan 2008). The Atlas also reports from non breeding records from the Towns of Harrison and Rye.

Given the reported itinerant habits of sedge wren, the species might occasionally appear at Westchester airport. However, the wetlands at the airport do not appear to be suitable as breeding habitat for sedge wren. Either the vegetation is too tall or otherwise unsuitable (e.g. cattail, common reed, swamp thickets) or the hydrology is too unstable even though the vegetation may be suitable (Basins A and B).

If sedge wrens did venture to breed at the airport the only time during which the birds might be impacted is during construction (for example, the basin modifications). Almost certainly the construction activity would cause the birds to avoid these areas during site preparation and construction. My conclusion is that there would be no significant impacts on sedge wren even on the slight chance the species were present at construction time.

**References cited**


New York State Department of Environmental Conservation. 2009. Sedge Wren fact Sheet
www.dec.ny.gov/animals/59556.html
Scope
In accordance with 14 CFR Part 139.337(e), Westchester County Airport (HPN) recognizes the threat wildlife pose to aircraft operations and takes measures to minimize this threat. This Wildlife Hazard Management Plan presents recommendations for preventing or reducing wildlife hazards at HPN. The contents of this document are intended to complement the Wildlife Hazard Assessment completed in 2011 by the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) under a cooperative service agreement with Westchester County Airport. The Wildlife Hazard Assessment (WHA) fulfilled the requirements of subsections (a) and (b) of 14 CFR 139.337, whereas this Plan fulfills requirements listed under subsection (f) of the same regulation.

In accordance with its Airport Certification Manual and the requirements of 14 CFR Part 139.337, and in addition to the priorities and actions established in this Plan, HPN will take immediate action to alleviate wildlife hazards whenever they are detected.

Objectives
The purpose of this Plan is to present actions and priorities to reduce or eliminate wildlife hazards at HPN, to list key participants and individuals associated with the wildlife program at HPN, and to identify criteria by which the program will be operated and evaluated.

14 CFR Part 139.337(f)(1)
The individuals having authority and responsibility for implementing each aspect of the plan:
Airport Manager
Assistant Airport Manager
Airport Operations Manager
Airport Operations Duty Supervisors
Airport Operations Training Supervisor
Airport Operations Coordinator
Airport Maintenance Supervisors

Support Agencies:
Airport Environmental Department
Air Traffic Control Tower at HPN
U.S. Department of Agriculture, Wildlife Services (WS)
Federal Aviation Administration, Eastern Region Airports Division
Department of the Interior, U.S. Fish and Wildlife Service
NYS Department of Environmental Conservation
New York City Department of Environmental Protection
Westchester County Police Department
Westchester County Health Department
Westchester County Department of Public Works & Transportation
Westchester County Public Affairs Office
Westchester County Planning Department
14 CFR Part 139.337(f)(2)
Prioritized actions identified in the Wildlife Hazard Assessment and target dates for initiation and completion

The following actions are prioritized within each of the following sub-sections.

139.337(f)(2)(i)
Wildlife population management

Rabbit management
Eastern cottontail rabbits can be a strong attractant to foxes, coyotes, and raptors, which can all be a serious threat to aviation safety, especially for smaller aircraft. HPN will monitor rabbit population and work with USDA to manage the rabbit population. Population management and/or observations by HPN will be documented in the wildlife control log.

Initiation Date: Pre-existing
Completion Date: Ongoing

Reduce starling population
Large flocks of European starlings use Westchester County Airport to loaf and forage. Many of these starlings roost on Hangar E. USDA Wildlife Services will conduct an aggressive and persistent population reduction of starlings by using three primary tools: netting in hangars, shooting in hangars, and trapping on the airport. Wildlife Services has begun starling management efforts and is working with the primary tenants that have expressed starling issues in their hangars (Hangars E and 26). Routine and consistent application of these methods is anticipated to decrease the starling population over time. Historical survey data will indicate if the methods are having a desired effect. USDA will continue to provide technical assistance in the form of recommendations on exclusion and population control measures. For starling populations using HPN as a travel corridor USDA will investigate potential offsite locations. If roost sites are observed on DEP property USDA will coordinate with DEP personnel proper mitigation.

Initiation Date: July 2011
Completion Date: Ongoing

Monitor deer and coyote activity
USDA Wildlife Services will monitor woodlands, vegetated areas, and the perimeter fence at Westchester County Airport to observe and document deer and coyote presence. To effectively monitor these areas, USDA will use thermal imaging surveys, camera traps, and fence line inspections. Observations from airport personnel will also be included in the monitoring.

Initiation Date: Pre-existing
Completion Date: Ongoing
Manage deer and coyote activity
When deer or coyote activity is observed and documented, USDA will work with airport operations to remove the animals through shooting or trapping management. Trapping best management practices will be employed. Efforts will also be made to determine and correct points of ingress.

Initiation Date: Pre-existing
Completion Date: Ongoing

Canada goose and gull management: On Airport
HPN Operations will immediately disperse Canada Geese and gulls when they are observed within the AOA during their routine duties. Additionally, USDA will work with operations to remove and/or disperse any Canada Geese or gulls that are observed within the AOA.

Initiation Date: Pre-existing
Completion Date: Ongoing

Canada goose and gull management: Off Airport
USDA Wildlife Services routinely surveys the Westchester County Airport and properties within 7 miles of the airport to identify sites attracting large-bodied birds such as Canada geese, gulls, and possibly cormorants. The USDA airport wildlife biologist dedicated to the airport is responsible for identifying sites that attract large-bodied birds both to the airport and to sites within 7 miles of the airport. The USDA airport wildlife biologist will work in both New York and Connecticut, and he will form a working group of off-airport landowners and land managers to address management of these large-bodied birds and the risk the pose to aircraft using the airport. He will also work with the NYC Department of Environmental Protection to mitigate impacts of the Kensico Reservoir waterfowl management program on aircraft using HPN.

Initiation Date: Pre-existing
Completion Date: Ongoing

Swallow Management:
Swallows frequent the airport during the spring and summer months to nest and forage. HPN will add Cliff and Barn Swallow eggs, nests, and birds to their USFWS Federal Depredation Permit. HPN and USDA will actively destroy nests that are constructed in areas where they cannot be excluded. The sand and salt sheds have been identified as an area used for nesting. HPN will place doors on both sheds to exclude birds from nesting within the sheds during this season. Also where nests are observed HPN will manage muddy areas by establishing grass to decrease access to nesting materials.

Initiation Date: April 2013
Completion Date: Ongoing
Habitat modification

HPN will coordinate with the Westchester County Planning Department to determine the proper environmental review process is undertaken to accomplish habitat modification projects. These processes will be coordinated with the Airport District Office.

**Modifications to Existing Security Fence**

Westchester County Airport has approximately 27,500 linear feet of an outer perimeter security fence line that serves as the primary defense against wildlife entering the airfield. In the year 2010 the airport completed a Fence Line Project that involved the installation of approximately 4,250 feet of new fence fabric mesh. The new fence begins at the southwest corner of the airfield adjacent to Lincoln Avenue and the SUNY Purchase Property Line and continues north until ending at the Light General Aviation Area (aka Millionaire). This new fence line meets all applicable FAA Advisory Circulars and Certification Alerts and includes the following general specifications:

- Fence fabric material is manufactured from 9-gauge (.148”) metallic galvanized steel and coated with a black extruded Poly Vinyl Chloride (PVC).
- Fence fabric is constructed into a “One (1) inch mesh” and then is attached to galvanized steel line posts that are at least 1.7/8” in diameter. All line posts including ends, corners, and pull posts are set in concrete (min. 4,000 psi) footings at a minimum of 36” below grade and are at least 8’ above grade. Line Posts are evenly spaced at 8’ apart.
- Fence fabric is connected to the line posts by 9-gauge galvanized steel fabric tie wires. Fabric ties are evenly spaced on line post by at a maximum of 14” apart.
- Fence fabric is supported between each line post by both top and bottom tension wire manufactured from 9-gauge galvanized steel.
- All fence fabric ends have a continual stretcher flat rod weaved through the mesh; rod is bolted to line posts with stretcher bands. Bands are spaced on posts at a maximum of 14” apart.
- Fence fabric mesh is installed on the outside (landside) of the line posts and continues buried into the soil on an angle away from the airfield to at least 18” below grade. This particular design feature will prevent wildlife from digging under the fence.
- Top of fence line has a continual run of 3 strands of 9-gauge galvanized steel barbed wire that extends up and outward from the airfield. Barbed wire is supported on galvanized barb holders or stretcher bands.
- Perimeter fence line runs over the airports Outfall #1 stream course that conveys all storm water discharge from the Detention Basin B into the Blind Brook Tributary. In this area where powerful water flow occurs the airport installed a concrete pre-cast structure (Approx. 25’ x 10’ x 10’) with a heavy duty metallic 4’ mesh insert designed for stream course flow-through. Fence line posts are installed into this structure by way of core.
bores and hydraulic cement. Fence fabric is fastened in aforementioned manner and sits flush atop the pre-cast structure.

One of the airport’s top habitat management priorities is to continue in the design and installation of the remaining 23,250 linear feet of the outer perimeter security fence line. Westchester County Department of Public Works (WCDPW) will provide all survey data, utility and navigational aid locations, wetland delineation, stream courses, storm water run-off areas, property lines and complete comprehensive engineered design plans ready for construction. Significant considerations will be given to the following:

- Future fence line design will at a minimum provide the above specifications.
- Provide the optimum wildlife exclusion measures pertaining to fence lines.
- Maintain proper tree and vegetation buffer zones on either side of the fence line.
- Maintain vegetation beyond buffer zone that extents to the property boundary.
- Provide access roads on the inner perimeter of the fence so airport personnel can properly observe and inspect the fence line.

These considerations will be recognized in addition to involving the USDA during design with the WCDPW.

Because deer and coyotes are significant wildlife hazards at HPN, airport personnel will continue to inspect and repair fences to minimize access to the airfield and to identify points of wildlife ingress as soon as possible. HPN will continue to make ongoing fence line improvements and will monitor these repairs frequently since wildlife use these areas as a travel corridor. Airport maintenance and contracted fencing vendors will provide proper fence repair to any discrepancy observed on the fence line.

Initiation Date: Pre-existing
Completion Date: On-going

**Remove or Thin Brushy and Wooded Areas**
HPN contains large areas of trees and brush on airport property. These areas are a major attractant to various species of wildlife for food and shelter including white-tailed deer, coyotes, and rabbits. HPN will remove the brushy areas found on airport property.

These areas include brush along drainage ditches and brush found throughout wooded areas.

HPN will maintain a buffer zone free of brushy and woody vegetation on both sides of the security fences. This practice will help maintain the integrity of the fence by allowing easier access for inspection and maintenance and by discouraging the growth of woody vegetation into and through the fence.
To better manage the population of cottontail rabbits, HPN will remove brushy vegetation from the property along the western edge between runway 11 and NYS Route 120. Brush management is dependent upon completion of the State Environmental Quality Review process.

Initiation Date: Pre-existing  
Target Completion Date: Ongoing

**Remove excess vegetation in the “scar”**
Due to its attractiveness to several hazardous species, the vegetated area referred to as the “scar” is cut and maintained throughout the growing season to minimize brushy and woody growth. The size and condition of this area will be reduced and improved. Coyotes have been observed using this area of vegetation. Cattails and phragmites provide food and shelter for muskrats, beavers, and geese, along with providing nesting sites for red-winged blackbirds, bitterns, and marsh wrens.

Initiation Date: Pre-existing  
Target Completion Date: Ongoing

The scar and detention basins A and B are designated as federal wetlands. Approximately 90% of the airport’s storm water run-off and additional run-off from the State of Connecticut flows in and out of these basins. Due to their designation as federal wetlands and their normally wet conditions, the airport must strictly adhere to applicable Federal Laws set forth by the US Army Corps of Engineers (Section 404) for working in wetland areas. Brush and vegetation removal will be accomplished by utilizing specialized equipment during dry conditions. Westchester County Airport will coordinate with Westchester County Planning Department regarding the feasibility to mitigate the wetlands off site. Off-site mitigation may allow for more management options that will decrease potential wildlife attracts.

Initiation Date: Pre-existing  
Target Completion Date: Ongoing

**Modification of detention basins A and B**
Westchester County Airport has enlisted the consulting services of USDA Wildlife Services to modify detention basins A and B to better exclude wildlife from using these attractants. USDA will work with WCDPW to determine appropriate and realistic exclusion plans. To date, possible exclusion scenarios discussed include:

- Overhead wires strung across each pond on 20-foot support poles
- Netting draped over each basin on 20-foot support poles
- Ensure that the basin sides are steep with riprap
- Use string trimmers to remove vegetation at the edge of the ponds, unreachable by mower decks

Initiation Date: November 2012  
Completion Date: Ongoing
Grass management
Grass management is a critical wildlife hazard management tool for airports. HPN will maintain the mowing decks at a uniform height of 6-10 inches, mowing regularly to maintain dense grass cover and prevent seed production. Around edge lights and navigational aids, the grass height may be less. In areas away from taxiways and runways where grass is not regularly maintained, grass will be mowed as often as possible to discourage seed heads from developing. Small saplings between hard surfaces and wooded areas will be removed. Grass seed sewn on the AOA will comply with FAA specifications regarding appropriate seed mixture to deter wildlife.

Initiation Date: Pre-existing
Target Completion Date: Ongoing

Remove and modify perches
Birds use many structures on airports for perching. To reduce attractiveness for perching species, some structures should be treated or removed. HPN will remove all dead trees and any unnecessary man-made structures found to be highly attractive as perching sites. Flood lights and “telephone” poles are frequent perching sites. HPN will install anti-perching devices, such as “daddy long legs” to deter bird activity at sites that are suitable for perching. Hangar E was identified as an attractant during the WHA and during continued monitoring surveys, where large numbers of starling perch and stage before and after feeding on airfield grass. HPN will continue to work with the tenant of Hangar E to mitigate wildlife presence through habitat modification and direct management (see 139.337(f)(2)(i), reduce starling population).

Initiation Date: November 2012
Target Completion Date: Ongoing

Remove debris
HPN will remove all earth mounds and construction debris found on airport property, which serve as cover and nesting for rabbits, feral cats, and rodents.

Initiation Date: Pre-existing
Target Completion Date: Ongoing

Remove temporary standing water
HPN will continue to improve drainage areas adjacent to runways and taxiways to reduce attraction of ducks, gulls, and other birds. As an interim measure HPN will increase vigilance in wildlife patrols and dispersals whenever temporary standing water is present.

Initiation Date: Pre-existing
Target Completion Date: Ongoing

139.337(f)(2)(iii)
Land use changes
No land use changes were recommended in the WHA.
14 CFR Part 139.337(f)(3)
Requirements for and, where applicable, copies of local, state, and Federal wildlife control permits:

Federal, state, and local governments administer laws and regulations that protect wildlife and their habitats. A number of laws and regulations affect wildlife management, and HPN wildlife control personnel will adhere to all applicable laws. State and federal permits are needed to operate a successful control program and will be obtained on a routine basis by the Wildlife Coordinator or other designated official.

Federal Regulations
The U.S. Government has passed several statutes for the protection of wildlife including the Migratory Bird Treaty Act (MBTA), the Lacey Act, the Endangered Species Act, Bald and Golden Eagle Protection Act, the National Environmental Policy Act, and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). These are the basis of most wildlife regulations that have been issued in the Codes of Federal Regulations (CFR). There are three sections that specifically address wildlife management: 50 CFR 10 (General Provisions), 50 CFR 13 (General Permit Procedures), and 50 CFR 21 (Migratory Bird Permits)—all are included as Appendices of the Wildlife Hazard Assessment.

Several agencies are responsible for implementing these regulations and many of these regulations affect wildlife management at airports. Federal wildlife laws are administered by the U.S. Fish and Wildlife Service (USFWS) and primarily involve migratory birds protected under the MBTA and all species protected under the Endangered Species Act.

Federal Permits
HPN currently operates under Federal Fish and Wildlife Depredation Permit Number MB671603-0. This permit authorizes HPN to kill a limited number of Canada geese, ring-billed gulls, herring gulls, great black-backed gulls, mallards, black ducks, green-winged teal, mourning doves, American kestrels, and red-tailed hawks. Under the “emergency take” clause this permit authorizes HPN to take any non-endangered and non-threatened species of migratory birds (such as Great Blue Heron) when they are creating or about to create a hazard to aircraft. HPN will exercise this option when necessary.

To avoid a lapse in permit, HPN will maintain a current permit by submitting a written application at least 30 days prior to the expiration date of the permit (see 50 CFR § 13.22). If non-lethal harassment is not effective to reduce wildlife hazards, HPN will seek authorization for additional species or additional takes by requesting a Form 37 Migratory Bird Damage Project Report from WS. For 2013 HPN will attempt to add the eggs, nests and individuals of barn and cliff swallows to their permit.

State Regulations
New York State law follows the Federal regulations for migratory bird species and further regulates actions concerning mammals and non-migratory birds (Environmental Conservation Law of New York, article 11). The New York Department of Environmental Conservation (DEC) is responsible for issuing state depredation permits (permits that allow for the take of...
birds and mammals to protect property, agriculture, and human health and safety). The DEC publishes these regulations annually as the Environmental Conservation Law of New York, and they were included as an appendix of the Wildlife Hazard Assessment.

State Permits
HPN possesses an Airport Air Strike Hazard Permit, Permit Number 3-06-07, which is a standing permit to remove deer, foxes, coyotes, beavers, muskrats, and wild turkeys. Raccoons, opossums, and skunks may be taken at any time without a permit (Environmental Conservation Law of New York §11-0523). Woodchucks are considered unprotected wildlife and may also be taken at any time without a permit, pursuant to Environmental Conservation Law of New York §11-0523. HPN will request modification to species and Special Conditions on these permits as needed to accomplish other objectives in this Wildlife Hazard Management Plan. For 2013 HPN will attempt to add beaver and muskrat lodges to their permit.

14 CFR Part 139.337(f)(4)
Identification of resources that the certificate holder will provide to implement the plan:
Personnel:
Airport Operations Manager
Airport Operations Duty Supervisors
Trained Airport Operations personnel
Trained Westchester County Police Dept.
USDA Airport Wildlife Biologist

Equipment:
Bird Patrol Vehicles
All-terrain Vehicle
Radios for monitoring air traffic and for ground to tower/aircraft communication
Police-issued firearms for wildlife removal
Pyrotechnic launchers and cleaning supplies
Screaming and exploding pyrotechnics and starter caps
ATF compliant pyrotechnic storage boxes
Eye and hearing protection
Grass cutting vehicle
Brush cutting vehicle

Pavement brooms
Carcass collection bags
Wildlife carcass disposal container
Specimen collection materials (snarge kits)
Wildlife collection freezer
Bird identification book
Gloves
Binoculars
Spotlights
Thermal imaging device
Anti-perching devices
Secure equipment storage area

14 CFR Part 139.337(f)(5)
Procedures to be followed during air carrier operations
139.337(f)(5)(i)
Designation of personnel responsible for implementing the procedures:
Trained Airport Operations Duty Supervisors and Airport Operations personnel
(Seven days per week, 24 hours per day)
Trained Westchester County Police Department
(Seven days per week, 24 hours per day)
USDA Airport Wildlife Biologist
(Five days per week, 8 hours per day)

139.337(f)(5)(ii)
Provisions to conduct physical inspections of the aircraft movement areas and other areas critical to successfully manage known wildlife hazards before air carrier operations begin:

Airfield Inspections
Airport Operations personnel will monitor the entire AOA seven days per week for wildlife and attractants. A Security Coordinator is present 24 hours/day, 7 days/week, and a security inspection is made twice each shift. HPN will use a 4 x 4 all terrain vehicle (ATV) to perform a full interior perimeter fence line inspection at a minimum of once per week. Additionally, full interior perimeter fence line inspections will be completed after any high wind, heavy rain, snow/ice event or any weather phenomenon to ensure that new access points are identified and repaired quickly. Inspections will be documented in the airports Wildlife Observation and Control Log. Airport Operations personnel will conduct at least three full length inspections of each runway each day, including full-length inspections before any closed runway is reopened and after any wildlife strike is reported. All wildlife strikes will be reported using FAA form 5200 or the online wildlife strike reporting form. All wildlife observations will be logged in the airport’s Wildlife Observation and Control Log.

Procedures for monitoring the fence line and woodlots for coyote and deer activity near RT 120; From Gate #9 and running to the east approximately 1,000’ exists a stone hedge wall approximately 3’ high and 2’ wide. This stone hedge wall is located on the inside (airfield) of the fence line; when operating the ATV in this area the view is obstructed by the stone hedge and the full fence integrity cannot be easily observed. During weekly scheduled full interior perimeter fence line inspections in this area; airport personnel will conduct the proper visual inspection by walking on top of the stone hedge to observe and detect wildlife crawl-throughs under the bottom portion of the existing 8’- high fence line made of 2” mesh fence fabric.

139.337(f)(5)(iii)
Wildlife hazard control measures

Aggressive Bird Dispersal and Removal
In reference to CFR 139.337(a) – Airport Operations will take immediate actions in addressing any wildlife hazard as they arise. Specifically, if any wildlife is observed on or in the vicinity of an active runway, coordination of an immediate runway closure with HPN ATC will occur. In this type of event, Airport Operations personnel operating on the airfield will contact HPN ATC on the LOCAL TOWER FREQUENCY (118.575 MHz). Airport Operations may also contact ATC via the land line located on the Airport Operations Bridge and notify the ATC Supervisor or Controller in Charge (CIC) of the specific wildlife hazard details that deems the
runway unsafe for aircraft operations. Prior to the Airport Operations vehicle entering the Runway(s) for dispersal or removal, the HPN ATC Local Controller will verbally confirm that the Runway(s) is closed. Runway(s) shall remain closed until all wildlife has been dispersed or removed to the satisfaction of the Duty Airport Operations Supervisor. Airport Operations will coordinate all other wildlife dispersals or removals on the airfield on either the Ground Control Frequency (121.825MHz) or the land line.

Airport Operations personnel will take an aggressive approach in dispersing birds, particularly waterfowl, gulls, crows, and starlings. Operations personnel will conduct patrols several times each day during periods when starlings, gulls, and crows are likely to be present. The detention basins will be continually monitored throughout the year for wildlife because waterfowl are routinely observed using the basins and have been observed flying across the active runway to and from the basins. All birds using the basins will be harassed with pyrotechnics until they leave airport property. From wildlife survey data the USDA has recommended the airport adopt a zero-tolerance policy for waterfowl (specifically Canada geese) on the airport. During routine inspections or when observed anytime by airport operations personnel, a request for immediate assistance will be made and coordinated to remove the geese. The USDA wildlife biologist is expected to remove all waterfowl during daily surveys and inspections. All wildlife observations and control measures will be logged on the airport’s Wildlife Observation and Control Log.

The USDA Wildlife Biologist will conduct an aggressive and persistent population reduction of European Starlings as mentioned in section 139.337(f)(2)(i) to mitigate the number of these individuals on the airfield and associated hangars and structures.

**Large Mammal Removal**

All deer, coyotes, and foxes observed inside the security fence will be immediately removed by either the USDA wildlife biologist or any qualified member of the WCPD shooting team. Airport personnel will maintain a “zero tolerance” policy for deer and other large mammals on the airfield because of their severe threat to aviation safety. The Airport Operations Manager or Duty Supervisor will notify necessary personnel when a lethal removal effort is being conducted to maintain safe shooting conditions.

**Feral Cat Removal**

HPN will work with local animal control officials, via the Westchester County Police Department, to remove all feral cats from airport property. Measures will be taken to discourage people from feeding cats on airport property. Cats are a prey species for coyotes and may serve as an attractant for raptors and vultures.

**Carcass Disposal**

HPN will coordinate carcass disposal with a local incineration service. HPN personnel will deposit carcasses recovered from the airfield into a black plastic bag and place them in the Wildlife Container marked “WL,” outside the airport maintenance building. A written note of the collected remains and approximate weight (> 17 lbs or < 17 lbs) must be placed in the mailbox above the Wildlife Container. The contents of this container will be transferred to the incineration site as often as necessary.
Wildlife Strike Collection Freezer
Airport Operations will maintain a freezer chest in the ARFF garage to preserve wildlife remains in the event that the carcass cannot be immediately identified by Operations personnel and/or the USDA. Wildlife remains will be removed from freezer storage and be disposed of following the protocol of this plan once the proper identification has been confirmed by the appropriate source.

139.337(f)(5)(iv)
Ways to communicate effectively between personnel conducting wildlife control or observing wildlife hazards and the air traffic control tower:
All vehicles assigned to wildlife control have operational two-way radios for communication with the Air Traffic Control Tower. These vehicles have a rotating overhead beacon for visibility. All personnel assigned to these vehicles are trained in proper radio communication with the Air Traffic Control Tower and are familiar with aeronautical operations.

Airport Operations personnel will coordinate wildlife dispersal with the Air Traffic Control Tower as described in Section 139.337 (f)(5)(iii) paragraphs 2 and 3.

If personnel in the Air Traffic Control Tower observe hazardous wildlife, this information will be communicated immediately to Airport Operations.

14 CFR Part 139.337(f)(6)
Procedures to review and evaluate the wildlife hazard management plan every 12 consecutive months or following an event described in 14 CFR Part 139.337 (b)(1), (b)(2), and (b)(3)

One meeting per year will be held with representatives from the following departments:
Airport Assistant Manager
Airport Operations Manager
Airport Operations Duty Supervisors
Airport Operations Training Supervisor
Airport Operations Coordinator
Airport Operations Maintenance Supervisors

Support Agencies:
Airport Environmental Department
Air Traffic Control Tower at HPN
U.S. Department of Agriculture, Wildlife Services (WS)
Federal Aviation Administration, Eastern Region Airports Division
Department of the Interior, U.S. Fish and Wildlife Service
NYS Department of Environmental Conservation
New York City Department of Environmental Protection
Westchester County Police Department
Westchester County Health Department
Westchester County Department of Public Works & Transportation
Westchester County Public Affairs Office
Westchester County Planning Department
During this annual meeting HPN will review information based on the Wildlife Strike Log, Wildlife Observation and Control Log, and data from wildlife surveys. HPN will discuss the effectiveness of wildlife dispersal and control efforts, and will discuss the need for changes to permits or the need for any operational or technical assistance from WS.

Agenda Topics must include:

Previous improvements made: effectiveness and additional changes
Address and update each Part 139 subject area of the WHMP
Increase safety performance (e.g., new technology, training)
USDA services: focus resources and manpower in weak areas
Tree and Brush Removal for future wildlife habitat modifications in site-specific areas.

139.337(f)(6)(i)
The plan’s effectiveness in dealing with known wildlife hazards on and in the airport’s vicinity

The effectiveness of the Airport’s Wildlife Hazard Management Program will be evaluated at least annually during an annual meeting with responsible parties and supporting agencies. The following measures will support the effectiveness of the Airport’s Wildlife Hazard Management Program.

Designate a Wildlife Coordinator
HPN has appointed the Airport Operations Manager as the Wildlife Coordinator. The Wildlife Coordinator will monitor all wildlife-related activities, to see that recommendations from the WHA are implemented, and to ensure that the appropriate wildlife control permits and supplies are maintained. The Wildlife Coordinator will keep a database of wildlife strike information, and will be responsible for ensuring that HPN personnel, and airline pilots and ground crews are familiar with the proper procedures for collecting and reporting wildlife strike information (either on the web or using the FAA Form 5200-7). The Coordinator will also oversee wildlife management activities conducted by Airport Operations personnel and the Westchester County Police Department, and will communicate wildlife management trends, progress, and issues to the Airport Manager.

The Wildlife Coordinator, with the assistance of the WS Airport Biologist if necessary, will actively participate in wildlife management project and construction and land-use projects or changes, on or off airport property, which could increase wildlife hazards at HPN. For example, wildlife dispersal activities at Rye Lake or nearby golf courses can be coordinated with the airport to minimize any hazards they may create. Also, new buildings can be designed in a manner that discourages wildlife use, and mitigation projects to restore habitat potentially attractive to hazardous species can be sited as far as possible from the airfield’s critical zone.

Diligently Document Wildlife Strikes and Wildlife Management Actions
HPN will record all wildlife strikes in a computerized Wildlife Strike Log that will allow them or other individuals the ability to analyze data quickly and conveniently. Direct strikes reported by pilots, wildlife remains on planes, and carcasses found will all be considered strikes and recorded in the database. Carcasses or parts of carcasses found within 250 feet of a runway centerline will
be considered as strikes to maintain compliance with AC5200-32A (unless another cause of
death is determined). The Wildlife Coordinator will ensure that FAA Strike Report Form 5200-7
is completed and filed for each of these types of strikes. HPN will record all wildlife
observations and control actions in a computerized Wildlife Control and Observation Log.
Information from this log will be used to notify either the USDA Airport Wildlife Biologist,
trained Operations personnel, or the Westchester County Police Department of the need for lethal
wildlife removal.

**Conduct Wildlife Surveys**
Wildlife Services will conduct surveys for wildlife activity using the WHA data as a baseline.
Surveys will be conducted during two days each month. The survey route and method required
about 1.5 hours to complete. WS will also conduct spotlight surveys once per month to monitor
large mammal activity. WS will also conduct monthly surveys of Hangar E roof to monitor bird
use and potential attractants. The intent of the WHA was to document general presence and
behavior of wildlife at HPN. Data from this study and from continued monitoring surveys will
provide information on trends in wildlife activity at HPN.

**Better Bird Identification**
Of paramount importance to furthering our knowledge and understanding of bird strikes is
correct species identification. Whenever possible (carcass reporting, strike reporting, dispersal,
etc.) it is important to determine and report the correct species of bird. HPN Operations
personnel will continue to undergo Airport Wildlife Hazard Management and Bird Identification
training provided by WS or other qualified training provider. If a collected specimen is
unidentifiable, HPN will send appropriate parts to the Smithsonian Institution Feather Lab for
proper identification.

**Wildlife Dispersal Equipment**
All vehicles assigned to wildlife control will have access to a pyrotechnic launcher, a supply of
pyrotechnics and eye and hearing protection. In addition to hazing equipment, carcass collection
bags, snarge kits (snarge is the remains of wildlife on an aircraft after a strike), data sheets, bird
identification books, gloves, and binoculars will be available to operations personnel and
vehicles.

**Wildlife Hazard Management Working Group**
Off airport properties can contain wildlife hazards or wildlife attractants that present hazards for
aircraft departing or landing at HPN. HPN and USDA will begin to address offsite hazards by
forming a working group comprised of HPN managers and land owners or land managers from
properties at least within 5 miles of the airport that have been identified as presenting a hazard or
a potential hazard to aircraft using HPN. The purpose of the Working Group is for the airport,
land owners, and land managers to work together to mitigate or remove these hazards and
potential hazards. The current focus is on local population reduction of Canada Geese. This work
may involve properties in Connecticut as well as New York.

A new Wildlife Hazard Assessment was completed in September 2011 by USDA, APHIS,
Wildlife Services.
HPN will address each recommendation in the Wildlife Hazard Assessment and 139.337(f)(2) of the Wildlife Hazard Management Plan, making a documented effort to implement as many as possible.

HPN personnel will meet their designated responsibilities of Part 139.337(f)(5) per the discretion of the Airport Manager.

139.337(f)(6)(ii)
**Aspects of the wildlife hazard assessment that should be reevaluated:**
The effectiveness of the measures implemented to reduce or eliminate the wildlife hazards listed in 139.337(f)(2) will be evaluated during annual meetings to review the Wildlife Hazard Management Plan.

HPN and WS will identify changes in the presence of any bird guild or mammal species based on standardized surveys conducted by WS as compared to the Wildlife Hazard Assessment, as well as trends identified when reviewing the Airport’s Wildlife Strike Log and Wildlife Observation and Control Log. The Wildlife Hazard Assessment will include specific recommendations that will be implemented to address the measures and actions detailed in 139.337(f)(2). HPN will modify the Wildlife Hazard Management Plan in order to continually reduce wildlife hazards. HPN will contact WS if assistance is needed to evaluate changes in wildlife activity or habitats, or to update the Wildlife Hazard Management Plan.

14 CFR Part 139.337(f)(7)
**A training program conducted by a qualified wildlife damage management biologist to provide airport personnel with the knowledge and skills needed to successfully carry out the wildlife hazard management plan required by paragraph (d) of this section**
Every 12 consecutive months, HPN Airport Operations personnel will attend the WS Airport Wildlife Hazard Management and Bird Identification class, or other qualified training, as required by the FAA and the New York State Department of Environmental Conservation. HPN will invite personnel from the Westchester County Police Department and HPN Air Traffic Control to attend this training. This training will help HPN personnel and support agencies develop and retain familiarity with bird identification and wildlife control methods.

Updated November 2012.
APPENDIX D

EXCERPTS FROM WESTCHESTER COUNTY AIRPORT WETLAND DELINEATION REPORT, PREPARED BY VANASSE HANGEN BRUSTLIN (VHB) ENGINEERING, SURVEYING AND LANDSCAPE ARCHITECTURE, P.C. JANUARY 31, 2014
Transportation
Land Development
Environmental Services

Vanasse Hangen Brustlin, Inc.

To: U.S. Army Corps of Engineers
Date: January 31, 2014

Project No.: 28859.00

From: Vanasse Hangen Brustlin, Inc.
Re: Westchester County Airport Wetland Delineation Report

This report describes the wetland resources located within the boundaries of the Westchester County Airport (HPN) in White Plains, New York. The 694-acre subject property was field-inspected on December 12, 13, and 14, 2012, and April 28, 29, and 30, 2013, for the presence of regulated wetland resources in accordance with the wetland delineation procedures provided in the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands.¹

This report includes a general description of the wetland resource areas found on the subject property and contains supplemental wetland data forms for each resource area.

Existing Conditions

The Westchester County Airport (HPN) is located east of Interstate 684, north of Lincoln Avenue, and west of King Street (Route 120A) in White Plains, New York (Figure 1). The State University of New York-Purchase is located to the south and residential and commercial properties are located to the east, west and north of the HPN.

Interior portions of the HPN consist of mowed grasses and various herbaceous species, drainage features, roadways, taxiways, and runways. Runway 16/34 has a north/south orientation and Runway 11/29 has an east/west orientation. The eastern and southwestern perimeters of the property consist of airport buildings, hangers and parking areas. The remainder of the property perimeter is comprised of wetland and upland habitats consisting of various native and non-native tree, shrub, woody vine, and herbaceous species assemblages.

The topography of the subject property is flat to moderately-sloped, with elevations ranging from 315 to 440 feet (National Geodetic Vertical Datum [NGVD]). The site is underlain with a combination of Charlton loam, Charlton-Chatfield complex, Fluvaquents-Udifluvents complex, Leicester loam, Paxton fine sandy loam, Ridgebury loam, Sun loam, Udorthents-smoothed, Udorthents-wet substratum and Woodbridge loam soils.²

Methodology

Wetlands were delineated in accordance with the procedures outlined in the 1989 *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*. Based on site characteristics, the Plant Community Assessment Procedure under the Routine Onsite Determination method was used for the site’s delineation. This procedure “requires initial identification of representative plant community types in the subject area and then characterization of vegetation, soils, and hydrology for each type.” Wetland boundaries were then delineated based on representative plant communities and the presence of the three requisite wetland criteria: hydrophytic vegetation, hydric soil, and wetland hydrology. Infield areas that consist of mowed grasses and herbaceous species were treated as disturbed areas and were evaluated based on soils and hydrology in accordance with the “Disturbed Areas” procedure.

Stream channels that were present outside of wetland resource areas were delineated separately. The centerlines of intermittent stream channels were delineated while the Ordinary High Water lines of perennial streams were delineated. In circumstances where more than one resource area existed, only the outer resource boundary was delineated. If a stream channel flowed through a wetland, only the wetland boundary was flagged until such time when the stream channel flowed out of the wetland resource area.

Wetlands were identified in the field by numbered, pink survey tape or pin flags. Each wetland was delineated with a unique identification code that consisted of a double letter and single numerical prefix and a sequential three digit flag identifier (ex. WF1-100 through WF1-119). Flags were located with a sub-meter accuracy Trimble® GeoXT GeoExplorer 3000 series GPS device. The 1995/1996 wetland delineation performed by Westchester County Department of Public Works was utilized to depict the disturbed wetland area associated with VHB-delineated Wetland WF4.

The majority of the wetlands located on the HPN property were accessed from either inside or outside the newly upgraded fence line. The exception to this was Wetland WF64 that was inaccessible by foot due to its location between the old and new fence lines. Instead, this wetland was delineated based on a visual analysis of aerial imagery that was supplemented by the field investigation.

Wetlands

The field inspections conducted in December 2012 and April 2013 revealed a variety of wetland communities throughout the Airport property (Figure 2). Wetlands were classified and described according to *Classification of Wetlands and Deepwater Habitats of the United States* and a complete list is included as Attachment B – Table 1. Wetland communities identified included forested, scrub-shrub, emergent, and perennial and intermittent streams.

Approximately 20 palustrine forested wetland communities were located along the northern, western, and southern site perimeters. Forested wetlands were primarily dominated by a red maple (*Acer rubrum*) canopy with a small portion of those communities being co-dominated with one of the following species: yellow birch (*Betula alleghaniensis*), Eastern cottonwood

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(Populus deltoides), or honey-locust (Gleditsia triacanthos). The shrub layer was predominately comprised of silky dogwood (Cornus amomum), Northern spicebush (Lindera benzoin), high-bush blueberry (Vaccinium corymbosum) and multiflora rose (Rosa multiflora). The herbaceous layer was predominately comprised of cinnamon fern (Osmunda cinnamomea), lamp rush (Juncus effusus), sedges (Carex sp.) and sensitive fern (Onoclea sensibilis). Forested wetlands were most often found to comprise larger wetland complexes with a combination of scrub-shrub or emergent wetland communities.

Palustrine scrub-shrub wetlands were most often associated with at least one other wetland community. Approximately 10 scrub-shrub wetland communities were located throughout the Airport property. The shrub layer was predominately comprised of willow (Salix sp.), poplar (Populus sp.), speckled alder (Alnus incana), high-bush blueberry, multiflora rose, spicebush and silky dogwood. The herbaceous stratum was most often dominated by sensitive fern, lamp rush, purple loosestrife (Lythrum salicaria) and goldenrod (Solidago spp.).

Approximately 50 palustrine emergent wetland communities were identified throughout the Airport property. The majority of the palustrine emergent wetlands were isolated wetlands within the mowed grass areas of the infield. Herbaceous species included lamp rush, white clover (Trifolium pratense), fescue (Festuca sp.), English plantain (Plantago lanceolata), and dandelion (Taraxacum officinale). These wetlands were characterized as disturbed, due to mowing practices, and were delineated based on the presence of hydric soil and hydrologic indicators. Undisturbed emergent marshes, found outside of the infield areas, were primarily comprised of cinnamon fern, goldenrods, sedges, sensitive fern, purple loosestrife, common reed (Phragmites australis) and poison ivy (Toxicodendron radicans). These wetlands were most commonly found to be associated with at least one other wetland community type.

According to the United States Geological Survey (USGS) topographic map for the Airport (Glenville quadrangle), Blind Brook, a perennial stream, flows from beneath the southwestern portion of the Airport in a southerly direction and flows beneath Lincoln Avenue, off property. Two unnamed perennial streams are located on the western side of the Airport property. One is associated with wetlands WF14 and WF64 and the second is associated with wetlands WF55 and WF8. An intermittent stream channel connecting wetlands WF1, WF2, and WF3 was also observed.

Multiple drainage features were located within the study area, including detention basins and drainage swales. Two large detention basins were located along the property’s south-central perimeter (WF45 & WF46); that are interconnected with various drainage features on the Airport property. A smaller water quality system, comprised of a detention basin and drainage swale connected to a natural wetland complex, is located along the property’s southwestern perimeter (WF47). Wetlands WF19 and WF20 are two larger drainage swales that border either side of an airport perimeter road.

**Summary**

Field-inspections conducted in December 2012 and April 2013 of the 694-acre HPN site revealed more than 65 wetlands throughout the property. Wetlands were delineated in accordance with procedures provided in the 1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands and wetland communities included palustrine forested, scrub-shrub, and emergent...
wetlands and perennial and intermittent streams. Supplemental wetland data forms for each resource area are provided as Attachment D to this report.
Attachment A
Figures

- Figure 1 - USGS Topographic Map
- Figure 2 - Aerial Map
- Figure 3 - Wetland Map
- Figure 4 - Soil Map
- Figure 5 - Stream Map
Figure 1
January 2014
Airport Boundary

Source: USGS 2001, VHB 2013

USGS Topographic Map
Wetland Delineation Report
Westchester County Airport
White Plains, New York
Aerial Map

Vanasse Hangen Brustlin, Inc.

Source: BING 2009, VHB 2013

Figure 2
January 2014
Airport Boundary
Wetland
Disturbed Wetland
Stream

*The 1995/1996 wetland delineation performed by Westchester County Department of Public Works was utilized to depict the disturbed wetland area associated with VHB-delineated Wetland WF4.
Figure 3
January 2014

Airport Boundary
National Wetland Inventory
- Wetland
New York State
- Stream

Source: NYSDEC 2004, USFWS 2010 & VHB 2013

Wetland Map
Wetland Delineation Report
Westchester County Airport
White Plains, New York
Legend

CHB - Canton and Charlton very stony fine sandy loams
CIC - Canton fine sandy loam
FT - Fluvaquents - Udifluents complex, frequently flooded
LA - Leicester loam
LCB - Leicester loam
PB - Paxton fine sandy loam
PC - Paxton fine sandy loam
PBV - Paxton fine sandy loam, very stony
RA - Ridgebury loam
RDB - Ridgebury loam
RG - Ridgebury loam, very stony
RH - Riverhead loam
Sh - Sun loam
Ub - Udorthents, smoothed
UC - Udorthents, wet substratum
UF - Urban Land
WD - Woodbridge loam

Source: NRCS 2013, VHB 2013

Soil Map
Wetland Delineation Report
Westchester County Airport
White Plains, New York

Figure 4
January 2014
Airport Boundary

Vanasse Hangen Brustlin, Inc.
Attachment B

Wetland Resource Areas

- Table 1 – Wetlands and Waters Table
- Table 2 – Stream Classification Table
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<td>WF58</td>
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</table>
### STREAM CLASSIFICATION TABLE

Westchester County Airport  
City of White Plains, Westchester County, New York

<table>
<thead>
<tr>
<th>Stream ID</th>
<th>Drainage Area Size (mi²)*</th>
<th>Avg. Annual Precipitation (in)**</th>
<th>Class of Aquatic Resource</th>
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<tbody>
<tr>
<td>A</td>
<td>0.1</td>
<td>52.549</td>
<td>RPW</td>
</tr>
<tr>
<td>B</td>
<td>0.0723</td>
<td>52.549</td>
<td>RPW</td>
</tr>
<tr>
<td>C</td>
<td>0.0456</td>
<td>52.549</td>
<td>RPW</td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>52.549</td>
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<td>E</td>
<td>Not Calculated</td>
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<td>Seasonal RPW</td>
</tr>
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<td>F</td>
<td>0.12</td>
<td>52.549</td>
<td>RPW</td>
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**Source: 10 year average of NOAA precipitation data. http://www.weather.gov/
Attachment C
Site Photographs
<table>
<thead>
<tr>
<th>Photo #1</th>
<th>Location: Vicinity of Wetland 43, facing North</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Drainage swale/wetland typical of maintained airport infield areas. Many of the wetlands delineated within the airport infields were drainage features with associated catch basins.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo #2</th>
<th>Location: Wetland 45, facing South</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Wetland 45 is typical of the wetlands that provide stormwater detention along the western side of the site. Note the security fencing in the background of the picture. Security fencing surrounds the entire airport property.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo #3</th>
<th>Location: Wetland 53, at the northern extent of the site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Vegetation and structure of Wetland 53 is typical of the palustrine forested wetlands located throughout the site.</td>
<td></td>
</tr>
<tr>
<td>Photo #4</td>
<td>Location: Wetland 28, facing South</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>One of several N.Y.S. discharge points located on the property. Several were observed in the southwestern portion of the site, and one associated with Wetland 53 at the northern extent of the site.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo #5</th>
<th>Location: Wetland 47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Wetland 47 is located in the western portion of the airport property. The series of wetlands located in this area appear to receive stormwater runoff from adjacent roadways and parking areas.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Photo #6</th>
<th>Location: Wetland 51</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Wetland 51 is located in the southeastern corner of the airport property, outside of the fenced secure airport perimeter. The area was historically used for horse training and is visibly disturbed due to past use.</td>
<td></td>
</tr>
</tbody>
</table>
Attachment D
Wetland Delineation Forms
# DATA FORM
**ROUTINE ONSITE DETERMINATION METHOD**

Field Investigator(s): VHB (AB, MF)  
Date: 12/12/12  
Project/Site: Westchester County Airport (WCA)  
State: NY  
County: Westchester  
Applicant/Owner: WCA  
Plant Community #/Name: WES Wat  

**Note:** If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?  
Yes [ ] No [X] (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?  
Yes [X] No [ ] (If yes, explain on back)

## VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
</tr>
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<td>2.</td>
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<td>12.</td>
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<tr>
<td>3.</td>
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<td>13.</td>
<td></td>
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<tr>
<td>5.</td>
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<tr>
<td>6.</td>
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<td>16.</td>
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<td>7.</td>
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<td>17.</td>
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<tr>
<td>8.</td>
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<td>18.</td>
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<td>9.</td>
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<td>19.</td>
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<tr>
<td>10.</td>
<td></td>
<td></td>
<td>20.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominant species that are OBL, FACW, and/or FAC:  

Is the hydrophytic vegetation criterion met?  
Yes [X] No [ ]  
Rationale: ________________________________

## SOILS

Series/phase:  
Subgroup:  

Is the soil on the hydric soils list?  
Yes [X] No [ ] Undetermined  

Is the soil a Histosol?  
Yes [X] No [ ]  
Histic epipedon present?  
Yes [X] No [ ]

Is the soil: Mottled?  
Yes [X] No [ ]  
Gleyed?  
Yes [X] No [ ]

Matrix Color:  
Mottle Colors:  

Other hydric soil indicators:  

Is the hydric soil criterion met?  
Yes [X] No [ ]  
Rationale: ________________________________

## HYDROLOGY

Is the ground surface inundated?  
Yes [X] No [ ]  
Surface water depth: ________________________________

Is the soil saturated?  
Yes [X] No [ ]

Depth to free-standing water in pit/soil probe hole: ________________________________

List other field evidence of surface inundation or soil saturation: ________________________________

Is the wetland hydrology criterion met?  
Yes [X] No [ ]  
Rationale: ________________________________

## JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland?  
Yes [X] No [ ]  
Rationale for jurisdictional decision: ________________________________

---

1 This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

2 Classification according to "Soil Taxonomy."
DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): VHB (AB, MF) Date: 12/13/12
Project/Site: Westchester County Airport (WCA) State: NY
Applicant/Owner: WCA County: Westchester
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes X No (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No (If yes, explain on back)

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trifolium pratense</td>
<td>FACU Herb</td>
<td></td>
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<td></td>
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<tr>
<td>Plantago lanceolata</td>
<td>FACU Herb</td>
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<td></td>
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</tbody>
</table>

Percent of dominant species that are OBL, FACW, and/or FAC 0

Is the hydrophytic vegetation criterion met? Yes X No
Rationale: Hydrophytic vegetation is not dominant throughout the plot.

SOILS

Series/phase: Urban land Subgroup: 2

Is the soil on the hydric soils list? Yes No X Undetermined
Is the soil a Histosol? Yes No X Histosic epipedon present? Yes No X
Is the soil: Mottled? Yes X No Gleyed? Yes X No X
Matrix Color: See below Mottle Colors: See below

Other hydric soil indicators:
Is the hydric soil criterion met? Yes X No
Rationale: A:0-8" 10YR 4/3-100% Stony coarse sandy loam. Refusal at 8". Upland consists of a fill slope leading up to exterior runway road.

HYDROLOGY

Is the ground surface inundated? Yes No X Surface water depth:
Is the soil saturated? Yes No X Depth to free-standing water in pit/soil probe hole: None observed.

List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No
Rationale: Wetland hydrology criteria is not met.

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No
Rationale for jurisdictional decision: The criteria for hydrophytic vegetation, hydric soils, and wetland hydrology are not met.

1 This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
2 Classification according to "Soil Taxonomy."
DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Field Investigator(s): VHB (AB, MF) Date: 12/13/12
Project/Site: Westchester County Airport (WCA) State: NY
Applicant/Owner: WCA County: Westchester
Plant Community #/Name: WP17-101 Wet

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes X No (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes No X (If yes, explain on back)

--- VEGETATION ---

<table>
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<tr>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juncus effusus</td>
<td>OBL</td>
<td>Herb</td>
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<td></td>
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<tr>
<td>Trifolium pratense</td>
<td>FACU</td>
<td>Herb</td>
<td>11.</td>
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</tr>
<tr>
<td>12.</td>
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</tbody>
</table>

Percent of dominant species that are OBL, FACW, and/or FAC: 50

Is the hydrophytic vegetation criterion met? Yes X No
Rationale: Hydrophytic vegetation is dominant throughout the plot.

--- SOILS ---

Series/phase: Urban land Subgroup: 2
Is the soil on the hydric soils list? Yes No X Undetermined
Is the soil a Histosol? Yes No X Histic epipedon present? Yes No X
Is the soil: Mottled? Yes X No Gleyed? Yes No X
Matrix Color: See below Mottle Colors: See below

Other hydric soil indicators:
Is the hydric soil criterion met? Yes X No
Rationale: A:0-4" 10%R 4/2-100% Mucky silty loam. B1:4-8" 2.5Y 4/2-65%, 7.5Y 4/6-35%
Fine sandy loam. B2:8-16" 2.5Y 4/1-80%, 7.5Y 4/6-20% fine sandy loam.

--- HYDROLOGY ---

Is the ground surface inundated? Yes X No
Surface water depth: 2-5"
Is the soil saturated? Yes X No
Depth to free-standing water in pit/soil probe hole: At surface, 0"
List other field evidence of surface inundation or soil saturation.
Water-stained leaves, wetland drainage patterns, and water marks.

Is the wetland hydrology criterion met? Yes X No
Rationale: Multiple field indicators were present.

--- JURISDICTIONAL DETERMINATION AND RATIONALE ---

Is the plant community a wetland? Yes X No
Rationale for jurisdictional decision: The criteria for hydrophytic vegetation, hydric soils, and wetland hydrology are met.

1 This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.
2 Classification according to "Soil Taxonomy."
**DATA FORM**

**ROUTINE ONSITE DETERMINATION METHOD**

Field Investigator(s): VHB (AB, MF)  
Project/Site: Westchester County Airport (WCA)  
State: NY  
County: Westchester  
Applicant/Owner: WCA  
Plant Community #/Name: WE28  

*Note: If a more detailed site description is necessary, use the back of data form or a field notebook.*

---

Do normal environmental conditions exist at the plant community?  
Yes [x] No [ ] (If no, explain on back)  
Has the vegetation, soils, and/or hydrology been significantly disturbed?  
Yes [ ] No [x] (If yes, explain on back)

---

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
<th>Dominant Plant Species</th>
<th>Indicator Status</th>
<th>Stratum</th>
</tr>
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Percent of dominant species that are OBL, FACW, and/or FAC:  
Is the hydrophytic vegetation criterion met? Yes [ ] No [ ]  
Rationale: ____________________________________________________________________________

---

### SOILS

Series/phase: Fluvaquents-Udifuluents complex  
Subgroup: 2 frequently flooded

Is the soil on the hydric soils list? Yes [ ] No [x] Undetermined [ ]

Is the soil a Histosol? Yes [x] No [ ]  
Histic epipedon present? Yes [ ] No [ ]

Is the soil: Mottled? Yes [x] No [ ]  
Gleyed? Yes [ ] No [ ]

Matrix Color: ________________________________________________________________________  
Mottle Colors: ________________________________________________________________________

Other hydric soil indicators: ________________________________________________________________________

Is the hydric soil criterion met? Yes [ ] No [x]  
Rationale: ____________________________________________________________________________

---

### HYDROLOGY

Is the ground surface inundated? Yes [ ] No [x]  
Surface water depth: ________________________________________________________________________

Is the soil saturated? Yes [x] No [ ]

Depth to free-standing water in pit/soil probe hole: ________________________________________________________________________

List other field evidence of surface inundation or soil saturation. ________________________________________________________________________

Is the wetland hydrology criterion met? Yes [ ] No [x]  
Rationale: ____________________________________________________________________________

---

### JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes [ ] No [x]  
Rationale for jurisdictional decision: ________________________________________________________________________

---

1 This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

2 Classification according to "Soil Taxonomy."
APPENDIX E

WESTCHESTER COUNTY AIRPORT UPDATED STORM WATER MANAGEMENT STUDY, PRELIMINARY FINDINGS – BLIND BROOK WATERSHED

JULY 18, 2008
Memorandum

To: Patty Chemka, Westchester County DOT 
David Schiff, AICP, Saccardi & Schiff 
Eric Zamft, AICP, Saccardi & Schiff

From: Christopher S. Hanzlik, CPESC, CPSWQ 
Project Manager

Subject: Westchester County Airport 
Updated Storm Water Management Study 
Preliminary Findings - Blind Brook Watershed

Date: July 18, 2008
Project No.: 44010-S

A. Purpose

The purpose of this memo is to document the preliminary findings of TRC Engineers’ (TRC) updated storm water management (SWM) analysis for the Westchester County Airport as verbally presented during a meeting with various Airport and County officials on June 6, 2008. The analysis is based on the development of hydrologic models that compare current conditions to the “Full Development” and “Pre-1987 (Pre-Development)” Conditions as documented in the 1999 Storm Water Management Plan prepared by Dvirka and Bartilucci (“1999 SWM Plan”). The analysis was done to determine whether or not the current Airport SWM system is being impacted by upstream properties and/or causing negative impacts to downstream properties.

The hydrologic models were developed to simulate:

- The volumes and peak rates of runoff from the drainage areas tributary to Detention Basins A and B.
- The peak storage volumes and rates of runoff from Detention Basins A and B in order to determine the current performance of the Basins.
- The cumulative peak discharge rates within the Blind Brook watershed at various “locations of confluence” identified in the 1999 SWM Plan where runoff leaves the Airport site in order to determine the current performance of the overall SWM system.

Models were developed for the 2-year (3.3 inch, 24-hour rainfall) and 10-year (5.0 inch, 24-hour rainfall) SCS Type III design storms.
B. Data Used in Analysis

The following data was used for the analysis:

- Copies of the SCS runoff curve number calculation worksheets for the “Full Development” drainage sub areas in both the Blind Brook and the Rye Lake watersheds identified in the 1999 SWM Plan. These worksheets, which were obtained directly from Dvirka and Bartilucci, summarize the land use/cover type for each drainage sub area.
- Input data used to create the “Full Development” HEC-1 Flood Hydrograph hydrologic model runs in Volume 2 (Appendices) of the 1999 SWM Plan.
- December 2001 AutoCAD® files obtained from Camp Dresser McKee (CDM) that contains the “Full Development” drainage sub areas in both the Blind Brook and the Rye Lake watersheds identified in the 1999 SWM Plan.
- GIS data provided by Westchester County. The data included the most recent aerial photographic base tiles (Year 2006) and GIS shape files delineating the access roads, parking areas, buildings and runways/taxiways within the Airport property.
- AutoCAD® files of February/March 2008 topographic surveys for storm water Basins A and B prepared by Ward Carpenter Engineers of White Plains, NY.

C. Analysis

1. 1999 Full Development Conditions

Since the HEC-1 hydrologic modeling program used in the 1999 SWM Plan has been replaced by the updated Hydrologic Engineering Center’s Hydrologic Modeling System (HEC-HMS), it was necessary to use HEC-HMS to develop the Full Development Conditions model. TRC was able to import the HEC-1 input data described above into the HEC-HMS program and successfully recreate the Full Development Conditions model in the Blind Brook watershed for the 2-year and 10-year design storms so that a baseline model could be established.

The Full Development Conditions model includes the following hydrologic parameters calculated for the 1999 SWM Plan by Dvirka and Bartilucci: drainage sub area and SCS runoff curve number values; the lag travel times/times of concentration for each drainage sub area; and the channel reach characteristics. The storage volumes and outlet discharges for Detention Basins A and B based on design drawings prepared by Raymond Keyes Associates, Inc. (predecessor to TRC Engineers, Inc.) under the following County project and contract numbers:

- Detention Basin A – Project No. 8901.24; Contract No. 94-405R
- Detention Basin B – Project No. 91-219; Contract No. 4102
The sixteen Blind Brook drainage sub areas identified in the 1999 SWM Plan are grouped and described as follows:

- **Group I Sub Areas** – Direct discharge to the East Fork of Blind Brook. The group, which includes sub areas BB-4F and BB-5F, encompasses a small portion of the south perimeter access road. The balance of development and infrastructure within these sub areas are off Airport property.

- **Group II Sub Areas** – Direct discharge to Blind Brook. The group includes sub areas BB-1AF, BB-1BF, BB-1CF, BB-1DF, BB-1EF, BB-1FF, and BB-1GF. With the exception of BB-1AF, runoff from all of these sub areas enters Blind Brook upstream of the Airport through direct runoff or through the storm drain collection system. These sub areas encompass the Airport Access Road and parking areas near Hangars 6 and 26, along with King Street and Old Lake Street. Blind Brook is conveyed through the Airport property within a 7’-3” square concrete box culvert. Sub area BB-1AF (which includes the exposed portion of the Blind Brook) enters Blind Brook downstream of the Airport and Blind Brook culvert through direct runoff.

- **Group III Sub Areas** – Direct discharge to Blind Brook downstream of SPDES Outfall 003. The group includes sub areas BB-2F, BB-3F, BB-6F, and BB-9F which encompass the southern-most ends of Taxiways A and L, the perimeter access road, and undeveloped on- and off-site areas adjacent to the southwest corner of the Airport. The stormwater flows through an open channel down to and beneath Lincoln Avenue before entering Blind Brook.

- **Group IV Sub Area** – Discharge to Detention Basin A from sub area BB-7F. Nearly half of all airside impervious (paved) surfaces are contained within this group. In addition, Hangar E is located in these sub areas along the western side of the Airport. Stormwater runoff is directed through two 54-inch pipes and one 24-inch storm pipe into Detention Basin A.

- **Group V Sub Area** – Discharge to Detention Basin B from sub areas BB-8F. The remainder of the airside impervious surfaces, including the terminal deicing pit, Hangar A ramp, and most corporate hangers. Stormwater runoff is directed through two primary storm drain collection systems and discharged through two 72-inch, one 18-inch, and one 12-inch storm pipes into Detention Basin B.

The Detention Basin design parameters are described below.

- **Detention Basin A**, which also serves as a wetland mitigation area, had design elevations ranging from a bottom at Elevation 365 to the top of berm at Elevation 374. Stormwater within Detention Basin A is discharged through one of two outlet structures on the south side of the detention basin. The first structure has a 12-inch inlet leading to SPDES Outfall 003, which is a 54-inch reinforced concrete pipe (RCP) ending at the headwall structure for the Blind Brook culvert. The second structure is intended for detention basin overflow control and leads to a 60-inch RCP ending at a headwall downstream of SPDES Outfall 003. The design of Basin A also incorporated a 200-foot wide earthen spillway with a crest elevation of 373.5.
The design storage volume at Elevation 373.5 (the spillway crest) is 35 acre feet, and the maximum storage volume at the top of berm (Elevation 374) is 37.6 acre feet.

- **Detention Basin B** had design elevations ranging from a bottom at Elevation 359 to the top of berm at Elevation 366. An 18-inch pipe with a manually operated gate valve in the outlet structure regulates the discharge rate from Detention Basin B to SPDES Outfall 001. The design of Basin B also incorporated a 250-foot wide earthen spillway with a crest elevation of 365.

The design storage volume at Elevation 365 (the spillway crest) is 24.2 acre feet, and the maximum storage volume at the top of berm (Elevation 366) is 28.8 acre feet.

In the Full Development model, Blind Brook Sub Area BB-4BF was the designation given in the 1999 SWM Plan to the 400,000 square feet (9.18 acres) of future paved aircraft operational area that was to be diverted from the Rye Lake Watershed to Basin A.

2. **2008 Current Conditions**

As the first step in updating the Full Development Conditions model of the Blind Brook drainage sub areas to reflect Current Conditions, TRC superimposed the AutoCAD® files obtained from CDM containing the “Full Development” drainage sub area divides onto the GIS and aerial photographic base tiles to create a “Current Conditions Storm Water Management Map”. Using the SCS runoff curve number calculation worksheets from Dvirka and Bartilucci for the “Full Development” as a guide, TRC performed detailed takeoffs with AutoCAD® of the total area and of the areas of the various land use/cover types for each Group (I-V) of drainage sub areas within the Blind Brook watershed. These takeoffs were used to calculate the SCS runoff curve number values for each sub area in the Current Conditions model.

The AutoCAD® files showed that some of the Blind Brook drainage sub area divides were changed by CDM as part of the work for their 2001 “Final Report of Proposed Deicing Alternatives for the Westchester County Airport”. The changes to the drainage divides and smaller sub areas account for the redirecting of storm water runoff from what was presented in the 1999 SWM Plan due to various storm drain pipe systems that were constructed through 2000. There were other changes in sub area characteristics discovered by TRC during the area takeoff process. These changes are summarized below:

- **Group III Sub Areas** – Direct discharge to Blind Brook downstream of SPDES Outfall 003. Sub area BB-3F was subdivided into areas BB-3FA and BB-3FB based on a review of surveyed topography by CDM of the area south of the approach end of Runway 34 and within the perimeter access road. Part of the change is due to a 12-inch corrugated metal pipe, installed circa 2000, that routes runoff from area BB-3FA, which includes the taxiway run-up pads, to Detention Basin B (see additional discussion in the Group V Sub-Areas below). CDM had also confirmed that improvements made by the County at the same time to the swale running along the interior edge of the perimeter
access road conveys the runoff from sub areas BB-3FB and BB-6F south through a 24-inch corrugated metal pipe beneath the perimeter access road southwest of the end of Runway 34. The stormwater then flows through an open channel down to and beneath Lincoln Avenue before entering Blind Brook.

- **Group IV Sub Areas** – Discharge to Detention Basin A. The group now includes sub areas BB-7FA and BB-7FB.

- **Group V Sub Areas** – Discharge to Detention Basin B. The group includes sub areas BB-8FA, BB-8FB, BB-8FC and BB-3FA.

Sub Area BB-8FA includes, at a minimum, approximately 4 acres of additional impervious area from a Connecticut school complex that was constructed after the completion of the 1999 SWM Plan. It is unknown at this time whether storm water management facilities were constructed on the school complex to mitigate the impacts from the additional impervious area. It is also unknown whether all the area indicated drains to this sub area, since the school complex sits on the divide between sub areas BB-8FA and BB-5F (Group I Sub-Area).

The diversion of sub area BB-3FA results in an additional 10.4 acres (approximately 4.3 acres impervious) of tributary area that discharges to Detention Basin B. TRC also discovered and confirmed that the “current” computed size of area BB-8F (sub areas BB-8FA, BB-8FB, and BB-8FC) is approximately 22.7 acres greater than the original values from the 1999 SWM Plan. TRC has no explanation for the discrepancy. Therefore, the total drainage area that is tributary to Detention Basin B has increased by approximately 33 acres under current conditions.

The results of the comparative analysis of drainage areas tributary to Detention Basins A and B are summarized in the attached Table **Comparison of Total and Impervious Areas by Watershed**. The diversion of sub area BB-4BF in the 1999 SWM Plan from the Rye Lake Watershed to Basin A would reduce Rye Lake sub area RL-4F from 64.77 acres to 55.59 acres. The Table shows that the TRC 2008 total area value for Rye Lake Sub Area RL-4F (63.98 acres) is consistent with the pre-diversion area from the 1999 SWM Plan (64.77 acres).

Although the Table shows the breakdown of Areas BB-7F and BB-8F, the total area values are used in the Current Conditions HEC-HMS model for consistency. Also, the model uses the same drainage sub area lag travel times/times of concentration values, and channel reach characteristics as calculated by Dvirka and Bartilucci for the 1999 Full Development model.

TRC determined the current condition storage and discharge parameters for Detention Basins A and B from the February/March 2008 topographic surveys provided by Ward Carpenter. Spillway widths and elevations, and top of berm elevations were estimated based on a visual inspection of the topographic surveys. In order to estimate the storage volumes of the Basins, TRC used AutoCAD® to calculate the surface areas for each 1-foot contour within the range of storage elevations. The volumes were then calculated using the sum of
the average surface areas between 1-foot contours multiplied by the maximum storage depth in each basin.

The comparison of Basin parameters is provided in the Table below:

<p>| COMPARISON OF AIRPORT STORM WATER BASIN ELEVATION AND STORAGE PARAMETERS |
|---------------------------|-----------|-----------------|-----------------|</p>
<table>
<thead>
<tr>
<th>BASIN I.D.</th>
<th>PARAMETERS</th>
<th>1999 SWM Plan</th>
<th>2008 TRC Estimated</th>
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</thead>
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<tr>
<td>A</td>
<td>Spillway Width @ Elevation</td>
<td>200 ft @ 373.5</td>
<td>440 ft @ 372.3*</td>
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<td>A</td>
<td>Storage Volume (Ac.Ft.)</td>
<td>35.0</td>
<td>25.7</td>
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<tr>
<td>A</td>
<td>Top of Berm Elevation</td>
<td>374.0</td>
<td>373.0</td>
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<tr>
<td>A</td>
<td>Storage Volume (Ac.Ft.)</td>
<td>37.6</td>
<td>29.1</td>
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<tr>
<td>B</td>
<td>Spillway Width @ Elevation</td>
<td>250 ft @ 365.0</td>
<td>368 ft @ 363.5*</td>
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<tr>
<td>B</td>
<td>Storage Volume (Ac.Ft.)</td>
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<td>23.9</td>
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<tr>
<td>B</td>
<td>Top of Berm Elevation</td>
<td>366.0</td>
<td>364.0</td>
</tr>
<tr>
<td>B</td>
<td>Storage Volume (Ac.Ft.)</td>
<td>28.8</td>
<td>26.2</td>
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</table>

*Average crest elevation. For Basin B, spillway consists of two separate segments: 208 ft. on the west side of the basin, and 160 ft. on the south side of the basin.

The above table shows that the current storage depths and volumes for Detention Basins A and B are reduced from the design depths and volumes presented in the 1999 SWM Plan. Spillway and top of berm elevations under Current Conditions are lower than the design elevations used for 1999 Full Development conditions.

As a supplement to the survey information, TRC performed a visual inspection of the outlet structures for each basin in order to calculate the stage/discharge parameters used in the Current Conditions model.

D. Results of Modeling

The results of the 1999 Full Development and 2008 Current Conditions models for the 2-year and 10-year design storms are summarized in the attached Table Comparison of Peak Discharge Rates – Pre-1987 Conditions vs. 1999 Full Development Conditions and 2008 Current Conditions. The Locations of Confluences shown and described are the same as in the 1999 SWM Plan. The Table also includes a comparison of Detention Basin performance under 1999 Full Development and 2008 Current Conditions.

Based on the attached tabular summaries, the discussion herein and information from the 1999 SWM Plan, it is the opinion of TRC that the results indicate the following:

1. Except at Confluences L3 and CON 5, the 2-year peak discharge rates under 2008 Current Conditions are less than those under 1999 Full Development conditions.
2. For the 2-year storm, the 2008 Current Conditions peak discharge rates and storage elevations for Detention Basins A and B are less than those under 1999 Full Development conditions. The 2-year storm runoff from the Airport areas tributary to Detention Basins A and B is detained within the basins below the spillway crests and attenuated. While the 2008 Current Conditions peak storage volume for Detention Basin A is less than the volume under 1999 Full Development conditions, the 2008 Current Conditions peak storage volume for Detention Basin B is greater than the volume under 1999 Full Development conditions.

3. The 10-year peak discharge rates under 2008 Current Conditions are greater than those under 1999 Full Development conditions and Pre-1987 Conditions, especially at critical Confluences L1, CON 5 and CON 6.

4. For the 10-year storm, the 2008 Current Conditions peak discharge rates from Detention Basins A and B are significantly greater than those under 1999 Full Development conditions. Under the 1999 SWM Plan, 10-year storm runoff from the Airport areas tributary to Detention Basins A and B was designed to be detained within the basins below the spillway crests and attenuated. Based on the results of the 2008 Current Conditions model, the 10-year storm runoff is not detained, with spillway flow occurring at both basins.

E. **Summary of Findings**

Based on our analysis, TRC believes that the following preliminary conclusions can be reached regarding the current condition of the Airport’s storm water management system within Blind Brook:

- Based on the 2008 topographic survey data, it appears that Detention Basins A and B were not constructed as originally designed with respect to storage depths and volumes.
- When compared to the 1999 SWM Plan, the total drainage area that is tributary to Detention Basin B has increased by approximately 33 acres under Current Conditions. Including the impervious area from the Connecticut school complex, the total impervious area that is tributary to Detention Basin B has increased by approximately 5.5 acres under Current Conditions.
- While the increase in tributary drainage areas to the Detention Basin B is part of the problem, the overall reductions in detention basin storage depths and volumes are the major factors contributing to the increases in peak discharge rates from the detention basins and the increases in peak discharge rates where runoff leaves the Airport site for the 10-year storm.
- Increased peak discharge rates from Detention Basin A for the 10-year storm occur even though the amount of total and impervious areas tributary to the basin is less than proposed in the 1999 SWM Plan without the Rye Lake diversion.
- The Blind Brook portion of the current Airport SWM system is being impacted by upstream properties and is also causing negative impacts to downstream properties.

F. **Discussion and Follow-Up**

There was some discussion about how the above results and findings would impact the 100-year storm. Although the 1999 SWM Plan shows that the peak discharge rates for the 100-year storm are reduced below Pre-1987 levels, the detention basins in the 1999 SWM Plan were not
designed to detain runoff above the 10-year storm. The 1999 SWM Plan (Page 3-22) states that the excess runoff above the 10-year storm will bypass the detention basins, following various overland flow paths, and be attenuated at downstream confluence points. While there is some level of agreement in theory with the statement, TRC has reservations about whether or not the data modifications of the HEC-1 hydrologic model in the 1999 SWM Plan for the 100-year storm are accurate in depicting the stated conditions. Practically speaking, it is very possible that there would be even greater spillway flow from the basins during the 100-year storm, with increases in peak discharge rates similar to those described in Item No. 4 of Section D above, but at greater magnitudes.

As part of our proposal for performing a more detailed analysis and update of the Airport’s SWM Plan, TRC would investigate further how an updated hydrologic model can be accurately constructed for the 100-year storm. Once a hydrologic model for the 100-year storm is established, TRC would also analyze various options to modify the Airport SWM system so that the impacts of the 10- and 100-year storm events are mitigated under both current conditions and conditions where increases in runoff would occur due to proposed actions associated with future updates to the Airport Master Plan. Some of the options may include, but not be limited to, one or a combination of the following:

- Increase the storage capacity of Basins A and B by raising the elevations of the earthen spillways and top of berms of the Basins one to two feet higher than their current elevations (i.e. restore the basins to their original design capacities).
- Increase the storage capacity of Basin B through full-depth expansions at the southeast corner adjacent to the perimeter access road and adjacent to the western side slope.
- Construction of a third detention basin at the southeast corner of the Airport property (this option was originally contemplated in the 1999 SWM Plan, but never implemented because it was not cost effective). This option would require rerouting of existing drainage systems and/or construction of new drainage systems in order to divert runoff to the new basin.
APPENDIX F

UPDATE TO THE 1999 STORM WATER MANAGEMENT PLAN

DECEMBER 2010
UPDATE TO THE
1999 STORM WATER
MANAGEMENT PLAN

WESTCHESTER COUNTY AIRPORT
AIRPORT ROAD
TOWN OF HARRISON, TOWN OF NORTH CASTLE AND
VILLAGE OF RYE BROOK, NEW YORK

OWNER/OPERATOR OF FACILITY:

WESTCHESTER COUNTY DEPARTMENT OF TRANSPORTATION
100 EAST FIRST STREET
MOUNT VERNON, NEW YORK
TEL: (914) 813-7756

PREPARED BY:

TRC ENGINEERS, INC.
7 SKYLINE DRIVE
HAWTHORNE, NEW YORK 10532
TEL: (914) 592-4040

TRC PROJECT NO.: 44010

DECEMBER 2010

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Update to the 1999 Storm Water Management Plan…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………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Harrison, North Castle and Rye Brook, New York
Update to the 1999 Storm Water Management Plan

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<td>Air National Guard</td>
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*1999 SWMP* 1999 Storm Water Management Plan
Executive Summary

1. **INTRODUCTION TO STORMWATER MANAGEMENT**

   a. **What is Stormwater Runoff**

   Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground and eventually into waterways and water bodies. The magnitude of stormwater runoff is determined primarily by the amount of precipitation and by the infiltration characteristics of the land, more specifically soil type and antecedent moisture level, cover type (wooded, grass/meadow, bare soil), and surface retention. Runoff travel time is determined primarily by slope, length of flow path, depth of flow, and the roughness of flow surfaces. Peak discharges, or rates of stormwater runoff, are based on the relationship of the above parameters and the size of the watershed or drainage area.

   Based on the above factors, undeveloped and undisturbed land typically has the ability to absorb small, frequent storms and a substantial portion of larger storms before runoff occurs.

   b. **Why is it a Problem?**

   Urban development converts undeveloped and undisturbed (rural) watersheds to urban watersheds, in which a considerable portion of the watershed area is covered or will be covered by impervious surfaces. Impervious surfaces (roads, sidewalks, parking lots and buildings) prevent stormwater from naturally being absorbed into the ground. Natural flow paths in urban watersheds may be replaced or supplemented by paved gutters, storm sewers, or other elements of artificial drainage. These changes result in reduced infiltration and decreased travel time, which in turn significantly increase rates and volumes of stormwater runoff. This increased runoff is swiftly carried to local streams, lakes, wetlands and rivers and can cause increased flooding and erosion that can damage property and natural resources.

   Stormwater runoff from urban watersheds also picks up debris, chemicals, soil, and other pollutants and flows either into a storm sewer system or directly into a lake, stream, river, wetland, or coastal water. This stormwater pollution is usually discharged untreated into water bodies that are used for swimming, fishing, and providing drinking water. The result is degraded water quality and aquatic habitat.

   c. **Solutions – Stormwater Management**

   Prior to the 1980s, the prevention of flooding and other stormwater runoff problems related to urban development was accomplished by relying on collection and conveyance systems (i.e. swales, curbs and gutters, inlets, storm sewers and channels) to quickly remove water safely from developed areas and to protect life, property, and health. However, this approach resulted in increased flooding and erosion, especially for downstream portions of a watershed where the ill effects were cumulative.
During the 1980s, stormwater detention emerged as one of the basic and principal components of “modern” stormwater management that is still used today. The basic approach to stormwater detention is to capture and temporarily detain all or part of the runoff during and immediately after a rainfall or snowmelt event and then release it at controlled rates downstream. By doing so, flooding damage can be reduced or prevented, thereby allowing downstream conveyance systems to be smaller and less costly.

Over the past twenty to twenty-five years, the design and use of stormwater detention facilities, in the forms of ponds, dry basins, constructed wetlands, or swales, has also evolved into one of the most popular and widely used stormwater management practices for water quality enhancement by reducing the discharge of pollutants known to be found in stormwater runoff.

More recent advancements in stormwater management methodology and design incorporate, where practicable, such principles as Low-Impact Development (LID), green infrastructure, and Environmental Site Design (ESD) to supplement the use of traditional detention for both quantity and quality control of stormwater runoff.

Low-Impact Development (LID) is a stormwater management approach that seeks to manage runoff using distributed and decentralized controls. LID's goal is to mimic a site's predevelopment hydrology (runoff conditions) by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to its source. Instead of conveying and treating stormwater solely in large end-of-pipe facilities located at the bottom of drainage areas, LID addresses stormwater through small-scale landscape practices and design approaches that preserve natural drainage features and patterns.

Green Infrastructure refers to natural systems that capture, cleanse and reduce stormwater runoff using plants, soils and microbes. At the site scale, green infrastructure consists of site-specific management practices (such as interconnected natural areas) that are designed to maintain natural hydrologic functions by absorbing and infiltrating precipitation where it falls.

Environmental Site Design (ESD) is an effort to mimic natural systems along the whole stormwater flow path through combined application of a series of design principles throughout the development site. The objective is to replicate forest or natural hydrology and water quality. Each ESD practice incrementally reduces the volume of stormwater on its way to the receiving waters, thereby reducing the amount of conventional stormwater infrastructure required. Examples of the practices include preserving natural areas, minimizing and disconnecting impervious cover, minimizing land disturbance, conservation (or cluster) design, using vegetated channels and areas to treat stormwater, and incorporating transit, shared parking, and bicycle facilities to allow lower parking ratios (i.e. to reduce the size of paved parking areas).

d. Local, State, and Federal Regulations

In order to address stormwater runoff quality and quantity impacts, Congress enacted the Clean Water Act Amendments of 1987, which required the United States
Environmental Protection Agency (EPA) to develop a two-phase comprehensive regulatory program aimed at reducing water pollution produced from stormwater discharges. In 1990, the EPA promulgated the rules, which established Phase I of the National Pollutant Discharge Elimination System (NPDES) program. The purpose of the Phase I stormwater program was to reduce the discharge of pollutants to waters of the United States from three sources:

- Medium and large municipalities;
- Construction activities disturbing greater than five acres; and,
- Eleven (11) identified industrial categories.

Phase II of the NPDES program, promulgated in 2003, addresses stormwater discharges from construction activities disturbing one to five acres of land, and stormwater discharges from small municipalities located in urbanized areas (as defined by the Bureau of the Census). As part of the rule, small municipalities are required to employ a program, which reduces the pollutant loadings in stormwater runoff, which discharge to receiving waters to the maximum extent practicable. As part of the regulation, municipalities are required to implement a stormwater program which addresses six minimum control measures:

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge Detection and Elimination
4. Good Housekeeping/Pollution Prevention
5. Construction Site Runoff Control
6. Post Construction Runoff Control

Benefits of the Phase II regulation include: reduced erosion on streambeds, improved aesthetic quality of waters, reduced eutrophication of aquatic systems, and improved habitats for wildlife and endangered species.

As a result of implementation of the Phase I and II programs and regulations, many communities have adopted regulations requiring developers to install stormwater management practices that reduce the rate and/or volume and remove pollutants from runoff generated on their development sites.

State and Local Requirements
The New York State Department of Environmental Conservation (NYSDEC) enforces the Federally-delegated Phase II stormwater regulations enacted in 2003, promulgated by revisions to the Clean Water Act (CWA), by issuing permits to non-point source pollution dischargers.

Compliance with the Phase II regulations requires obtaining coverage under the State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (Permit GP-0-10-001). This General Permit, issued January 29, 2010, regulates both existing and new stormwater discharges associated with construction activity, specifically activities that result in the disturbance of one or more acres of total land area. The timing for authorization to
discharge under the General Permit is based on completion of the State Environmental Quality Review Act (SEQR) process, obtaining of local/regional approvals, obtaining all necessary Department permits subject to the Uniform Procedures Act (UPA) (see 6 NYCRR Part 621), the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that conforms to NYSDEC technical standards for: (1) stormwater quantity and quality management as presented in the New York State Stormwater Management Design Manual; and (2) soil erosion and sediment control as presented in New York Standards and Specifications for Erosion and Sediment Control; and the filing of a Notice of Intent (NOI) with the DEC.

For construction activities that are subject to the local requirements of a regulated, traditional land use control MS4, an owner or operator that has satisfied the General Permit requirements will be authorized to discharge stormwater from their construction activity in five (5) business days from the date the DEC receives a complete NOI and an “MS4 SWPPP Acceptance” form signed by the designated MS4 official.

At its sole discretion, the NYSDEC may make a determination that a specific project can not obtain coverage under the SPDES General Permit program, and require the owner or operator to apply for and obtain an Individual SPDES permit. An Individual SPDES permit is required for stormwater discharges that are mixed with non-stormwater sources, and establishes effluent limits for project-specific pollutants of concern associated with the stormwater discharges. The Individual SPDES permit requires monitoring the water quality from the permitted stormwater outfalls that discharge directly to State waters on a regular basis. In addition to monitoring activities, the Individual SPDES Permit also requires the use of best management practices to minimize the risk of pollutants migrating to the stormwater infrastructure.

e. Description of Stormwater Management at the Westchester County Airport

In general, stormwater runoff from the developed portions of Westchester County Airport is collected by four extensive systems consisting of inlets, catch basins, manholes, drainage pipe and man-made open channels. These systems then convey the runoff to two large detention basins that provide flood control and water quality treatment. Runoff from the remaining, undeveloped portions of Westchester County Airport is conveyed offsite via a series of natural gullies, channels, streams, and man-made culverts.

An Individual SPDES permit (Permit No. NY 007 5132) that established effluent limits for various pollutants of concern associated with stormwater discharges from the Airport was first issued in 1984. Since then, it has been modified and renewed as appropriate, with the latest renewal in effect until January 31, 2014. The SPDES permit requires the Airport to monitor the water quality from a number of outfalls that discharge directly to State waters on a regular basis. The Airport is also required to provide a public repository of Discharge Monitoring Reports (DMRs), and to post signs at each outfall, according to the Discharge Notification Act. In addition to monitoring activities, the Permit also requires that the Airport use best management practices to minimize the risk of pollutants migrating to the stormwater infrastructure.
Stormwater runoff from seven discharge locations is monitored either monthly or quarterly for a variety of parameters, including biochemical oxygen demand (BOD), pH, ethylene and propylene glycols, oil and grease, benzene, toluene, xylenes and ethylbenzene. A more detailed description of these locations and the Individual SPDES Permit for the Airport is provided in Chapter II.

2. PURPOSE AND OBJECTIVE OF THIS REPORT

This report, entitled “Update to the 1999 Storm Water Management Plan,” provides discussion and results of an updated stormwater management analysis done by TRC Engineers, Inc. (TRC) for the Westchester County Airport (“Airport”) that reflects and compares existing and planned development with the conditions that were documented in the 1999 Storm Water Management Plan (1999 SWMP) prepared by Dvirka and Bartilucci.

It establishes the hydrologic conditions for the Airport as of 2010 to determine the effectiveness of existing stormwater quantity mitigation measures as well as the need for future ones; to determine if the existing Airport stormwater management system is being impacted by upstream properties; to analyze the stormwater impacts of existing and proposed actions at the Airport, and; to present the measures required to mitigate those impacts and reduce peak runoff rates.

The findings and recommendations of a preliminary hydrologic analysis (see Subsection 4c) identified the need to prepare a more detailed, comprehensive update to the 1999 SWMP. In addition, Westchester County wanted to address concerns raised over the Airport’s potential impacts to downstream communities, especially in the wake of the flooding that occurred within the Blind Brook watershed as a result of the April 2007 nor’easter.

3. BACKGROUND AND HISTORY

The 1986 Master Plan Update for the Westchester County Airport recommended the construction of a new terminal building, along with other modernization and improvement projects for taxiways, aprons, fixed-based operator (FBO) facilities, aircraft tie down areas, and parking areas. The specific projects are listed in Section 2.3.1 of the 1999 SWMP. An Environmental Assessment (EA) and an Environmental Impact Statement (EIS) was then produced in February of 1987. This document also identified the need for stormwater detention projects and for storm drainage system improvements to allow the diversion of runoff from the Rye Lake watershed to the Blind Brook watershed in order to accommodate the concepts considered in the 1986 Master Plan Update. As a result, in 1991, the County completed a technical stormwater management plan. This stormwater management plan recommended the diversion of some runoff feeding Rye Lake to the Blind Brook and construction of two extended detention basins (A and B) to detain runoff prior to its controlled discharge to the Blind Brook.

The 1991 stormwater management plan was updated in 1993 in order to provide additional technical guidance for the planning, engineering, design, and construction of
future Airport stormwater facilities to reduce stormwater runoff rates.

In 1997, the County issued its Findings Statement for a second supplemental EA/FGEIS to the 1986 Master Plan Update, which recommended additional stormwater management at the Airport. The County stated that there was to be no increase in runoff rates from the Airport for a 100-year storm and that the diverted runoff was to be treated to improve water quality by removing, to the extent practicable, sediment-borne and dissolved (soluble) pollutants. Specifically, the second supplemental EA/FGEIS contained the following stormwater management recommendations:

- Divert more runoff from Rye Lake to the Blind Brook than anticipated in the 1987 Master Plan Update EA/FGEIS;
- Ensure no net increase in runoff rates for the 100-year storm;
- Provide treatment of the diverted runoff and Airport project runoff for both volume and water quality;
- Expand existing Detention Basins A and B or expand Detention Basin A and construct a new Detention Basin C;
- Install new stormwater drainage pipes within the existing developed Airport property to redirect runoff to the detention basins;
- Eliminate some of the existing stormwater outfalls; and,
- Redirect the runoff from 157 acres of developed Airport properties within the Rye Lake drainage area, part of the Kensico Reservoir that supplies drinking water to New York City and Westchester County, to the detention basins for treatment and, ultimately, discharge to the Blind Brook.

Also in 1997, Westchester County, along with over eighty governmental agencies signed a Memorandum of Agreement (MOA) to protect New York City’s drinking water supply. The MOA identifies the elements of a watershed protection program that is intended to protect drinking water without inhibiting the economic viability of the watershed communities. Westchester County’s agreement with the New York City Department of Environmental Protection (NYCDEP) under the MOA did not address the issue of increased stormwater quantity to Blind Brook that would be caused by the required diversion of Airport runoff from the Rye Lake drainage basin. As a result, Westchester County needed to prepare a plan that provided quantity controls to properly manage the increased runoff to Blind Brook.

As a result of these recommendations and the 1997 MOA, an update to the 1993 Storm Water Plan was prepared in 1999, entitled “1999 Storm Water Management Plan,” which is described below.

4. METHODOLOGY FOR THIS UPDATE TO THE 1999 STORM WATER MANAGEMENT PLAN

a. Basis for Analysis for this Update to the 1999 Storm Water Management Plan

The basis for analysis of this report, Update to the 1999 Storm Water Management Plan, is the 1999 Storm Water Management Plan (1999 SWMP). The “study area,” or limits of study, in the 1999 SWMP included the Airport property, approximately 70 acres of offsite properties in New York immediately south of the Airport, and
approximately 300 acres of offsite properties immediately north and east of the Airport in the Town of Greenwich, Connecticut. The Airport is situated within two major drainage basins – Rye Lake (RL) and Blind Brook (BB), with their Pre-1987 sub areas described and depicted in the 1999 SWMP (in Sections 2.2.2.1 and 2.2.2.2, respectively and as shown in 1999 SWMP Figure 2-1 in Appendix D).

The 1999 SWMP recommended the diversion of runoff from the Rye Lake/Kensico Reservoir watershed to the Blind Brook watershed, as well as provide water quality treatment and attenuate peak rates of runoff associated with modernization and improvement projects prior to exiting the Airport property.

Various improvements recommended in the 1999 SWMP were designed and constructed so that peak rates of stormwater runoff under “the 1999 Full Development” Conditions during 2-, 10-, and 100-year, 24-hour storms\(^1\) were to be no greater than the peak rates from similar storms prior to 1987, “Pre-1987” Conditions.

The 1999 SWMP provided a comparative analysis between Pre-1987\(^2\) and 1999 Full Development\(^3\) runoff rates at various “points of confluence” within the limits of study. See Chapter II for more detailed discussions of Pre-1987 and 1999 Full Development Conditions. The “points of confluence” are indicated on 1999 SWMP Figure 2-1, and TRC Drawings DA-1 and DA-2 (see Appendix D), with a detailed description of these points provided in Chapter II.

Under most changes in hydrologic conditions caused by urban development, control of both the 10-year and 100-year storms require providing storage to attenuate post-development peak discharge rates to pre-development levels. One of the major findings of the 1999 SWMP was that there was no need to construct a third detention basin (“C”).

b. Objectives of the 1999 SWMP

The main objective of the 1999 SWMP was to design and implement a stormwater management system that controlled peak rates of stormwater runoff from modernization and improvements under “full development” conditions during 2-, 10-, and 100-year, 24-hour storms. The “full development” peak rates were to be no

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1 The 24-hour storms are synthetic rainfall distributions developed by the National Resources Conservation Service (NRCS) based on actual 24-hour rainfall data published by the National Weather Service (NWS) for various parts of the country. The 1-year storm has a 24-hour rainfall amount that historically has been equaled or exceeded once a year. The 2-year storm has a 24-hour rainfall amount that can be equaled or exceeded once during any two-year period. Put another way, the magnitude of a 2-year storm has a 50% chance of being equaled or exceeded during any given year. The 10-, and 100-year storms represent the respective equivalents.

2 “Pre-1987” Conditions are those that existed prior to development at the Airport that resulted in the diversion of runoff from the Rye Lake watershed to the Blind Brook watershed.

3 1999 Full Development Conditions as described in the 1999 SWMP are comprised of Pre-1987 Conditions plus numerous Airport facility, stormwater management and drainage infrastructure improvements that were designed between 1987 and 1999. The improvements are described in Sections 2.3, 2.4, and 3.2 of the 1999 SWMP.
greater than the peak rates from similar storms prior to 1987, “pre-development” conditions. The 1999 SWMP also states that the plan “is designed to avoid and minimize under the full 1987 Master Plan Update (full development) conditions stormwater impacts to downstream properties and receiving waters.”

c. Parameters – Changes in the Conditions Between 1999 and this Update

Based on an analysis conducted by TRC in 2008, entitled “Westchester County Airport Updated Storm Water Management Study, Preliminary Findings – Blind Brook Watershed” (July 18, 2008), it was established that the existing conditions in the Blind Brook drainage basin of the Airport are different from those designed under 1999 “Full Development” Conditions. This results in higher peak discharge rates from the detention basins and at the downstream confluence of the east and west branches of Blind Brook during a 10-year storm event.

d. Parameters – Changes in Hydrologic Design Between 1999 and this Update

Since the publishing of the 1999 SWMP, the Natural Resource Conservation Service (NRCS) methodology to compute rates and volumes of runoff has been changed as a result of the Unified Stormwater Sizing Criteria presented in Chapter 4 of the New York State Stormwater Management Design Manual. The two major design parameters that have changed are: 1) 24-hour rainfall values (P) have increased; and 2) Maximum length of sheet (overland) flow as part of time of concentration (Tc) calculations has decreased. These updated parameters were integrated into the computation of runoff rates and volumes for Pre-1987, Existing (2010), and Proposed/Future (2011) Conditions provided in this Update to the 1999 Storm Water Management Plan.

The revised parameters result in increased computed runoff rates and volumes for each storm. A more detailed explanation of how the parameters changed and their effect on runoff rates and volumes that were computed as part of the updated analysis is provided in Chapter II.

5. EXISTING CONDITIONS AS OF 2010

Existing (2010) Conditions were established for the Blind Brook and Rye Lake drainage sub areas. This was accomplished by updating the 1999 Full Development Conditions with supplemental information such as land uses, cover types, topography, detention basin storage and outlet data, and known diversions from onsite and offsite drainage systems. Then, using the updated hydrologic parameters noted above, a hydrologic model of the Existing (2010) Conditions for the Rye Lake and Blind Brook drainage areas was created for the 1-, 2-, 10- and 100-year, 24-hour storms. A more detailed,
technical description of the various sources of supplemental information, methods used and conditions/factors considered in the creation of the hydrologic model of the Existing (2010) Conditions can be found in Chapter II.

Table 6, Comparison of Peak Discharge Rates, located at the end of the main report, summarizes the results of the hydrologic modeling and analysis, providing a comparison of peak discharge rates for both Pre-1987 Conditions and Existing (2010) Conditions for the 1-, 2-, 10- and 100-year storm events. The results are summarized below:

- Not all of the diversion of runoff from the Rye Lake drainage basin to the Blind Brook drainage basin occurred (143 acres of 157 acres planned was diverted).
- The total peak flow rates to Rye Lake under Existing (2010) Conditions continue to be less than those during Pre-1987 Conditions for all storm events.
- The peak flow rates to the East Branch of Blind Brook at CON 5 (at Lincoln Avenue) under Existing (2010) Conditions are significantly greater than those under Pre-1987 Conditions for all storm events. While the increased flow rates are partly attributable to the slight increase in total tributary drainage area to the East Branch of Blind Brook at CON 5, the increased flow rates are likely mainly caused by an increase of the offsite impervious area tributary to CON 5 from upstream Connecticut properties. Most of the increased impervious area tributary to CON 5 can be attributed to the construction and expansion of the Brunswick School.
- The peak flow rates to the West Branch of Blind Brook at critical Point of Confluence L1 (at Lincoln Avenue) under Existing (2010) Conditions continue to be less than those under Pre-1987 Conditions for the 1-, 2-, and 10-year storm events.
- Peak discharge rates from Detention Basins A and B are significantly greater than those under 1999 Full Development Conditions for the 10-year storm event. The total computed drainage area tributary to Detention Basin B is greater under Existing (2010) Conditions than what was represented under 1999 Full Development Conditions. Under the 1999 SWMP, 10-year storm runoff from the Airport areas tributary to Detention Basins A and B was designed to be detained within the basins below the spillway crests and attenuated. Based on the results of the Existing (2010) Conditions hydrologic model, the 10-year storm runoff is not detained, with spillway flow occurring at both basins.
- The total peak flow rate to Blind Brook at critical Point of Confluence CON 6 (intersection of the East and West Branches) under Existing (2010) Conditions continues to be less than those under Pre-1987 Conditions for the 1-, 2- and 10-year storm events. This occurs even with the increased flow rates to CON 5 and with the increased peak discharge rates from Detention Basins A and B.
- The peak flow rates to the West Branch of Blind Brook at critical Point of Confluence L1 and the total peak flow rate to Blind Brook at critical Point of Confluence CON 6 under Existing (2010) Conditions are greater than those under Pre-1987 Conditions for the 100-year storm event. It was determined that more runoff is ultimately being conveyed to Detention Basin B and less excess overland runoff is bypassing the detention basins when compared to 1999 Full Development Conditions in the 1999 SWMP. Based on the results of the Existing (2010) Conditions hydrologic model, there is even greater spillway flow from the detention basins during the 100-year storm.
While the peak discharge rates from Sub Area BB-3F to Point L2 continue to be less than those under Pre-1987 Conditions for the 100-year storm, the rates are slightly greater than those under Pre-1987 Conditions for the 1-, 2-, and 10-year storm events. This occurs because under Existing (2010) Conditions, Sub Area BB-3F has 4 more acres of impervious area and fewer acres of forest cover than what was shown for the sub area under the 1999 Full Development Conditions. This results in a greater runoff factor for the sub area.

The peak flow rates from Sub Area BB-6F to Point L3 under Existing (2010) Conditions continue to be less than those under Pre-1987 conditions for all storm events.

In summary, the results of the existing conditions analysis show that the peak rates of runoff at critical Points of Confluence L1 (West Branch of Blind Brook at Lincoln Avenue), CON 5 (East Branch of Blind Brook at Lincoln Avenue) and CON 6 (intersection of the East and West Branches) for the 100-year storm event are greater than those under Pre-1987 Conditions. All other locations and storm events are less than the Pre-1987 Conditions. The main factors causing 100-year existing condition peak runoff rates to exceed pre-1987 levels are:

- Increased runoff from development of offsite Connecticut properties tributary to the West Branch of Blind Brook, upstream of CON 5. The 1999 SWMP did not contemplate any development in the offsite Connecticut drainage areas tributary to CON 5.
- Total computed drainage area tributary to Detention Basin B (and Points L1 and CON 6) is approximately 11 acres greater under existing (2010) conditions than what was represented and computed for 1999 Full Development Conditions.
- More runoff is ultimately being conveyed to Detention Basin B and less excess overland runoff is bypassing the detention basins when compared to 1999 Full Development Conditions.
- Existing (2010) conditions storage depths and volumes for Detention Basins A and B are reduced from the design depths and volumes presented in the 1999 SWMP. Spillway and top of berm elevations under existing (2010) conditions are lower than the design elevations used for 1999 Full Development conditions. Detention Basins A and B were not constructed as originally designed with respect to storage depths and volumes.

6. **PROPOSED IMPROVEMENTS TO THE DETENTION BASINS**

Based on the results of the hydrologic modeling of Existing (2010) Conditions summarized above, various options to modify the Airport’s stormwater management system were analyzed so that the impacts of the 10- and 100-year storm events can be mitigated under both Proposed (2011) and Future (2011) Conditions.

The following improvements are recommended to Detention Basins A and B. These actions will improve the performance of the existing stormwater management system during the 10- and 100-year storm events, improve downstream hydrologic conditions within the Blind Brook headwaters, and provide additional capacity to undertake future projects at the Airport.
Detention Basin A

- Provide full-depth expansion through excavation at the southeast corner of the basin adjacent to the Perimeter Access Road;
- Reconstruct the earthen spillway, raising the crest from Elevation 372.3 feet (ft) to Elevation 373.75 ft. Reduce the width of the spillway crest to its original design width of 200 ft;
- Reconstruct the embankment slope along the eastern and southern perimeters, raising the top of berm from Elevation 373.0 ft to Elevation 374.75 ft; and,
- Reconstruct the two basin outlet structures.

Implementation of these proposed improvements would increase storage volume at the spillway crest from 25.7 acre-feet (ac-ft) to 37 ac-ft. Storage volume at the top of berm would increase from 29.1 ac-ft to 42 ac-ft. These volumes will be greater than the design volumes used under the 1999 Full Development Conditions.

Detention Basin B

- Provide full-depth expansion through excavation at the southeast corner of the basin adjacent to the Perimeter Access Road;
- Reconstruct the earthen spillway, raising the crest from Elevation 363.5 ft to Elevation 365.6 ft;
- Reconstruct the embankment slope along the eastern, western and southern perimeters, raising the top of berm from Elevation 364.0 ft to Elevation 366.6 ft; and,
- Provide full-depth expansion of the basin to the north between Blind Brook and the Perimeter Access Road.

Implementation of these improvements would increase storage volume at the spillway crest from 23.9 ac-ft to 38 ac-ft. Storage volume at the top of berm would increase from 26.2 ac-ft to 44 ac-ft. These volumes will be greater than the design volumes used under the 1999 Full Development Conditions.

A hydrologic model of Proposed (2011) Conditions for the Blind Brook drainage areas was created for the 1-, 2-, 10-, and 100-year, 24-hour storms, with the improvements to Detention Basins A and B as described above incorporated into the model.

Table 6, Comparison of Peak Discharge Rates, located at the end of this report, demonstrates that the proposed stormwater management system (i.e. detention basin) improvements would reduce the total peak discharge rates to Blind Brook at the downstream confluence of the East and West Branches of Blind Brook (Point of Confluence CON 6) under Existing (2010) Conditions to below Pre-1987 levels as follows:

- 100-Year Storm – Approximately 9% below Pre-1987 levels
- 10-Year Storm – Approximately 15% below Pre-1987 levels
- 2-Year Storm – Approximately 34% below Pre-1987 levels
- 1-Year Storm – Approximately 38% below Pre-1987 levels
Further, the construction of the proposed stormwater management improvements would mitigate any negative impacts that properties located immediately downstream of CON 6 may be currently experiencing during a 100-year storm event. As shown by the increasing percentage reductions, the mitigating effects would be greater for the more frequent (i.e. the 1-, 2- and 10-year) storm events.

7. **PLANNED CAPITAL PROJECTS**

Westchester County has been planning various modernization and improvement projects at the Airport. In addition to the improvements to the detention basins, the following proposed capital projects are planned: the creation of a permanent baggage screening area in the Main Terminal, a consolidated deicing pad on the Westside of the airport, the reconstruction of the South Airport Rescue Fire Fighting (ARFF) Road, and the redevelopment of the former Air National Guard (ANG) site.

Incorporating these future projects would result in a proposed increase of approximately 4.7 acres of impervious surface area within the Airport. All of these projects would, however, be located in the Blind Brook watershed; thus, associated stormwater runoff would drain to the Blind Brook. Furthermore, an evaluation was undertaken to determine if the proposed detention basin improvements would also mitigate the increased stormwater runoff that would be generated by these projects. A hydrologic model of future conditions with the additional proposed projects for the Blind Brook drainage area was created for the 1-, 2-, 10-, and 100-year, 24-hour storms.

8. **RESULTS OF THE PROPOSED IMPROVEMENTS**

*Table 6, Comparison of Peak Discharge Rates*, located at the end of this report, shows that even with construction of the increased impervious surfaces that are part of the future capital projects, the basin improvements would still reduce the total peak discharge rates to Blind Brook at CON 6 under Existing (2010) Conditions to below Pre-1987 levels as follows:

- 100-Year Storm – Approximately 8% below Pre-1987 levels
- 10-Year Storm – Approximately 15% below Pre-1987 levels
- 2-Year Storm – Approximately 33% below Pre-1987 levels
- 1-Year Storm – Approximately 37% below Pre-1987 levels

Raising the earthen spillway crests and tops of berm for both basins, runoff from the Airport Operational Areas (AOAs) within the Blind Brook drainage basin during a 100-year storm will be detained below the spillway crests and the minimum freeboard (height above the 100-year water surface elevation to the top of berm) of one foot will occur, satisfying current County and New York State Department of Environmental Conservation (NYSDEC) requirements (Sources: Section 4.5 of the *New York State Stormwater Management Design Manual*, DEC publication “Guidelines for the Design of Dams”).
9. **SUMMARY**

The proposed improvements to Detention Basins A and B alone would improve downstream hydrologic conditions within the Blind Brook headwaters and give the Airport additional capacity to undertake the scheduled future capital projects discussed herein, while still keeping peak discharge rates below Pre-1987 levels.

However, TRC can not state with any degree of certainty that the proposed basin improvements can handle additional future projects outside of the planned capital projects. That determination can come only through additional and/or supplemental hydrologic analysis when such future projects are identified.
Chapter 1  
Project Information

1. **STUDY AREA LOCATION**

   Westchester County Airport is located along Airport Road in the Towns of Harrison and North Castle, and the Village of Rye Brook in Westchester County, New York. The Airport is an approximately 695-acre irregularly shaped tract of land that is approximately 10,000 feet in length from north to south. The Airport site is bounded by Airport Road to the north and east and Lincoln Avenue to the south, with a portion bounded by NYS Route 120 to the west (see *Site Location Map in Appendix A*). The eastern property line of the Airport abuts the Town of Greenwich in Fairfield County, Connecticut. The elevations on the Airport site range from approximately 440 feet above sea level in the northeast to 330 feet above sea level in the southeast.

   The Study Area, or limits of study, includes the Airport property, approximately 70 acres of offsite properties in New York immediately south of the Airport, and approximately 300 acres of offsite properties immediately north and east of the Airport in the Town of Greenwich, Connecticut. The boundaries of the Study Area of this report matches the Study Area examined in the *1999 SWMP* (see further discussion in *Chapter 2, Section 2*). With the Airport situated within two major drainage basins, or watersheds – Rye Lake (RL) and Blind Brook (BB), the boundaries of the Study Area:

   - Allow a determination of stormwater runoff impacts on Rye Lake from Airport tributary areas;
   - Define the total (offsite and Airport) drainage areas tributary to the east and west branches of Blind Brook. The two branches, which are the headwaters for Blind Brook, converge just downstream of the Airport property, and;
   - Allow a determination of stormwater runoff impacts from offsite and Airport drainage areas tributary to the headwaters for Blind Brook.

   The majority of the Study Area is currently located within the Blind Brook drainage basin. The East Branch of Blind Brook, which starts within Airport property adjacent to the South Airport Rescue and Fire Fighting (ARFF) Road, flows as a natural channel through the southeast portion of the Airport property for approximately 2,000 feet south to Lincoln Avenue. The West Branch of Blind Brook also starts within Airport property and flows as a natural channel for approximately 1,600 feet south and parallel to Airport Road. It then flows through the Airport site, with the Blind Brook conveyed within a series of underground concrete culverts that generally runs along the path of the original Blind Brook and under the majority of the Airport Operational Area (AOA). From a headwall located on the east side of Airport Road, approximately 300 feet northwest of the Airport roundabout, 1,810 lineal feet of 54-inch diameter reinforced concrete pipe (RCP) conveys the Blind Brook headwaters to an existing underground drainage structure located south and east of Hangar D. From there, the Blind Brook flows south within a 7”-3” square concrete box culvert to a point just downstream of Taxiway K, approximately 300 feet west of the intersection of Taxiway K with Runway 16/34. The West Branch of Blind Brook daylights between Runway 16/34 and Taxiway L and flows just east of and
generally parallel to Taxiway L for approximately 1,000 feet. Blind Brook is carried under Taxiway L within a 340-foot long, 4’-6” high by 18’ wide concrete box culvert, then flows as a natural stream approximately 2,000 feet south to Lincoln Avenue.

2. **STUDY AREA CHARACTERISTICS**

A review and identification of the study area’s hydrologic and hydraulic characteristics is important in developing a basis for the stormwater analysis and a context for this *Update to the 1999 Storm Water Management Plan*.

a. **Soils**

A review of the Soil Surveys for Westchester County, NY and the State of Connecticut indicate that there are nineteen types of soils present within the limits of the study area (see *Soils Map* in *Appendix A*).

It is important to determine the type of soils that occur at the Airport since each soil has its own characteristics that contribute to the stormwater conditions at the Airport. *Table 1, Soil Characteristics* below summarizes the characteristics of each of the soil types present. Further, these soil characteristics are important to identify because hydrologic analysis requires knowledge of the runoff-producing characteristics of the predominant soil types within the limits of study. The Natural Resource Conservation Service (NRCS) has established a classification system which groups the soils based on their “runoff potential.” These Hydrologic Soil Groups (HSG) are identified by the letters A, B, C, and D. Group A soils have the lowest runoff potential, while Group B, C, and D soils have increasingly higher runoff potential. Group A soils are usually deep, well-drained, and sandy or gravelly with high infiltration rates when thoroughly wet. On the other hand, Group D soils usually have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. These soils exhibit a very slow infiltration rate.

Identification of groundwater and bedrock depths is also important with the context of a hydrologic analysis because these parameters can influence the placement and/or construction of stormwater management facilities.

The *Soils Map* shows that the predominant soils in the developed operational areas of the Airport consist of a combination of Udorthents (Ub, Uc) and Urban Land (Uf), with variable depths to bedrock and groundwater. It should also be noted that the predominant soils in and around the Airport’s detention basins are Paxton fine sandy loams (PnB, PoB) and Raynham Silt Loam (RdA), which generally have a high (shallow) water table. This means that there is a fairly constant source of groundwater available which helps keep the constructed wetland areas within the detention basins viable.
Table 1
Soil Characteristics

<table>
<thead>
<tr>
<th>Map Unit</th>
<th>Soil Names</th>
<th>Water Table (ft)</th>
<th>Depth to Bedrock</th>
<th>Hydrologic Soil Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChB</td>
<td>Charlton Loam, 2 to 8 percent slopes</td>
<td>More than 6’ deep throughout the year</td>
<td>&gt; 60”</td>
<td>B</td>
</tr>
<tr>
<td>CrC</td>
<td>Chatfield-Charlton Complex, rolling, very rocky (Charlton soil properties)</td>
<td>More than 6 feet deep throughout the year</td>
<td>&gt; 60”</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Chatfield-Charlton Complex, rolling, very rocky (Chatfield soil properties)</td>
<td>More than 6 feet deep throughout the year</td>
<td>20” to 40”</td>
<td>B</td>
</tr>
<tr>
<td>Ff</td>
<td>Fluvaquents-Udifluvents complex, frequently flooded</td>
<td>0 feet</td>
<td>&gt; 80”</td>
<td>D</td>
</tr>
<tr>
<td>LcA</td>
<td>Leicester loam 0 to 3 percent slopes, stony</td>
<td>0 to 1.5 feet</td>
<td>&gt;80”</td>
<td>C</td>
</tr>
<tr>
<td>LcB</td>
<td>Leicester Loam 3 to 8% slopes, stony</td>
<td>1.5 feet November thru May</td>
<td>&gt; 60”</td>
<td>C</td>
</tr>
<tr>
<td>PnB</td>
<td>Paxton fine sandy loam 2 to 8% slopes</td>
<td>1.5 to 2.5 feet February to April</td>
<td>&gt; 60”</td>
<td>C</td>
</tr>
<tr>
<td>PnC</td>
<td>Paxton fine sandy loam 8 to 15% slopes</td>
<td>1.5 to 2.5 feet February to April</td>
<td>&gt; 60”</td>
<td>C</td>
</tr>
<tr>
<td>PoB</td>
<td>Paxton fine sandy loam, 2 to 8 percent slopes, very stony</td>
<td>1.5’ to 2.5’</td>
<td>20 to 40”</td>
<td>C</td>
</tr>
<tr>
<td>RdA</td>
<td>Raynham Silt Loam</td>
<td>0.5 to 2.0 feet November thru May</td>
<td>&gt; 60”</td>
<td>C</td>
</tr>
<tr>
<td>RdB</td>
<td>Ridgebury Loam 3 to 8% slopes</td>
<td>Within a depth of 1.5 feet November thru May</td>
<td>&gt; 60”</td>
<td>C</td>
</tr>
<tr>
<td>Sh</td>
<td>Sun loam</td>
<td>1.0’ above to 0.5’ below the surface from Nov. to April</td>
<td>&gt; 60”</td>
<td>D</td>
</tr>
<tr>
<td>SuA</td>
<td>Sutton Loam 0 to 3% slopes</td>
<td>1.5 to 2.5 feet November thru April</td>
<td>&gt; 80”</td>
<td>B</td>
</tr>
<tr>
<td>Ub</td>
<td>Udorthents, smoothed</td>
<td>Variable</td>
<td>Variable</td>
<td>C</td>
</tr>
<tr>
<td>Uc</td>
<td>Udorthents, wet substratum</td>
<td>Variable</td>
<td>Variable</td>
<td>Variable</td>
</tr>
<tr>
<td>Uf</td>
<td>Urban land</td>
<td>Greater than 2 feet</td>
<td>&gt; 10”</td>
<td>B/C</td>
</tr>
</tbody>
</table>

b. **Floodplains**

An analysis of floodplains (via FEMA or other sources of flood mapping) is important within the context of a hydrologic analysis because current design standards in the *New York State Stormwater Management Design Manual* require that stormwater management facilities, particularly stormwater ponds and wetlands, be located outside jurisdictional waters, which include rivers or streams and their floodplains. FEMA’s mapping is the most commonly used source for determining the extents of the 100-year or 500-year floodplains.

A review of FEMA Flood maps (see *Appendix A*) for the Towns of Harrison and North Castle, and Village of Rye Brook effective September 28, 2007 indicate that the majority of the Airport site (i.e., the operational portions of the Airport site above the piped portions of Blind Brook) are located outside both the 100- and 500-year floodplains of Blind Brook (areas designated as “Zone X – unshaded”). These areas can be defined as “areas of minimal flood hazard” and, therefore, are considered outside of jurisdictional waters. However, the maps also indicate that there is a defined 100-year floodplain (areas designated as “Zone AE”, where base flood elevations have been established through detailed analysis) on the portion of the Airport site that includes the natural portion of Blind Brook starting approximately 500 feet downstream of the 4'-6” high by 18’ wide concrete box culvert. This defined floodplain is adjacent to undeveloped portions of the Airport property in the Village of Rye Brook that are outside the AOAs (including stormwater management facilities) and, therefore, does not impact them. Any new facilities, however, should be placed outside of this 100-year floodplain.

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6 According to the *New York State Stormwater Management Design Manual*, the 100-year floodplain is “the land area that is subject to inundation from a flood that has a one percent chance of being equaled or exceeded in any given year.” The physical boundaries of the floodplain are defined in terms of horizontal limits and water surface elevation, and are determined through hydraulic analysis of a river or stream done as part of a Flood Insurance Study.

7 The 500-year floodplain is the land area that is subject to inundation from a flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The physical boundaries of the floodplain are established in a manner similar to that for the 100-year floodplain.
Chapter II
The Update to the 1999 Storm Water Management Plan

1. METHODOLOGY

The Update to the 1999 Storm Water Management Plan is based on the development of hydrologic models that compare “Existing (2010) Conditions” to the “Pre-1987” and “1999 Full Development” Conditions as documented in the 1999 Storm Water Management Plan prepared by Dvirka and Bartilucci (“1999 SWMP”). The Update to the 1999 Storm Water Management Plan has been designed in accordance with the methodology and criteria found in the following publications:


The designs for the Update to the 1999 Storm Water Management Plan are such that future runoff rates from the Airport property will be equal to or less than Pre-1987 runoff rates for the full range of design storms. Twenty-four (24) hour rainfall values for the 1-, 2-, 10- and 100-year design storms associated with a Type III rainfall distribution are used. This synthetic distribution was developed by NRCS based on actual 24-hour rainfall data published by the National Weather Service (NWS).

- The 1-year storm has a 24-hour rainfall amount that historically has been equaled or exceeded once a year.
- The 2-year storm has a 24-hour rainfall amount that historically has been equaled or exceeded once during any two year period. Put another way, the magnitude of a 2-year storm has a 50% chance of being equaled or exceeded during any given year. At the time the 1999 SWMP was published, the 2-year storm event was used as the criteria to protect stream channels from erosion (the 1-year storm is now used as a result of the Unified Stormwater Sizing Criteria presented in Chapter 4 of the New York State Stormwater Management Design Manual). The 2-year storm is now typically used as the criteria to ensure non-erosive flows through roadside swales, overflow/pond pilot channels, and over berms within stormwater management practices.
- The 10-year storm has a 24-hour rainfall amount that historically has been equaled or exceeded once during any ten year period, or the storm has a magnitude that has a 10% chance of being equaled or exceeded during any given year. According to Section 4.5 of the New York State Stormwater Management Design Manual, the 10-year storm is used as the criteria “to prevent an increase in the frequency and magnitude of out-of-bank flooding (flow events that exceed the bank-full capacity of the channel, spilling over into the floodplain.” The 10-year storm is also traditionally used for target sizing of storm drain piping systems and open channels for safe
conveyance of flows.

- The **100-year storm** has a 24-hour rainfall amount that historically has been equaled or exceeded once during any one-hundred year period, or, in other words, the storm has a magnitude that has a 1% chance of being equaled or exceeded during any given year. As stated in Section 4.6 of the New York State Stormwater Management Design Manual, the purpose of analyzing and designing for the 100-year storm is to “(a) prevent the increased risk of flood damage from large storm events; (b) to maintain the boundaries of the predevelopment 100-year floodplain; and (c) to protect the physical integrity of stormwater management practices.”

Under most changes in hydrologic conditions caused by urban development, control of both the 10-year and 100-year storms require providing storage to attenuate post-development peak discharge rates to pre-development levels.

In NRCS methodology, the hydrologic soil groups (HSG) shown in Table 1, Soil Characteristics are one of the major factors used in the selection of the NRCS Runoff Curve Number (CN) values for various land cover types (e.g., grass, forest/wooded, meadow, impervious, etc.) within a particular drainage area. In keeping with the design approach stated in Section 2.1.3 of the 1999 SWMP, the CN values used for cover types within the Airport drainage areas are based on the average of soil groups “C” and “D.” For the cover types within the Connecticut drainage areas, CN values conform to HSG “C.”

The size of the drainage sub areas, along with the sub areas’ corresponding CN value and time of concentration (Tc) values are computed. In NRCS methodology, these values, along with the 24-hour rainfall values for the 1-, 2-, 10- and 100-year design storms, are then used to generate flood hydrographs, which tabulate discharge rates over a 24-hour period (flow vs. time) based on the NRCS unit hydrograph values for the Type III rainfall distribution. The peak discharge rate for each design storm is the maximum value obtained within that 24-hour storm duration.

The computer software program utilized in this Update to the 1999 Storm Water Management Plan to compute the runoff rates and volumes is entitled “HydroCAD,” Version 9.1 published by HydroCAD Software Solutions. This “state-of the art” program incorporates the essential computational methodology used in NRCS TR-55 and TR-20 to compute and route flood hydrographs, plus other features such as time-of-concentration calculations, curve-number lookup, outlet hydraulics, exfiltration calculations, and pond storage calculations.

Changes in Hydrologic Design Standards and Parameters Between the 1999 SWMP and this Update to the 1999 Storm Water Management Plan

Since the publishing of the 1999 SWMP, two of the major design parameters used under NRCS methodology to compute peak rates and volumes of runoff have changed as a result of the Unified Stormwater Sizing Criteria presented in Chapter 4 of the New York State Stormwater Management Design Manual:
- **24-Hour Rainfall Value (P)** – The 24-hour rainfall values used in the *1999 SWMP* for each of the design storms, and the updated values used in this study are shown in Table 2 below. The changes between the *1999 SWMP* and this *Update to the 1999 Storm Water Management Plan* exist for the 24-hour rainfall values for the 2-year and 100-year storms where they have increased since the publishing of the *1999 SWMP*.

### Table 2

24-Hour Rainfall Values – Comparison Between the 1999 and Update Values

<table>
<thead>
<tr>
<th>Design Storm Frequency</th>
<th>P Values (in) 1999 SWM Plan</th>
<th>P Values (in) 2010 SWM Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Year</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>2-Year</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>10-Year</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>100-Year</td>
<td>7.2</td>
<td>7.5</td>
</tr>
</tbody>
</table>

- **Maximum Length of Sheet (Overland) Flow in Time of Concentration (Tc)** – In the computation of the sheet flow component of Tc, Chapter 3 of TR-55 states that the maximum reach length for sheet (overland) flow is 300 feet, which was utilized in the *1999 SWMP*. This *Update to the 1999 Storm Water Management Plan* utilizes Chapter 4 of the *New York State Storm Water Management Design Manual*, which requires that the maximum length of overland flow be limited to no more than 150 feet for pre-development conditions and 100 feet for post-development conditions. Further, for areas of extremely flat terrain (less than 1% average slope), the maximum length can be increased to 250 feet for pre-development conditions and 150 feet for post-development conditions. For example, the computed Tc in the *1999 SWMP* for Sub Area BB-8F to Detention Basin B was 1.02 hours. Using the revised maximum sheet flow reach lengths, the computed Tc is reduced to 0.51 hours. Similar reductions in Tc occur for all sub areas within the Study Area.

In both cases above, the revised parameters result in increased computed runoff rates and volumes for each storm. Increases in computed runoff rates and volumes for a particular storm event are directly proportional to increased 24-hour rainfall values. With respect to Tc, the example above shows that reduced maximum lengths for sheet (overland) flow result in shorter computed Tc values, thus causing computed rates and volumes of runoff to increase.

In order to create consistency between the *1999 SWMP* and this *Update to the 1999 Storm Water Management Plan* and to conform to the current design standards, TRC incorporated these updated parameters into the computation of runoff rates and volumes for both Pre-1987 and Existing (2010) Conditions. The result is that, although the actual numbers for the Pre-1987 Conditions differ between the *1999 SWMP* and this *Update to the 1999 Storm Water Management Plan*, the analysis and comparison in this *Update* is conducted under consistent parameters. The updated parameters were also used in the computation of runoff rates and volumes for future conditions described later in this *Update to the 1999 Storm Water Management Plan*. 
2. HYDROLOGIC DESIGN FACTORS

This subsection of the report provides detailed discussions of the hydrologic conditions, design factors and the procedures performed by TRC that form the basis for the Update to the 1999 Storm Water Management Plan.

a. Pre-1987 Conditions

The Airport is situated within two major drainage basins, or watersheds – Rye Lake (RL) and Blind Brook (BB), with their sub areas described in the 1999 SWMP (in Sections 2.2.2.1 and 2.2.2.2, respectively and shown in 1999 SWMP Figure 2-1 included in Appendix D).

As defined in the 1999 SWMP, Pre-1987 Conditions are those which existed prior to February of 1987, which was before the improvements to the Airport that were detailed in the 1987 EA/FGEIS for the 1986 Westchester County Airport Master Plan Update. In stormwater management terms, Pre-1987 Conditions are those that existed prior to the diversion of runoff at the Airport from the Rye Lake watershed to the Blind Brook watershed.

TRC used the Pre-1987 drainage sub area values, their NRCS/SCS runoff curve numbers, and the channel reach characteristics directly from the HEC-1 calculations in Appendix 2 of the 1999 SWMP. In keeping with the changes described in above, TRC then used the updated parameters to update the Pre-1987 Tc calculations in the hydrologic model for this study. The calculations for the Pre-1987 Conditions hydrologic model are provided in Volume 2, Appendix A.

As part of the analysis, Points of Confluence, which represent, either physically and/or hydrologically, the total computed runoff to Rye Lake or Blind Brook were identified (based on the 1999 SWMP). For “hydrologic points of confluence,” NRCS methodology allows flood hydrograph discharge rate values from multiple drainage sub areas draining to a common point or receiving water to be added along common time intervals to determine a combined discharge rate. This can be done on the condition that the discharge points for multiple drainage sub areas are in relatively close proximity to each other. It is at these points where comparisons of peak discharge rates can be made between Pre-1987, Existing (2010), and Proposed/Future (2011) Conditions for each design storm frequency. The two major Points of Confluence for the Airport are summarized below:

1) **Point CON 1** is the hydrologic point of confluence for the Airport drainage sub areas tributary to Rye Lake. Although runoff from the five Airport drainage sub areas tributary to Rye Lake exits the Airport site at five different physical points, CON 1 represents the combined total peak runoff rates from the five Airport drainage sub areas to Rye Lake.

2) **Point CON 6** is located offsite at the physical convergence of the eastern and western branches of Blind Brook. It represents the combined total peak runoff rates to Blind Brook and is the major point of confluence for all of the Blind Brook drainage sub areas within the limits of study. The location of CON 6 is...
Additional Points of Confluence were defined as part of the 1999 Full Development Conditions model in the 1999 SWMP. These were either intermediate points (physical and/or hydrologic) where runoff from multiple sub areas or discharges converge (e.g., Points CON 2, CON 3, and CON 3A), or supplemental points where runoff exits the Airport site (e.g., Points L1, L2, L3, and CON 5). Except for Points CON 2 and CON 3A, which were not documented in the 1999 SWMP, these points are where comparisons of peak discharge rates can be made between Pre- and Post-development conditions for each design storm frequency. The locations of each of these Points of Confluence are indicated on TRC Drawings DA-1 and DA-2 in Appendix C.

1) **Point CON 2** is located on site northeast of Hangar D and west of the intersection of Airport Road and Old Lake Street. It represents the convergence of several drain lines that convey runoff from offsite Sub Areas BB-1BF, BB-1CF, BB-1DF, BB-1EF, BB-1FF, and BB-1GF to the 54-inch diameter RCP culvert that conveys the Blind Brook headwaters to an existing underground drainage structure located south and east of Hangar D.

2) **Point CON 3** is located at the downstream end of the 4’-6” high by 18’ wide Blind Brook concrete box culvert between Detention Basins A and Basin B. It represents the convergence of runoff from CON 2, Sub Area BB-1AF, and the discharge from Detention Pond A.

3) **Point CON 3A** is located at the southern end of the Airport at the intersection of the Blind Brook and the downstream end of the discharge channel from Detention Pond B. It represents the convergence of runoff from CON 3, Sub Area BB-2F, and the discharge from Detention Pond B.

4) **Point L1** is located at the intersection of the West Branch of the Blind Brook and Lincoln Avenue. There are four 36-inch diameter corrugated metal pipes that carry the Blind Brook off the Airport site under Lincoln Avenue. It represents the convergence of runoff from CON 3A and Sub Area BB-9F.

5) **Point L2** is at an existing 2’-3” by 4’-6” rectangular box culvert under Lincoln Avenue and represents the point of discharge for Sub Area BB-3 from the Airport site.

6) **Point L3** is the point of discharge for Sub Area BB-6 from the Airport site under Lincoln Avenue.

7) **Point CON 5** is located in the southeastern portion of the Airport at the intersection of the East Branch of the Blind Brook and Lincoln Avenue. It represents the convergence of runoff from Sub Area BB-5F, which is comprised mainly of offsite area in Connecticut and Airport Sub Area BB-4F. Approximately three-fourths of the total tributary drainage area to Point CON 5 is offsite area in Connecticut.
b. 1999 Full Development Conditions Analyzed in the 1999 SWMP

1999 Full Development Conditions scenario, which was analyzed in the 1999 SWMP, is comprised of Pre-1987 Conditions plus numerous Airport facilities, stormwater management and drainage infrastructure improvements that were designed between 1987 and 1999, many of which actually were constructed. Some of the major improvements include:

- Installation of storm drain collection (e.g., catch basins/manholes and piping) systems. Some of these systems abandon or redirect several outfalls that previously discharged to the Rye Lake/Kensico Reservoir watershed;
- Improvements to Detention Basin B completed in 1993 and expansion of Detention Basin A completed in 1999;
- Water quality design enhancements for Detention Basins A and B that achieve treatment by using sedimentation to remove suspended particles such as sand, silt and debris, and vegetation (natural and planted) to encourage the biological removal of dissolved (soluble) pollutants; and,
- Use of areas such as natural and manmade depressions, grassed swales, manmade open channels and natural streams within the Airport property to provide additional storage and flow attenuation.

The hydrologic analysis of 1999 Full Development Conditions includes these improvements as described in Sections 2.3 and 2.4 of the 1999 SWMP.

One of the goals of the improvements associated with the 1999 Full Development Conditions was to divert runoff from approximately 157 acres of paved and other AOAs within the Rye Lake drainage basin to the Blind Brook drainage basin. This diversion helped to provide water quality protection for Rye Lake, but contributed more water quantity into the Blind Brook drainage basin.

Rye Lake

The 1999 SWMP identified five sub areas within the Rye Lake drainage basin. These sub areas, which are also described in the 1999 SWMP, are summarized below:

- **RL-1F** – This area utilizes small drainage ditches and culverts to transport runoff northwestward off the Airport site and eventually into Rye Lake. There were no significant changes to the drainage collection system planned between the Pre-1987 and 1999 Full Development Conditions.
- **RL-2F** – This is a small sub area in the northern end of the Airport site. Under the 1999 Full Development Conditions, the construction of a paved parking lot was planned, with an extended detention pond proposed in the western portion of the sub area to treat and attenuate runoff prior to discharging to Rye Lake.
- **RL-3F** – This area is located adjacent to Sub Areas RL-2F, RL-1F and Route 120, and essentially is an undeveloped area with no significant storm drains and no planned construction.
- **RL-4F** – This area is situated between Sub Area RL-3F to the north and Sub Area BB-7F to the south and east. A couple of existing operational facilities (the Airport Surveillance Radar (ASR-9) and the instrument lighting system (ILS) building), a portion of the North Perimeter Access Road and the former staging area for the Westchester County Department of Public Work are located within the area. However, the sub area is a predominantly undeveloped, wooded area with no significant storm drains and no planned construction. Under 1999 Full Development Conditions, up to 400,000 square feet (9.18 acres) of future paved aircraft operational area was to be diverted from this sub area to the Blind Brook drainage basin (Sub Area BB-7F) and Detention Basin A.

- **RL-5F** – This area is located in the southwest corner of the Airport property and is also adjacent to Sub Area BB-7F. Like RL-4F, RL-5F is a predominantly undeveloped, wooded area, even though it contains existing operational facilities (Hangar E, the pump house, airfield block house) and roadways (portion of the North Perimeter Access Road, Tower Road). Runoff from this sub area flows to a low point west of the intersection of Taxiways C and K and eventually to Rye Lake. The western portion of the sub area drains overland in a northerly direction to the low point near Taxiway K, and the southern portion drains eastward to a wetland mitigation area south of Hangar E. An existing 48-inch storm drain collects runoff from the Hangar E roof conveys runoff from the wetland mitigation area north and westward toward Rye Lake.

**Blind Brook**

The sixteen Blind Brook drainage sub areas identified in the 1999 *SWMP* are grouped and described as follows:

- **Group I Sub Areas** – These areas have direct discharge to the East Branch of Blind Brook (CON 5). This group, which includes Sub Areas BB-4F and BB-5F, encompasses a small portion of the south perimeter access road. The balance of development and infrastructure within these sub areas are off Airport property.

- **Group II Sub Areas** – These areas have direct discharge to the West Branch of Blind Brook (CON 3). This group includes Sub Areas BB-1AF, BB-1BF, BB-1CF, BB-1DF, BB-1EF, BB-1FF, and BB-1GF. With the exception of BB-1AF, runoff from all of these sub areas enters Blind Brook upstream of the Airport through direct runoff or through the storm drain collection system. These sub areas encompass Airport Road and parking areas near Hangars 6 and 26, along with King Street and Old Lake Street. From a headwall located on the east side of Airport Road approximately 300 feet northwest of the Airport roundabout, an underground culvert consisting of 1,810 linear feet of 54-inch diameter RCP conveys the Blind Brook headwaters to an existing underground drainage structure located south and east of Hangar D. From there, the Blind Brook flows south within a 7’-3” square concrete box culvert to a point just downstream of Taxiway K, approximately 300 feet west of the intersection of Taxiway K with Runway 16-34. Sub Area BB-1AF (which includes the exposed portion of the Blind Brook) enters the open portion of Blind Brook between Runway 16/34 and Taxiway L and the Blind Brook culvert through direct runoff.
Group III Sub Areas – These areas have direct discharge to the West Branch of Blind Brook downstream of the outlets from Detention Basins A and B. The group includes Sub Areas BB-2F, BB-3F, BB-6F, and BB-9F which encompass the southern-most ends of Taxiways A and L, the Perimeter Access Road, and undeveloped on- and off-site areas adjacent to the southwest corner of the Airport. Stormwater from these areas either flows through open channels down to and beneath Lincoln Avenue before entering Blind Brook or directly to Blind Brook.

Group IV Sub Area – These areas have discharge to Detention Basin A from Sub Area BB-7F. Nearly half of all airside impervious (paved) surfaces are contained within this group. Stormwater runoff from these areas is directed through two 54-inch pipes and one 24-inch storm pipe into Detention Basin A. In addition, as noted above, although runoff from its roof is conveyed to Rye Lake, Hangar E itself is located in this sub area. Under the 1999 Full Development Conditions, up to 400,000 square feet (9.18 acres) of future paved aircraft operational area was to be diverted from the Rye Lake drainage basin (Sub Area RL-4F) to this sub area.

Group V Sub Area – Discharge to Detention Basin B from Sub Areas BB-8F. This sub area includes the remainder of the airside impervious surfaces, including the terminal deicing apron, Hangar A ramp, and most corporate hangars on the east side of the Airport. Stormwater runoff from this sub area is directed through two primary storm drain collection systems and discharged through two 72-inch, one 18-inch, and one 12-inch storm pipes into Detention Basin B.

Detention Basins

The design parameters that were proposed in the 1999 SWMP for each of the detention basins are summarized below:

Detention Basin A was designed in the 1999 SWMP with elevations ranging from a bottom at Elevation 365 to the top of berm at Elevation 374. Stormwater within Detention Basin A is discharged through one of two outlet structures on the south side of the detention basin. The first structure has a 12-inch inlet leading to a 54-inch RCP ending at the headwall structure for the Blind Brook culvert. The second structure is intended for detention basin overflow control and leads to a 60-inch RCP ending at a headwall downstream of the 54-inch RCP. The design of Detention Basin A also incorporated a 200-foot wide earthen spillway with a crest elevation of 373.5.

The design storage volume at Elevation 373.5 (the spillway crest) is 35 acre-feet, and the maximum storage volume at the top of berm (Elevation 374) is 37.6 acre-feet.

In addition to managing stormwater runoff, Detention Basin A also serves as a wetland mitigation area. Refer to Subsection 4a (Wetlands) of this Update to the 1999 Storm Water Management Plan for a more detailed discussion.

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Additional details of the design parameters for Detention Basins A and B are provided in Section 3.3.2 of the 1999 SWMP.
Detention Basin B was designed in the 1999 SWMP with elevations ranging from a bottom at Elevation 359 to the top of berm at Elevation 366. An 18-inch pipe with a manually operated gate valve in the outlet structure regulates the discharge rate from Detention Basin B to twin 60-inch diameter RCPs. The design of Detention Basin B also incorporated a 250-foot wide earthen spillway with a crest elevation of 365.

The design storage volume at Elevation 365 (the spillway crest) is 24.2 acre-feet, and the maximum storage volume at the top of berm (Elevation 366) is 28.8 acre-feet.

Similar to Detention Basin A, in addition to managing stormwater runoff, Detention Basin B also serves as a wetland mitigation area. Refer to Subsection 4a of this Update to the 1999 Storm Water Management Plan for a more detailed discussion.

Under the 1999 Full Development Conditions, there are three major storm drain systems, which are described in more detail in Sections 3.2.2.1 through 3.2.2.3 of the 1999 SWMP, that collect runoff from the Blind Brook sub areas. The first major drainage pipe system is described under the “Group II Sub Areas” above and conveys runoff from those areas. The second major drainage pipe system, including the branch drainage pipe systems collecting runoff from the Hotel and Echo Fixed Base Operator (FBO) areas, conveys runoff from Sub Area BB-7F to Detention Basin A. The third major drainage pipe system conveys runoff from Sub Areas BB-8F and BB-8FD to Detention Basin B.

c. Existing (2010) Conditions

TRC utilized the 1999 Full Development Conditions as the basis to establish the Existing (2010) Conditions within the limits of study, along with the following supplemental data:

- Copies of the NRCS/SCS runoff curve number (CN) calculation worksheets for the 1999 Full Development drainage sub areas in both the Blind Brook and the Rye Lake watersheds identified in the 1999 SWMP. These worksheets, which were obtained directly from Dvirka and Bartilucci, summarize the land use/cover type for each drainage sub area.
- Copies of the NRCS/SCS time of concentration (Tc) calculation and flow path worksheets for the 1999 Full Development drainage sub areas in both the Blind Brook and the Rye Lake watersheds identified in the 1999 SWMP. These worksheets were obtained directly from Dvirka and Bartilucci.
- Input data used to create the 1999 Full Development HEC-1 Flood Hydrograph hydrologic model runs in Volume 2 (Appendices) of the 1999 SWMP.
- December 2001 AutoCAD® files obtained from Camp Dresser McKee (CDM) that containing the 1999 Full Development drainage sub areas for both the Blind Brook and the Rye Lake watersheds identified in the 1999 SWMP.
Storm Water Pollution Prevention Plan (SWPPP) for the Westchester County Airport Parallel Taxiway Phase IV, prepared by STV Incorporated, July 2001.

“Drainage Summary Report” for the Brunswick School, Greenwich, CT, prepared July 28, 2003 by Redniss & Mead, Inc., Stamford, CT.


GIS data provided by Westchester County and the Town of Greenwich, CT. The data included the most recent aerial photographic base tiles (Year 2008 and 2009) and GIS topographic files (Year 2006 for Westchester, Year 2008 for Greenwich) within the limits of study.

AutoCAD® file from Westchester County of the 1999 “Preliminary Utility Base Map” originally prepared by Ward Carpenter Engineers, White Plains, NY.

AutoCAD® files of September 2000 topographic surveys for Detention Ponds A and B prepared by YEC, Inc., Valley Cottage, NY.


As the first step in updating the 1999 Full Development Conditions model to reflect Existing (2010) Conditions, TRC created an updated “Existing (2010) Conditions Drainage Area Map” by combining the following AutoCAD® files: the Ward Carpenter 1999 Preliminary Utility Base Map, the 1999 Full Development drainage sub area divides obtained from CDM, and the Westchester County/Greenwich topographic files (which TRC converted from GIS to AutoCAD® format). This map is Drawing DA-1 in Appendix D. The drainage sub area divides were adjusted against the latest topographic data, and to account for known diversions from onsite and offsite drainage systems. Then, using the NRCS runoff curve number calculation worksheets from Dvirka and Bartilucci for 1999 Full Development Conditions as a guide, TRC performed detailed takeoffs with AutoCAD® of the total area and of the areas of the various land use/cover types for each of drainage sub areas within the Blind Brook Group (I-V) and Rye Lake watersheds. These takeoffs were used to calculate the CN values for each sub area in the Existing (2010) Conditions model.

TRC also obtained the most up to date information for the Brunswick School complex that abuts the Airport property to the east in the Town of Greenwich, Connecticut. This data includes the stormwater report and as-built site plans as described above. The drainage areas, CN values, times of concentration, and stormwater facilities design from the Brunswick School were used and incorporated into the Existing (2010) Conditions design.

Rye Lake

The following changes in the Rye Lake sub area characteristics from the 1999 Full Development Conditions were incorporated into the Existing (2010) Conditions hydrologic model:

- **RL-2F** – Under the 1999 Full Development Conditions, the construction of a 4.3-acre paved parking lot was planned, with an extended detention pond proposed in
the western portion of the sub area to treat and attenuate runoff prior to discharging to Rye Lake. Both the lot and the detention pond were not built.

- **RL-3F** – The North Airport Rescue and Fire Fighting (ARFF) Road, which provides access for emergency vehicles to remote areas of the Airport and allows service vehicles to drive to selected facilities on the Airport without crossing runways or driving on taxiways, was realigned and reconstructed to eliminate encroachment within the FAA safety area for Runway 16/34.

- **RL-4F** - Under 1999 Full Development Conditions, up to 400,000 square feet (9.18 acres) of future paved aircraft operational area was to be diverted from this sub area to the Blind Brook drainage basin (Sub Area BB-7F) and Detention Basin A. The 9.18 acres was ultimately not diverted because the future paved aircraft operational area was not constructed.

**Blind Brook**

A number of changes in the Blind Brook sub area characteristics from the 1999 Full Development Conditions were noted by TRC and incorporated into the Existing (2010) Conditions hydrologic model, as follows:

- **Group I Sub Areas** – The northern two-thirds of Sub Area BB-5F is redefined by the following sub area designations, as shown in the Redniss & Mead “Drainage Summary Report” associated with the design and construction of the Brunswick School: BS-C (majority portion), BS-D_{channel}, BS-D_{hypo}, BS-D_{det}, and BS-D_{pond}. Note that detention ponds were constructed in BS-D_{det} and BS-D_{pond} as part of the stormwater management system for the Brunswick School to attenuate runoff from those sub areas prior to discharging downstream. The size of Sub Area BB-4F is slightly smaller (approximately 1.1 acres less) than under 1999 Full Development Conditions.

- **Group II Sub Areas** – Full Development Sub Area BB-1GF, south and east of the intersection of Airport Road and Old Lake Street, is now redefined as Sub Areas BS-A and BS-B3 from the Redniss & Mead “Drainage Summary Report” associated with the design and construction of the Brunswick School.

- **Group III Sub Areas** – The 1999 Full Development divides for Sub Areas BB-3F and BB-6F were changed by CDM as part of the work for their 2001 “Final Report of Proposed Deicing Alternatives for the Westchester County Airport”. The 2001 AutoCAD® files from CDM showed that Sub Area BB-3F was subdivided into areas BB-3FA (northern half) and BB-3FB (southern half) based on a review of surveyed topography by CDM of the area south of the approach end of Runway 34 and within the perimeter access road. According to CDM, a 12-inch corrugated metal pipe, installed circa 2000, collects runoff from area BB-3FA, which includes the taxiway run-up pads, and conveyed it to Detention Basin B. While TRC confirmed the presence of the 12-inch pipe in the field, TRC’s field investigation of the topography along the divide between BB-3F and BB-8F concluded that runoff from the northern half of BB-3F never reaches the 12-inch pipe, and that BB-3F should not be subdivided. Furthermore, TRC reaffirmed CDM’s discovery that improvements made by the County at the same time to the swale running along the interior edge of the perimeter access road, and the construction of a 24-inch corrugated metal pipe beneath the Perimeter Access...
Road southwest of the end of Runway 34, changed the divides between Sub Areas BB-3F and BB-6F compared to 1999 Full Development Conditions. Runoff from the majority of Sub Area BB-3F flows south through the 24-inch pipe beneath the perimeter access road through an open channel down to and beneath Lincoln Avenue before entering Blind Brook. There were also changes to the boundaries and sizes Sub Areas BB-2F (increase of approximately 6 acres) and BB-9F (increase of 0.25 acre) from 1999 Full Development Conditions due to variations in topography.

**Group IV Sub Areas** – As noted earlier under 1999 Full Development Conditions, up to 400,000 square feet (9.18 acres) of future paved aircraft operational area was to be diverted from the Rye Lake drainage basin (Sub Area RL-4F) to Sub Area BB-7F and Detention Basin A. However, TRC determined that the diversion did not occur and construction of the paved areas did not occur either. This determination is substantiated by the fact that under Existing (2010) Conditions, the total acreage of Rye Lake Sub Area RL-4F (64.67 acres) is consistent with the pre-diversion area from the 1999 SWMP (64.77 acres). Based on discussions with Westchester County, there are currently no plans to complete this diversion.

**Group V Sub Areas** – The offsite portion of Sub Area BB-8FA is now redefined as Sub Areas BS-B3 (portion), BS-B2, BS-B1_{byp}, BS-B1_{det}, and a portion of Sub Area BS-C from the Redniss & Mead “Drainage Summary Report” associated with design and construction of the Brunswick School. In addition, a detention pond was constructed in BS-B1_{det} as part of the stormwater management system for the Brunswick School to attenuate runoff from the sub area prior to discharging downstream.

Table 3, Tributary Drainage Sub Areas, Existing (2010) Conditions below lists the tributary sub areas under Existing (2010) Conditions, with the acreage on the Airport, off the Airport in New York, off the Airport in Connecticut, and total acreage for each sub area. The Existing (2010) Conditions sub areas are depicted on TRC Drawing DA-1, Existing (2010) Conditions Drainage Area Map, which can be found in Appendix C.

The 1999 Full Development time of concentration (Tc) data obtained from both Dvirka and Bartilucci and the Redniss & Mead “Drainage Summary Report” for the Brunswick School was also used as a basis for the Tc’s in the Existing (2010) Conditions model. In keeping with the changes described above, the Tc’s for each sub area were adjusted to comply with current design standards and to also reflect overland and channel flow based on current topography and pipe travel times (for Airport sub areas) based on the best available drainage system data. The Existing (2010) Conditions model also accounts for the drainage areas and stormwater management system of the Brunswick School, but uses the updated rainfall and sheet flow parameters mentioned above within the school drainage sub areas tributary to the system.

It is important to note that the stormwater management system design for the construction and expansion of the Brunswick School was approved by the Town of Greenwich, CT Land Use Department. The Redniss & Mead analysis showed that
the stormwater management system would keep peak runoff rates after development of the Brunswick School at levels no greater than the peak rates under pre-development conditions at various points of discharge from the school site. However, the analysis was done using rainfall values and overland sheet flow length values that, while conforming to Connecticut State and local standards at the time, differ from the New York State “updated” values discussed in Section 1 above. Using the updated rainfall and sheet flow parameters within the school drainage sub areas tributary to the system allows for a consistent assessment of the overall peak runoff rate conditions at CON 5.
### Table 3

#### Tributary Drainage Sub Areas

**Existing (2010) Conditions**

<table>
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<th>Sub Area</th>
<th>On Airport (Ac.)</th>
<th>Off Airport In New York (Ac.)</th>
<th>Off Airport In Connecticut (Ac.)</th>
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<td>BS-B1 det</td>
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<td>4.99</td>
<td>4.99</td>
<td></td>
</tr>
<tr>
<td>BS-B2</td>
<td></td>
<td>13.58</td>
<td>13.58</td>
<td></td>
</tr>
<tr>
<td>BS-B3</td>
<td></td>
<td>11.23</td>
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</tr>
<tr>
<td>BS-C</td>
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<td>BS-D det</td>
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<td>BS-D chan</td>
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<td>BS-D bypass</td>
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<tr>
<td><strong>Sub Total 1</strong></td>
<td></td>
<td><strong>516.50</strong></td>
<td><strong>49.38</strong></td>
<td><strong>278.85</strong></td>
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Table 3
Tributary Drainage Sub Areas
Existing (2010) Conditions (cont’d)

<table>
<thead>
<tr>
<th>Sub Area</th>
<th>On Airport (Ac.)</th>
<th>Off Airport In New York (Ac.)</th>
<th>Off Airport In Connecticut (Ac.)</th>
<th>Total Area (Ac.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rye Lake</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>RL-1F</td>
<td>35.87</td>
<td></td>
<td></td>
<td>35.87</td>
</tr>
<tr>
<td>RL-2F</td>
<td>6.03</td>
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<td>RL-3F</td>
<td>26.64</td>
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<td>RL-4F</td>
<td>64.67</td>
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<td>59.82</td>
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<td>RL-5F</td>
<td>43.88</td>
<td></td>
<td>15.94</td>
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<tr>
<td>Total (1+2)</td>
<td>693.59</td>
<td>65.32</td>
<td>278.85</td>
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Detention Basins

TRC determined the Existing (2010) Conditions storage and discharge parameters for Detention Basins A and B from the February/March 2008 topographic surveys provided by Ward Carpenter. Spillway widths and elevations and top of berm elevations were estimated based on a visual inspection of the topographic surveys and confirmed through field inspection in the summer of 2010. In order to estimate the storage volumes of the detention basins, TRC used AutoCAD® to calculate the surface areas for each one-foot contour within the range of storage elevations. The volumes were then calculated using the sum of the average surface areas between one-foot contours multiplied by the maximum storage depth in each basin.

The comparison of elevation and storage parameters from each of the detention basins is provided in Table 4 below:

Table 4
Comparison of Airport Stormwater Basin Elevation and Storage Parameters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Spillway Width @ Elevation</td>
<td>200 ft @ 373.5</td>
<td>440 ft @ 372.3*</td>
<td>-1.2 ft.**</td>
</tr>
<tr>
<td></td>
<td>Storage Volume (Ac.-Ft.)</td>
<td>35.0</td>
<td>25.7</td>
<td>-9.3</td>
</tr>
<tr>
<td></td>
<td>Top of Berm Elevation</td>
<td>374.0</td>
<td>373.0</td>
<td>-1.0 ft.</td>
</tr>
<tr>
<td></td>
<td>Storage Volume (Ac.-Ft.)</td>
<td>37.6</td>
<td>29.1</td>
<td>-8.5</td>
</tr>
<tr>
<td>B</td>
<td>Spillway Width @ Elevation</td>
<td>250 ft @ 365.0</td>
<td>368 ft @ 363.5*</td>
<td>-1.5 ft.**</td>
</tr>
<tr>
<td></td>
<td>Storage Volume (Ac.-Ft.)</td>
<td>24.2</td>
<td>23.9</td>
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</tr>
<tr>
<td></td>
<td>Top of Berm Elevation</td>
<td>366.0</td>
<td>364.0</td>
<td>-2.0 ft.</td>
</tr>
<tr>
<td></td>
<td>Storage Volume (Ac.-Ft.)</td>
<td>28.8</td>
<td>26.2</td>
<td>-2.6</td>
</tr>
</tbody>
</table>

* - Average crest elevation. For Detention Basin B, spillway consists of two separate segments: 208 feet on the west side of the basin, and 160 feet on the south side of the basin.
** - Difference shown is for the spillway crest elevations.
The above table shows that the current storage depths and volumes for Detention Basins A and B are reduced from the design depths and volumes presented in the 1999 SWM Plan. Spillway and top of berm elevations under Current (2010) Conditions are lower than the design elevations used for 1999 Full Development Conditions. Based on the 2008 topographic survey data, Detention Basins A and B were not constructed as originally designed with respect to storage depths and volumes. Further, as is common with detention basins, volumes have been decreased due to sedimentation.

As a supplement to the survey information, TRC performed a field inspection of the outlet structures for each basin in the spring of 2010. This was done to verify the design configurations as compared to the construction as-built drawings for each basin outlet and the information shown on the YEC and Ward Carpenter surveys. TRC found that the two outlet structures in Detention Basin A conformed to the design configurations shown on the Detention Basin A construction as-built drawings.

However, the Detention Basin B outlet has an as-built configuration that is much different than that shown on the original Detention Basin B construction drawings. The as-built outlet has a principal rectangular concrete weir spillway at Elevation 361.33, built above an 18-inch diameter low flow pipe. Water flows from the low flow pipe and spillway through an open concrete transition chamber before discharging from the basin through twin 60-inch diameter RCPs. The Detention Basin B construction drawings detailed a concrete rectangular riser outlet structure. An 18-inch diameter low flow pipe was to be connected to the inlet side of the structure, with the twin 60-inch diameter RCPs connected to the outlet side of the structure. An open top of the riser was to be set at Elevation 362, with aluminum bar grating used to cover the opening. Once the water level in the basin rose above the top of the riser, water would spill through the grating into the riser before discharging from the basin through twin 60-inch diameter concrete pipes. Since the outlet structure for Detention Basin B was not constructed as originally designed, the Existing (2010) Conditions stage/discharge values are different than the design values (and the values depicted in the 1999 SWMP).

The findings of the TRC field inspection, along with the outlet elevation data from the YEC surveys, were used to calculate the stage/discharge parameters for each basin outlet in the Existing (2010) Conditions model.

Finally, Airport personnel reported in December 2009 that there is a base flow to Detention Basin B that, when the valve to the low flow outlet pipe is closed, fills the basin to the principal spillway crest within a 24-hour period. This results in a computed base flow of 200,000 gal/hr, or 7.4 cfs. This base flow has been included in the Detention Basin B stage/discharge parameters in the Existing (2010) Conditions model.
3. **HYDROLOGIC MODELING AND ANALYSIS**

a. Hydrologic Modeling Methodology

**1999 Full Development Conditions**

The *1999 SWMP* shows that for the 1-, 2-, and 10-year storms (i.e., those more frequent storms), runoff from the Airport drainage areas tributary to Detention Basin A (Sub Area BB-7F) and Detention Basin B (Sub Area BB-8F) was designed to be conveyed to the basins through the network of Airport storm drainage pipes. According to the *1999 SWMP*, the majority of Airport storm drains have adequate hydraulic capacity to convey 10-year storm runoff. For the 1-, 2-, and 10-year storms, runoff is detained within the basins below their earthen spillway crests as shown in Table 4 above and attenuated. A small portion of the 10-year storm runoff that exceeds the capacity of the storm drain system is also detained in the ponding area within Sub Area BB-8FD prior to being conveyed to Detention Basin B.

The 54-inch diameter RCP and the 7’-3” square concrete box culvert that convey runoff from the Group II Sub Areas underneath the Airport to the West Branch of Blind Brook (Points CON 3, CON 3A and L1) have sufficient capacity to handle runoff from the 100-year storm.

However, although the peak discharge rates for the 100-year storm are reduced below Pre-1987 levels, the detention basins were not designed to detain runoff above the 10-year storm. Excess runoff above the 10-year storm bypasses the detention basins and follows various overland flow paths, with most of the excess runoff combining with the detention basin discharges at downstream confluence points as follows:

- **Under 100-year storm conditions for Sub Area BB-8F to Detention Basin B**, the 10-year storm runoff will continue to flow to Detention Basin B, but the excess runoff will follow three different paths: excess runoff from areas BB-8FA and BB-8FD will flow overland to CON 3 on Blind Brook, excess runoff from area BB-8FB will flow overland southwestward to Blind Brook at CON 3 and excess runoff from area BB-8FC will flow overland southwestward to Blind Brook at CON 3A.

- **Under 100-year storm conditions for Sub Area BB-7F to Detention Basin A**, the 10-year storm runoff will continue to flow to Detention Basin A, but the excess runoff follows two different paths: 1) excess runoff from areas BB-7FA flows overland to Rye Lake (CON 1) and 2) excess runoff from area BB-7FB flows overland southeastward to Blind Brook at CON 3.

While the explanation of how primary and excess overland flow conditions occur during a 100-year storm event seemed theoretically sound, TRC had reservations about whether or not the data modifications to the HEC-1 hydrologic models for the 100-year storm in the *1999 SWMP* and their corresponding results, were accurate in depicting the stated conditions. For example, the primary and excess overland flow portions of the 100-year storm runoff (7.2 inch rainfall) were broken up into separate...
10-year (5.0 inch rainfall) and excess (2.2 inch rainfall) runoff hydrographs, which were modeled as described above. As a result, the peak discharge rates, peak storage volumes, and peak storage elevations for Detention Basins A and B were calculated to be the same for both in the 10-year and 100-year storm models. This should have yielded greater overall flow from the basins during the 100-year storm, with some of the overall discharge from the basins comprised of flow over the earthen spillway crests. However, TRC recognizes that the HEC-1 hydrologic program, while considered “state of the art” at the time that the modeling was done for the 1999 SWM Plan, had limited capabilities in terms of accurately modeling split flow/runoff conditions. The HydroCAD computer software program used to compute the runoff rates and volumes has an important feature which TRC believes more accurately models split flow/runoff conditions by allowing a limit to be specified for flood hydrograph flows from a sub area (see further discussion under Subsection 3b).

Existing (2010) Conditions

Using the hydrologic design parameters that were established as discussed above, TRC created an Existing (2010) Conditions hydrologic model of the Rye Lake and Blind Brook drainage areas for the 1-, 2-, and 10-year storms that is similar to the models created for the 1999 SWMP.

As part of the efforts to create an updated hydrologic model that more accurately represents runoff conditions from storm events greater than the 10-year storm, up to and including the 100-year storm, TRC obtained all available “as-built” data (e.g., paper plans, AutoCAD® files, and calculations) for the major drainage pipe systems conveying runoff from Sub Areas BB-7F, BB-8F, and BB-8FD to the detention basins that were previously described in the 1999 SWMP. This data was used to create computer models of the pipe systems that determine the hydraulic capacities and flow characteristics of the pipe systems for storm events from the 10-year storm, up to and including the 100-year storm. This analysis allowed TRC to determine the maximum storm flows that could be conveyed to the detention basins within the major drainage pipe systems. Runoff rates that were in excess of the determined system capacities traveled overland, either reaching the detention basins through alternate paths or bypassing the basins completely.

TRC used the hydraulic capacity analyses of the pipe systems, a “water drop path,” which is an AutoCAD® utility that can trace the path water takes across terrain surfaces, and field reconnaissance as tools to determine and compare the primary (i.e. pipe flow) and excess overland flow areas and patterns (i.e. where pipe capacities are exceeded) within the Airport drainage areas tributary to Detention Basin A (Sub Area BB-7F) and Detention Basin B (Sub Areas BB-8F and BB-8FD) for storms from the 10-year storm, up to and including the 100-year storm. The primary and excess overland flow areas are shown on Drawing DA-2, Existing (2010) Conditions Drainage Area Map – 100 Year Storm, which is located in Appendix D.
The results of the analysis are as follows:

Drainage Areas to Detention Basin B

- Contrary to the patterns assumed for the 1999 Full Development Conditions model, the two major storm drain pipes from Sub Areas BB-8FA and BB-8FD have the ability to convey greater than 10-year storm flows within the closed systems to Detention Basin B. The combined hydraulic capacity of the closed systems is approximately 460 cfs, which is equivalent to a flow rate from a storm between a 25-year and 50-year frequency. In other words, approximately 460 cfs can be safely conveyed to Detention Basin B within storm drain pipes from Sub Areas BB-8FA and BB-8FD before excess, secondary runoff occurs overland. The implications of this result are further explained below.

- Contrary to 1999 Full Development Conditions, excess runoff from Sub Area BB-8FA will flow overland to the ponding area within Sub Area BB-8FD. This area detains and attenuates runoff, then conveys it to Detention Basin B.

- Similar to 1999 Full Development Conditions, excess runoff from Sub Area BB-8FB will flow overland southwestward to Blind Brook at CON 3 and excess runoff from Sub Area BB-8FC will flow overland southwestward to Blind Brook at CON 3A. However, based on the results of the hydraulic capacity analyses of the pipe systems and the “water drop path,” analysis, the limits and extents of excess overland flow areas BB-8FB and BB-8FC differ from the limits determined in 1999 Full Development Conditions. Since the size of sub area BB-8FB under Existing (2010) Conditions is greater than determined in 1999 Full Development Conditions, there is more excess runoff to CON 3 during the 100-year storm. Conversely, the size of sub area BB-8FC under Existing (2010) Conditions is less than determined in 1999 Full Development Conditions, therefore, there is less excess runoff to CON 3A.

Drainage Areas to Detention Basin A

- The two major storm drain pipes from Sub Areas BB-7F have a combined hydraulic capacity of approximately 310 cfs, which is equivalent to flow rates from a 10-year frequency storm. In other words, approximately 310 cfs can be safely conveyed to Detention Basin A within the closed systems before excess, secondary runoff occurs overland. According to the 1999 SWMP, the storm drain trunk line collecting runoff from the Hotel and Echo FBO areas that was extended across Runway 11/29 and runs parallel to Taxiways K and C was to have sufficient capacity to transport 25-year storm runoff coming from Airport paved areas that were to be diverted from Sub Area RL-4F to Sub Area BB-7F and Detention Basin A. In terms of Existing (2010) Conditions, even though the diversion did not happen, the reduced capacities of the closed drainage systems to Detention Basin A relative to their intended design means there would be greater amounts of excess, secondary runoff bypassing Detention Basin A during the 100-year storm.

- Based on this, and similar to 1999 Full Development Conditions, the 10-year storm runoff from Sub Area BB-7F will continue to flow to Detention Basin A, but the excess runoff from Sub Area BB-7FA flows overland to Rye Lake (CON 1), and excess runoff from Sub Area BB-7FB flows overland.
southeastward to Blind Brook at CON 3. However, based on the results of the hydraulic capacity analyses of the pipe systems and the “water drop path,” analysis, the limits of BB-7FA and BB-7FB differ from the limits in 1999 Full Development Conditions. Since the size of sub area BB-7FA under Existing (2010) Conditions is less than determined in 1999 Full Development Conditions, there is less excess runoff to Rye Lake from storm events greater than the 10-year storm, up to and including the 100-year storm. Conversely, since the size of sub area BB-7FB under Existing (2010) Conditions is greater than determined in 1999 Full Development Conditions, there is greater excess runoff to CON 3.


Table 6, Comparison of Peak Discharge Rates, located at the end of the main report, summarizes the results of the hydrologic analysis, providing a comparison of peak discharge rates for both Pre-1987 and Existing (2010) Conditions (as well as the Future Conditions to be discussed later in this document) at the various Points of Confluence for the 1-, 2-, 10-, and 100-year storm events. The values at CON 1 represent the total peak runoff rates to Rye Lake, and the values at CON 6 represent the total peak runoff rates to Blind Brook. The calculations for the Existing (2010) Conditions hydrologic model are provided in Volume 2, Appendix B. The calculations for the Pre-1987 hydrologic model are provided in Volume 2, Appendix A.

The HydroCAD computer software program used to compute the runoff rates and volumes has an important feature which TRC believes more accurately models split flow/runoff conditions by allowing a limit to be specified for flood hydrograph flows from a sub area. For example, hydrograph flows for Sub Area BB-8FA up to the specified limit (460 cfs to model the combined hydraulic capacity of the closed pipe systems) will go to Detention Pond B. Sub Area BB-8FA flows that exceed the specified limit are diverted in the model as inflow to the ponding area within Sub Area BB-8FD.

When reviewed against the objectives achieved under the 1999 SWMP, the results indicate the following:

1. The total peak flow rates to Rye Lake at CON 1 under Existing (2010) Conditions continue to be less than those under Pre-1987 Conditions for the 1-, 2-, 10-, and 100-year storm events. The 1999 SWMP proposed the redirection of runoff from 157 acres of developed Airport properties within the Rye Lake watershed to the Blind Brook watershed and the proposed detention basins for treatment. Under Existing (2010) Conditions, runoff from approximately 143 acres was diverted. Under the 1999 SWMP, 400,000 square feet (9.18 acres) of future paved aircraft operational area was to be diverted from Sub Area RL-4F to Sub Area BB-7F and Detention Basin A. However, TRC determined that the diversion did not occur and construction of the paved areas did not occur. Also, approximately 5 acres of aircraft operational area within Sub Area RL-5F was not diverted to Blind Brook.
as intended in the 1999 SWMP. This area includes Hotel FBO Access Roads A and B and adjacent grassed shoulders surrounding the Hotel FBO West Apron.

2. The peak flow rates to the East Branch of Blind Brook at CON 5 (at Lincoln Avenue) under Existing (2010) Conditions are significantly (40% to 60%) greater than those under Pre-1987 Conditions for the 1-, 2-, 10-, and 100-year storm events. While the increased flow rates under Existing (2010) Conditions are partly attributable to the slight increase (approximately 2 acres) in total tributary drainage area to the East Branch of Blind Brook at CON 5, it is TRC’s opinion that the increased flow rates are mainly caused by an increase of almost 8 acres in offsite impervious area tributary to CON 5 from the Brunswick School and other upstream Connecticut properties. Most of this increased impervious area (approximately 6.3 acres) can be attributed to the construction and expansion of the Brunswick School.

3. The peak flow rates to the West Branch of Blind Brook at critical Point of Confluence L1 (at Lincoln Avenue) under Existing (2010) Conditions continue to be less than those under Pre-1987 Conditions for the 1-, 2-, and 10-year storm events. This occurs even with the Existing (2010) Conditions peak discharge rates from Detention Basins A and B being significantly greater than those under 1999 Full Development Conditions for the 10-year storm event. The total computed drainage area tributary to Detention Basin B is approximately 11 acres greater under Existing (2010) Conditions than what was represented and computed for 1999 Full Development Conditions. Under the 1999 SWMP, 10-year storm runoff from the Airport areas tributary to Detention Basins A and B was designed to be detained within the basins below the spillway crests and attenuated. Due to the increased acreage and reduced basin storage depths and volumes, the 10-year storm runoff is not detained, with spillway flow occurring at both basins (0.2’ flow depth for Detention Basin A, 0.34’ flow depth for Detention Basin B).

4. The total peak flow rate to Blind Brook at critical Point of Confluence CON 6 (intersection of the East and West Branches) under Existing (2010) Conditions continues to be less than those under Pre-1987 Conditions for the 1-, 2-, and 10-year storm events. This occurs even with the increased flow rates to CON 5 noted above and with the increased peak discharge rates from Detention Basins A and B under Existing (2010) Conditions noted in the discussion of Point L1. However, for the 100-year storm under Existing (2010) Conditions, the discharge rates are actually higher than the Pre-1987 levels. The 100-year storm for multiple points is discussed later in this document.

5. The peak flow rates to the West Branch of Blind Brook at critical Point of Confluence L1, and the total peak flow rate to Blind Brook at critical Point of Confluence CON 6 under Existing (2010) Conditions are greater than those under Pre-1987 Conditions for the 100-year storm event. The ponding area within Sub Area BB-8FD plays a much bigger role as a stormwater management component, providing an additional 6.5 acre-feet of storage volume for the excess diverted runoff from Sub Area BB-8FA without overtopping Runway 16-34. This results in more runoff ultimately being conveyed to Detention Basin B and less excess overland runoff bypassing the detention basins compared to 1999 Full Development Conditions in the 1999 SWMP. There is even greater spillway flow
from the detention basins during the 100-year storm (0.36’ flow depth for Detention Basin A, 0.53’ flow depth for Detention Basin B).

6. While the peak discharge rates from Sub Area BB-3F to Point L2 continue to be less than those under Pre-1987 Conditions for the 100-year storm, the rates are slightly greater than those under Pre-1987 Conditions for the 1-, 2-, and 10-year storm events. This occurs because under Existing (2010) Conditions, Sub Area BB-3F has an additional four (4) acres of impervious area and approximately 10 fewer acres of forest cover than what was represented and computed under the 1999 Full Development Conditions. Shifts in the divide (boundary) under Existing (2010) Conditions between Sub Areas BB-3F and BB-8F/BB-8FD account for additional impervious area from Taxiways A and L that drain to Areas BB-3F. These Taxiways were shown to drain to Sub Areas BB-8F and BB-8FD under Full Development Conditions in the 1999 SWMP. The combination of increased impervious area and reduced forest cover results in greater runoff due to an increased CN value for the sub area.

7. The peak flow rates from Sub Area BB-6F to Point L3 under Existing (2010) Conditions continue to be less than those under Pre-1987 Conditions for the 1-, 2-, 10-, and 100-year storm events.

**100-Year Storm**

The results of the existing conditions analysis show that the peak rates of runoff at critical Points of Confluence L1 (West Branch of Blind Brook at Lincoln Avenue), CON 5 (East Branch of Blind Brook at Lincoln Avenue) and CON 6 (intersection of the East and West Branches) under Existing (2010) Conditions for the 100-year storm event are greater than those under Pre-1987 Conditions. Therefore, the objectives of the 1999 SWMP are not being completely met under Existing (2010) Conditions.

The main factors causing 100-year Existing (2010) Conditions peak runoff rates to exceed Pre-1987 levels are:

- Increased runoff from development of offsite Connecticut properties tributary to the West Branch of Blind Brook, upstream of CON 5. The 1999 SWMP did not contemplate any development in the offsite Connecticut drainage areas tributary to CON 5.
- Total computed drainage area tributary to Detention Basin B (and points L1 and CON 6) is approximately 11 acres greater under Existing (2010) Conditions than what was represented under 1999 Full Development Conditions.
- More runoff is ultimately being conveyed to Detention Basin B and less excess overland runoff is bypassing the detention basins when compared to 1999 Full Development Conditions.
- Existing (2010) Conditions storage depths and volumes for Detention Basins A and B are reduced from the design depths and volumes presented in the 1999 SWMP. Further, spillway and top of berm elevations under Existing (2010) Conditions are lower than the design elevations used for 1999 Full Development Conditions. Detention Basins A and B were not constructed as originally designed with respect to storage depths and volumes.

Although it is acknowledged that the County has no control over increased runoff
rates caused by offsite development within the limits of study, greater tributary drainage areas and inflow, plus reduced storage depths and volumes, have resulted in increased peak discharge rates from Detention Basins A and B.

As a result, in order to reduce the increased discharge rates, particularly from the 10- and 100-year storms, to Pre-1987 levels, improvements to the stormwater management system at the Airport are necessary, as discussed below.


TRC analyzed various options to modify the Airport’s stormwater management system so that the impacts of the 10- and 100-year storm events are mitigated under Existing (2010) (and Future (2011) – see next section) Conditions. The option that is recommended and analyzed in this Update to the 1999 Storm Water Management Plan is to improve the detention basins. TRC Drawings DB-1 and DB-2 in Appendix D show the following proposed improvements to Detention Basins A and B:

**Detention Basin A (see TRC Drawing DB-1)**

- Provide full-depth expansion through excavation at the southeast corner of the basin adjacent to the Perimeter Access Road;
- Reconstruct the earthen spillway, raising the crest from Elevation 372.3 ft. to Elevation 373.75 ft. Reduce the width of the spillway crest to its original design width of 200 ft.;
- Reconstruct the embankment slope along the eastern and southern perimeters, raising the top of berm from Elevation 373.0 ft. to Elevation 374.75 ft.; and,
- Reconstruct the two basin outlet structures.

As a result of these improvements, storage volume at the spillway crest would increase from 25.7 ac-ft to 37 ac-ft. Storage volume at the top of berm would increase from 29.1 ac-ft to 42 ac-ft. These volumes will be greater than the design volumes used for the 1999 Full Development Conditions.

**Detention Basin B (see TRC Drawing DB-2)**

- Provide full-depth expansion through excavation at the southeast corner of the basin adjacent to the Perimeter Access Road;
- Reconstruct the earthen spillway, raising the crest from Elevation 363.5 ft. to Elevation 365.6 ft.;
- Reconstruct the embankment slope along the eastern, western and southern perimeters, raising the top of berm from Elevation 364.0 ft. to Elevation 366.6 ft.; and,
- Provide full-depth expansion of the basin to the north between Blind Brook and the Perimeter Access Road.

As a result of these improvements, storage volume at the spillway crest would increase from 23.9 ac-ft to 38 ac-ft. Storage volume at the top of berm would
increase from 26.2 ac-ft to 44 ac-ft. These volumes will be greater than the design volumes used for the 1999 Full Development Conditions.

The improvements to Detention Basins A and B as described and shown are the maximum expansion potential for the basins. These actions will improve the performance of the existing stormwater management system during the 10- and 100-year storm events, improve downstream hydrologic conditions within the Blind Brook headwaters, and provide additional capacity to undertake future projects at the Airport. A hydrologic model of Proposed (2011) Conditions for the Blind Brook drainage areas was created for the 1-, 2-, 10-, and 100-year, 24-hour storms, with the improvements to Detention Basins A and B as described above incorporated into the model. As shown in Table 6, when incorporated into the model, the basin improvements would reduce the peak discharge rates below Pre-1987 levels at critical Point of Confluence CON 6 (total peak runoff rate to Blind Brook) as follows:

- 100-Year Storm – Approximately 9% below Pre-1987 levels
- 10-Year Storm – Approximately 15% below Pre-1987 levels
- 2-Year Storm – Approximately 34% below Pre-1987 levels
- 1-Year Storm – Approximately 38% below Pre-1987 levels

In other words, the construction of the proposed improvements to Detention Basins A and B would mitigate any negative impacts that properties located immediately downstream of Point of Confluence CON 6 may be currently experiencing during a 100-year storm event. Further, as shown by the increasing percentage reductions, the mitigating effects would be greater for the more frequent (e.g., 1-, 2-, and 10-year) storm events.

With respect to Blind Brook points upstream of CON 6 (e.g., CON 3, CON 3A, CON 5, L1, L2, L3), Table 6 also shows that the construction of the proposed improvements to Detention Basins A and B would result in similar or greater reductions in peak discharge rates outside of CON 5 and L2. Again, note that the ultimate point of evaluation is CON 6, since it incorporates all points upstream.

The calculations for the Proposed (2011) Conditions hydrologic model are provided in Volume 2, Appendix C.


**Description of Capital Projects**
The following capital projects are planned at the Airport, with brief descriptions of the resulting changes to the stormwater management system at the Airport:

- **Creation of a Permanent Baggage Screening Area** – The permanent baggage screening area, to be located north of the terminal building and east of the existing Airport Rescue and Fire Fighting (ARFF) building, would replace approximately 0.09-acre (3,900 square feet) of pervious grassy area and existing pervious pavement with an impervious roof area, all of which would be located in the Blind Brook watershed, specifically Sub Area BB-8F.
- **Westside Consolidated Deicing Pad** – Although there are currently no plans showing specific components or engineering design, it is known that such a facility would require the addition of approximately 1.00 acre of new impervious surfaces to the Airport, all of which would be located in the Blind Brook watershed. The deicing pad should be located in “overflow” Sub Area BB-7FB, which discharges to Detention Basin A, with excess runoff from Sub Area BB-7FB flowing overland southeastward to Blind Brook at CON 3. This would prevent any possible introduction of deicing fluid to Rye Lake.

- **Reconstruction of the South ARFF Road** – The South ARFF Road provides access for emergency vehicles to remote areas of the Airport, and allows service vehicles to drive to selected facilities on the Airport without crossing runways or driving on taxiways. The road is approximately 1.45 miles long and runs from Hangar F just north and east of Runway 11/29 to Hangar E on the west side of the Airport.

  The reconstruction would widen the road from 18 feet to 28 feet and provide the ability to have two emergency/Airport vehicles, or a fuel truck and an emergency vehicle, pass by in opposite directions. This would result in an overall net increase of 1.76 acres (76,670 square feet) of impervious surfaces, all of which would be located in the Blind Brook watershed. The widening would impact the following Blind Brook Sub Areas: BB-3F, BB-4F, BB-6F, BB-7F, BB-8F and BB-1AF. As such, approximately 0.6 acres will discharge to Detention Basin A, approximately 0.4 acre to Detention Basin B, and approximately 0.8 acre directly to Blind Brook.

- **Reuse of the Former Air National Guard (ANG) Site** – The ANG Site is located on a major drainage divide between stormwater runoff discharging to Rye Lake/Kensico Reservoir and runoff discharging to Blind Brook. The northern portion of the ANG Site, which lies within drainage Sub Area RL-1F, is approximately 11.1 acres, of which approximately 6.5 acres (59 percent) is impervious under Existing (2010) Conditions. The southern portion of the ANG Site lies within drainage Sub Area BB-1BF and is approximately 7.2 acres, of which approximately 5.4 acres (75 percent) is impervious under Existing (2010) Conditions.

  Based on the TRC analysis, it is the opinion of TRC that future redevelopment scenarios for the ANG Site will not include any increase in new impervious surfaces within RL-1F, but could include up to approximately 1.8 acres of new impervious surfaces within BB-1F (see following for additional discussion).

**Model Results**

The total increase in impervious area associated with the planned capital projects is estimated to be 4.7 acres, with all of the increase occurring in the Blind Brook watershed. In order to determine if there would be any potential negative impacts, an evaluation was undertaken to determine if the stormwater management system (detention basin) improvements described earlier would also mitigate the increased
stormwater runoff that would be generated by these capital projects. A hydrologic model of “Future (2011) Conditions with Capital Projects” for the Blind Brook drainage areas was created for the 1-, 2-, 10-, and 100-year, 24-hour storms. The model accounts for the 4.7 acres of new impervious surfaces as described above.

As shown in Table 6, the improvements to Detention Basins A and B described above would give the Airport additional capacity to undertake the planned capital projects, while still keeping peak discharge rates below Pre-1987 levels at critical Point of Confluence CON 6, as follows:

- 100-Year Storm – Approximately 8% below Pre-1987 levels
- 10-Year Storm – Approximately 15% below Pre-1987 levels
- 2-Year Storm – Approximately 33% below Pre-1987 levels
- 1-Year Storm – Approximately 37% below Pre-1987 levels

By raising the earthen spillway crests and tops of berm for both basins, runoff from the Airport operational areas within the Blind Brook drainage basin during a 100-year storm will be detained below the spillway crests and the minimum freeboard (height above the 100-year water surface elevation to the top of berm) of one foot will occur, satisfying current County and New York State Department of Environmental Conservation (NYSDEC) requirements (Sources: Section 4.5 of the New York State Stormwater Management Design Manual, DEC publication “Guidelines for the Design of Dams”).

The calculations for the Future (2011) Conditions with Capital Projects are provided in Volume 2, Appendix D.

In sum, the proposed improvements to Detention Basins A and B would improve downstream hydrologic conditions within the Blind Brook headwaters and give the Airport additional capacity to undertake scheduled future capital projects, while still keeping peak discharge rates below Pre-1987 Condition levels.

4. **Permits**

   a. Wetlands

   **Background**

   Based on the review of records provided by Westchester County, the original construction of Detention Basins A and B was authorized in 1992 under a Nationwide Permit (NWP) 26 (Application No. 91-0876-YW) from the United States Army Corps of Engineers (USACOE) and a 401 Water Quality Certification (Permit No. 3-5528-00035/1-0) from the NYSDEC. In addition to managing stormwater runoff, a portion of Detention Basin A and all of Detention Basin B were constructed as wetland mitigation areas totaling 5.34 acres to compensate for filling of 4.29 acres of wetlands elsewhere on the Airport site. The initial construction of the basins was completed in 1993. The expansion of Detention Basin A, including the creation of approximately 1.3 acres of wetlands mitigation, was authorized in 1993 under a NWP 26 (Application No. 92-14530-YW) from the USACOE and a Section 401 Water Quality
Certification (Permit No. 3-5528-00035/4-0) from the NYSDEC. The above permits for the expansion of Detention Basin A were reauthorized in 1996, with construction completed in 1999.

Existing (2010) Conditions
A preliminary assessment of the wetlands within Detention Basins A and B was performed in 2010. The scope of the assessment included the following:

- Review of aerial photographs from online sources (Google Earth, Bing Maps);
- Review of the United States Fish & Wildlife Service’s (USFWS) digital wetland inventory mappings and classification system;
- Review of the latest topographic survey for the detention basins;
- Review of TRC Drawings DB-1 and DB-2 showing the proposed basin improvements, and;
- A field inspection of both basins and their environmental context at ground level.

The data obtained from the assessment was used to determine a preliminary delineation of the wetland boundaries for each basin, based on evidence of wetland conditions (vegetation and visible signs of hydrology) on the ground in and around the basins, and quantitative information (e.g. elevations, slopes) obtained from the basin surveys and grading plans. It must be noted that the scope of delineation work was limited to drawing the wetland boundaries on hard copies of the topographic survey for each basin. TRC then used AutoCAD® to transfer the drawn boundaries into digital file of the basin surveys and compute the wetland areas within each basin.

Based on the preliminary delineation performed, the computed size of the wetland area within Detention Basin A is 4.32 acres. The computed size of the wetland area within Detention Basin B is 4.16 acres.

A copy of the preliminary wetland delineation and assessment report is provided in Appendix B.

Potential Impacts to Wetlands
Once the preliminary extents of the wetlands for each basin were determined, TRC analyzed the potential impact of the basin improvements by establishing limits and areas of wetland disturbance based on the required grading for each basin shown on Drawings DB-1 and DB-2. TRC then used AutoCAD® to compute the areas of wetland disturbance within each basin.

The computed area of wetland disturbance within Detention Basin A is 0.37 acre. The computed wetland disturbance area within Detention Basin B is 0.12 acre. Therefore, the total potential wetland impacts associated with the proposed basin improvements is 0.49 acre.
Required Permits

The proposed expansion of the detention ponds as described above will require a NWP from the USACOE as well as a Section 401 Water Quality Certification from the NYSDEC. The County should apply for coverage from both agencies by filing a Joint Application Form with the USACOE and the NYSDEC.

The USACOE provides coverage under NWP 43, which permits construction of new or expansion of existing stormwater management facilities. Conditions of NWP 43 require detailed, project-specific wetland delineation (based on field flagging and survey of the wetland limits) and limit the maximum loss of non-tidal waters to $\frac{1}{2}$ acre. In conjunction with NWP 43 a Pre-Construction Notification (PCN) is required for approval prior to commencement of construction activity. It is the opinion of TRC that the permitting and construction of the proposed basin improvements will be consistent with the requirements of the original USACOE permits.

b. NYSDEC SPDES Permits

Description of SPDES Permit

A New York State Pollutant Discharge Elimination System (SPDES) permit (Permit No. NY 007 5132) that established effluent limits for various pollutants of concern associated with stormwater discharges from the Airport was first issued in 1984. Since then, it has been modified and renewed as appropriate, with the latest renewal in effect until January 31, 2014. The SPDES permit requires the Airport to monitor the water quality from a number of outfalls that discharge directly to State waters on a regular basis. The Airport is also required to provide a public repository of Discharge Monitoring Reports (DMRs), and to post signs at each outfall, according to the Discharge Notification Act. In addition to monitoring activities, the Permit also requires that the Airport use best management practices to minimize the risk of pollutants migrating to the stormwater infrastructure.

Stormwater runoff from seven discharge locations is monitored either monthly or quarterly for a variety of parameters, including biochemical oxygen demand (BOD), pH, ethylene and propylene glycols, oil and grease, benzene, toluene, xylenes and ethylbenzene. The locations of each monitored discharge point are included on the Drainage Area Maps, Drawings DA-1 and DA-2, located in Appendix D. Table 5, Description of SPDES Permitted Outfalls, provides a description of the outfalls as taken from the SPDES permit, along with the drainage sub areas that are tributary to them. Five outfalls discharge to Blind Brook, and two discharge to tributaries to Rye Lake.

The majority of the flow within the headwaters of the Blind Brook comprises stormwater runoff from improved portions of the Airport (73 percent of the drainage area). SPDES Outfall 003 represents the discharge from Detention Basin A to Blind Brook. SPDES Outfall 001, located downstream of SPDES Outfall 003, represents the discharge from Detention Basin B. SPDES Outfalls 008, 009 and 010 are located on the east side of Airport Road. They directly discharge to Blind Brook, which is conveyed under the Airport property through the existing pipe system described in Subsection 2b under “Group II Sub-Areas.”
**Table 5
Description of SPDES Permitted Outfalls**

<table>
<thead>
<tr>
<th>OUTFALL NO.</th>
<th>DESCRIPTION</th>
<th>TRIBUTARY DRAINAGE SUB AREAS</th>
<th>RECEIVING STREAM/CLASS</th>
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<tbody>
<tr>
<td>001</td>
<td>Stormwater discharge from Detention Pond “B”</td>
<td>BB-8F BB-8FD</td>
<td>Blind Brook/C</td>
</tr>
<tr>
<td>003</td>
<td>Stormwater discharge from Detention Pond “A”</td>
<td>BB-7F</td>
<td>Blind Brook/C</td>
</tr>
<tr>
<td>004</td>
<td>Stormwater drainage from the Hangar “E” facility, Runway 16/34, Runway 11/29, Taxiways C and K, General Aviation tie-down area</td>
<td>RL-5F BB-7FA (overflow runoff)</td>
<td>Tributary to Rye Lake/A</td>
</tr>
<tr>
<td>007</td>
<td>Stormwater drainage from aircraft run-up ramp, General Aviation tie-down area, automobile parking, ANG Buildings 1, 2, 3, 10 and 15 roof drainage</td>
<td>RL-1F</td>
<td>Tributary to Rye Lake/A</td>
</tr>
<tr>
<td>008</td>
<td>Stormwater drainage from automobile parking, ANG Buildings 4, 5, and 11</td>
<td>BB-1BF (Airport site portion)</td>
<td>Blind Brook/C</td>
</tr>
<tr>
<td>009</td>
<td>Stormwater drainage from automobile and aircraft parking, Hangars 6, and 26</td>
<td>BB-1BF (Airport site portion)</td>
<td>Blind Brook/C</td>
</tr>
<tr>
<td>010</td>
<td>Stormwater drainage from Hangar 6 Aircraft Pad and Hangar V Entrance Road</td>
<td>BB-1BF (Airport site portion)</td>
<td>Blind Brook/C</td>
</tr>
</tbody>
</table>

The portions of the Airport property that drain to Rye Lake include both undeveloped and improved areas. SPDES Outfall 004 collects runoff from undeveloped and developed portions of the Airport, discharging to a small, intermittent stream originating in the west-central portion of the Airport, then directly to Rye Lake after passing beneath Route 120 and I-684. SPDES Outfall 007, also presently conveys runoff from Sub Area RL-1F under Airport Road to Rye Lake via intermittent streams or ditches.

TRC performed a field investigation with Westchester County personnel of the Airport site portions of Blind Brook Sub Area BB-1BF to determine the tributary drainage areas to SPDES Outfalls 8, 9, and 10, along with any drainage areas tributary to non-SPDES, or “MS4” (Municipal Separate Storm Sewer System) outfalls. *Figure/Drawing 4 in Appendix A* shows the extent of the SPDES versus MS4 tributary drainage areas.

Runoff from the northern portion of the ANG Site within BB-1BF, which includes Buildings 1, 2, 15 and adjacent areas, drains to an MS4 outfall located approximately 50 feet north of SPDES Outfall 008. Runoff from the balance of the ANG Site within BB-1BF is collected in two separate storm drainage systems that flow to SPDES Outfall Nos. 008 and 009, respectively. The MS4 outfall and SPDES Outfall Nos. 008 and 009 directly discharge to the Blind Brook headwaters, flowing parallel to the...
Potential Impacts to Detention Basins

Based on discussions with NYSDEC Region 3 Division of Water in January 2010, the individual SPDES governs and authorizes any activities (construction and post-construction/operational) impacting stormwater discharges to the SPDES permitted outfalls at the Airport. Any proposed action in which its associated runoff drains to the SPDES permitted outfalls (i.e. the actions occur within the outfall’s tributary drainage sub areas) does not need to comply with the requirements of the SPDES Stormwater General Permits (Construction GP-0-10-001 or “MS4”). In particular, conformance with the technical standards for the sizing (volume based hydrology) and design of stormwater quality controls presented in the New York State Stormwater Management Design Manual does not apply. However, activities authorized under an individual SPDES still must meet water quantity control requirements.

Therefore, the construction of the proposed expansions of Detention Basins A and B would be authorized under the current SPDES permit.

Planned Capital Projects

Construction of the following planned capital projects would also be authorized under the current SPDES permit because they are located in sub areas tributary to SPDES permitted outfalls: Reconstruction of the South ARFF Road, Westside Deicing Pad, and the Baggage Screening Area.

Any future activities within Buffer Sub Area RL-1F, which is tributary to SPDES Outfall 007, would be authorized under the current SPDES permit. Any future activities within Buffer Area Sub Areas RL-3F, RL-4F, and portions of RL-5F, which will have runoff that does not drain to a SPDES outfall, will need to comply with the requirements of the SPDES Construction Stormwater General Permit (GP-0-10-001) for the sizing and design of stormwater quality controls. However, the New York City Department of Environmental Protection (NYCDEP) will also have jurisdictional review authority over all proposed activities within the Water Quality Buffer Area. As such, the NYCDEP could require that the design of post-construction water quality controls as part of a Storm Water Pollution Prevention Plan (SWPPP) be in conformance with the Enhanced Phosphorus Removal Standards included in the New York State Stormwater Management Design Manual, and in accordance with Section 18-39 of the latest version (adopted April 2010) of the New York City Department of Environmental Protection Rules and Regulations for the Protection from Contamination Degradation and Pollution of the New York City Water Supply and its Sources.

As part of the policy that will govern future redevelopment/reuse of the ANG Site as a whole, any future activities that would impact the runoff to the MS4 outfall in Sub Area BB-1BF will need to comply with the requirements of the SPDES Stormwater
General Permit (Construction GP-0-10-001). Activities which result in the disturbance of one or more acres of area will require the design of post-construction stormwater quality controls as part of a SWPPP for the project. Redevelopment of the ANG site that maintains discharge to the MS4 outfall would be governed by Chapter 9 in the *New York State Stormwater Management Design Manual* titled “Redevelopment.” These criteria allow for deviations in the technical standards for sizing and design of quality controls designed for redevelopment projects as set forth in the DEC Design Manual.

The Future (2011) Conditions with Capital Projects model accounts for 1.8 acres of new impervious surfaces within BB-1F (i.e., 100% impervious cover within the BB-1BF portion of the ANG Site), subject to the construction of the recommended improvements to Detention Basins A and B. The results of the hydrologic model indicate that the detention basin improvements would still reduce the total peak discharge rates to Blind Brook under Existing (2010) Conditions to below Pre-1987 levels. These reductions would more than offset increases (less than one percent) in direct discharge rates from BB-1BF to Blind Brook.

The ANG Site redevelopment policy allows for flexibility in the design of drainage and stormwater management systems (quality and/or quantity) that would divert all runoff to the SPDES Outfall(s), thereby authorizing the activity under the Airport’s individual SPDES permit. Based on the existing (current) drainage divides, any potential diversion of runoff away from the MS4 outfall to a SPDES Outfall(s) would occur within the same sub area BB-1BF and would not impact future hydrologic conditions as discussed in the paragraphs above. This would be important if it was determined, based on more detailed future designs, that complying with the requirements of the SPDES Stormwater General Permits (Construction GP-0-10-001 or MS4) for the sizing and design of stormwater quality controls would not be possible.

Special Conditions 1 through 6 of the SPDES permit require that Westchester County DOT maintain and implement a Best Management Practices (BMP) Plan at the Airport “to prevent, or minimize the potential for, release of significant amounts of toxic or hazardous pollutants to the waters of the State through…stormwater discharges…” Most, if not all, of the BMPs and measures implemented at the Airport are discussed in Sections 3.5 (Erosion and Sediment Controls) and 3.6 (Storm Water Pollution Prevention Measures) of the *1999 SWMP*. Implementation of these BMPs and measures for all activities and projects under both Existing (2010) and Post Future (2011) Conditions shall continue as a requirement in this *Update to the 1999 Storm Water Management Plan*. The one exception is that erosion and sediment control measures, practices and procedures for existing and future projects shall conform to the publication *New York Standards and Specifications for Urban Erosion and Sediment Control*, dated August 2005.
5. **ESTIMATED COST OF PROPOSED STORMWATER IMPROVEMENTS**

The preliminary estimated cost of the proposed improvements to Detention Basins A and B, based on 2010 dollars, is provided in *Appendix C*. The limits and associated quantity of potential rock excavation was estimated based on the review of historical soil boring data from construction documents of previous Airport projects in the vicinity of the detention basins.
Chapter III
Conclusions and Recommendations

1. INTRODUCTION

Westchester County and the Westchester County Airport, in an effort to improve stormwater conditions at the Airport and in Westchester County, have authorized the preparation of this Update to the 1999 Storm Water Management Plan. This Update accomplishes the following goals:

- Establishes the hydrologic conditions for the Airport as of 2010;
- Provides a comparison of 2010 hydrologic conditions with the hydrologic conditions that were documented in the 1999 Storm Water Management Plan (1999 SWMP);
- Determines the effectiveness of existing stormwater quantity mitigation measures, as well as the need for future ones;
- Determines if the existing Airport stormwater management system is being impacted by upstream properties;
- Analyzes the stormwater impacts of existing and proposed actions at the Airport, as well as impacts of existing actions in offsite areas within the Study Area, and;
- Presents the measures required to mitigate those impacts and reduce peak runoff rates.

This Update incorporates both structural and non-structural pollution prevention and waste reduction protocols designed to manage and improve the quantity and quality of discharges exiting the Airport property.

2. CONCLUSIONS

The following conclusions have been reached based on the information presented in this Update to the 1999 Storm Water Management Plan for the Westchester County Airport:

a. Existing (2010) Conditions

- The 1999 SWMP proposed the redirection of runoff from 157 acres of developed Airport properties within the Rye Lake watershed to the Blind Brook watershed and the proposed detention basins for attenuation and treatment. Under Existing (2010) Conditions, runoff from approximately 143 acres of drainage area has been diverted from Rye Lake to Blind Brook.
- The total peak flow rates to Rye Lake at CON 1 under Existing (2010) Conditions continue to be less than those under Pre-1987 Conditions for all analyzed storm events.
- The results of the existing conditions analysis show that the peak rates of runoff at critical Points of Confluence L1 (West Branch of Blind Brook at Lincoln Avenue), CON 5 (East Branch of Blind Brook at Lincoln Avenue), and CON 6 (intersection of the East and West Branches) under Existing (2010) Conditions for the 100-year storm event are greater than those under Pre-1987 Conditions. Therefore, two main objectives of the 1999 SWMP: 1) having existing peak rates no greater than the peak rates from Pre-1987 Conditions; and, 2) avoiding and
minimizing stormwater impacts to downstream properties and receiving waters, are not being completely met under Existing (2010) Conditions.

b. Proposed (2011) Conditions
   ▪ The proposed improvements to Detention Basins A and B under Proposed (2011) Conditions would reduce the Existing (2010) Conditions total peak discharge rates to Blind Brook below Pre-1987 levels at critical Point of Confluence CON 6. The expanded basins will improve the performance of the existing stormwater management system during the 10- and 100-year storm events, and improve downstream hydrologic conditions within the Blind Brook headwaters. The proposed improvements would also mitigate any negative impacts that properties located immediately downstream of Point of Confluence CON 6 may be currently experiencing during a 100-year storm event. The mitigating effects would be greater for the more frequent storm events.
   ▪ With respect to Blind Brook points upstream of CON 6, the proposed improvements to Detention Basins A and B would result in similar or greater reductions in peak discharge rates at Points CON 3 and L1 (where runoff exits the Airport site at Lincoln Avenue) along the West Branch of the Blind Brook. These reductions will help to offset the increases in peak flow rates to the East Branch of Blind Brook that currently occur at CON 5, where the County has no control over increased runoff rates caused by development in the offsite drainage areas tributary to CON 5.

c. Future (2011) Conditions
   ▪ The proposed improvements to Detention Basins A and B, when incorporated into the Future (2011) Conditions with Capital Projects model, would give the Airport additional capacity to undertake the planned capital projects described herein, while still keeping peak discharge rates below Pre-1987 levels.
   ▪ All current and future activities (construction and post-construction/operational) at the Airport impacting stormwater discharges that are in drainage sub areas tributary to SPDES permitted outfalls will continue to be authorized under the current individual SPDES permit.

In sum, the incorporation of the proposed improvements to Detention Basins A and B would ensure that stormwater is properly managed at the Airport under Existing (2010) Conditions, would reduce peak runoff rates downstream, would mitigate stormwater impacts of existing and proposed actions at the Airport as well as impacts of existing actions in offsite areas within the Study Area, and would provide the additional capacity needed to undertake the planned Airport capital projects described herein.

However, TRC can not state with any degree of certainty that the proposed basin improvements can handle additional future projects outside of the planned capital projects described herein. That determination can come only through additional and/or supplemental hydrologic analysis when such future projects are identified (see Recommendation 3b next page).
3. **RECOMMENDATIONS**

a. The implementation of Best Management Practices (BMPs) as discussed in Sections 3.5 (Erosion and Sediment Controls) and 3.6 (Storm Water Pollution Prevention Measures) of the 1999 SWMP for all activities and projects under both Existing (2010) and Future (2011) Conditions should continue as a requirement in this *Update to the 1999 Storm Water Management Plan*.

b. This *Update to the 1999 Storm Water Management Plan* should be treated as a "living document," be evaluated on a regular basis, and be revised or updated as necessary by Westchester County to ensure that the measures and programs outlined in the document are effective and attainable. If measures or programs outlined in this document are deemed to be ineffective or insufficient, the County should consider implementing alternative measures or programs.

Respectfully submitted,

TRC Engineers, Inc.

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Principal
New York P.E. No. 43583

Christopher S. Hanzlik, CPESC, CPSWQ
Project Manager

Under New York State Education Law Article 145 - Engineering, Section 7209 (2), it is a violation of this law for any person to alter an item in any way in this Report, unless acting under the direction of a licensed professional engineer. If an item bearing the seal of an engineer is altered, the altering engineer shall affix to the item his seal and the notation "altered by" followed by his signature and the date of such alteration, and a specific description of the alteration.
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<tr>
<th>Location of Confluence</th>
<th>1-Year Storm</th>
<th>2-Year Storm</th>
<th>10-Year Storm</th>
<th>100-Year Storm</th>
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<tbody>
<tr>
<td>CON 1 - Rye Lake</td>
<td>216.3</td>
<td>116.3</td>
<td>116.3</td>
<td>116.3</td>
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<tr>
<td>CON 3 - On Blind Brook @ Basin A discharge</td>
<td>256.1</td>
<td>108.4</td>
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<td>105.8</td>
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<tr>
<td>CON 3A - On Blind Brook @ Basin B discharge</td>
<td>N/A</td>
<td>151.8</td>
<td>141.1</td>
<td>143.8</td>
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<td>L1 - West Branch of Blind Brook @ Lincoln Ave.</td>
<td>266.4</td>
<td>152.8</td>
<td>142.1</td>
<td>144.7</td>
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<td>L2 - On Lincoln Avenue 470 feet east of L1</td>
<td>21.6</td>
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<td>25.2</td>
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<td>L3 - On Lincoln Avenue 1000 feet east of L1</td>
<td>5.1</td>
<td>3.4</td>
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<td>CON 5 - Intersection of East Branch Blind Brook &amp; Lincoln Avenue</td>
<td>41.8</td>
<td>66.5</td>
<td>66.5</td>
<td>67.3</td>
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<tr>
<td>CON 6 - Intersection of East and West Branches of Blind Brook</td>
<td>321.3</td>
<td>205.6</td>
<td>199.9</td>
<td>202.6</td>
</tr>
</tbody>
</table>

TRC Engineers, Inc.
Project No. 44010

December 2010

Update to the 1999 Storm Water Management Plan
### TABLE 7

**UPDATE TO THE 1999 STORM WATER MANAGEMENT PLAN**

**WESTCHESTER COUNTY AIRPORT**

**COMPARISON OF DETENTION BASIN FLOWS, ELEVATIONS AND STORAGE VOLUMES**

<table>
<thead>
<tr>
<th></th>
<th>1-Year Storm</th>
<th>2-Year Storm</th>
<th>10-Year Storm</th>
<th>100-Year Storm</th>
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<tr>
<td><strong>Basin A Discharge (cfs)</strong></td>
<td>18.7</td>
<td>14.2</td>
<td>14.2</td>
<td>28.0</td>
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<tr>
<td><strong>Basin A Storage (Ac-ft)</strong></td>
<td>14.4</td>
<td>16.9</td>
<td>16.9</td>
<td>21.1</td>
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<tr>
<td><strong>Basin B Discharge (cfs)</strong></td>
<td>49.8</td>
<td>44.0</td>
<td>44.7</td>
<td>104.0</td>
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<tr>
<td><strong>Basin B Storage (Ac-ft)</strong></td>
<td>17.9</td>
<td>18.3</td>
<td>18.4</td>
<td>21.6</td>
</tr>
</tbody>
</table>
APPENDIX A

FIGURES
APPENDIX B

PRELIMINARY WETLANDS DELINEATION AND ASSESSMENT

DETECTION BASINS A AND B
APPENDIX C

BUDGET COST ESTIMATES

IMPROVEMENTS TO DETENTION BASINS A AND B
APPENDIX D

DRAINAGE AREA MAPS

AND

DETENTION BASIN CONCEPTUAL GRADING PLANS
APPENDIX G

SCHEMATIC DESIGN DRAWINGS OF THE PROPOSED ACTION
APPENDIX H

STORM WATER MANAGEMENT CALCULATIONS
### Proposed 2014 Conditions 1&2 Year-Revised Ponds

**Type III 24-hr 1-Year Rainfall=2.80"**

**Prepared by TRC**

**Printed 12/9/2014**

Reach routing by Dyn-Muskingum-Cunge method  -  Pond routing by Dyn-Stor-Ind method

<table>
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<tr>
<th>Subcatchment</th>
<th>Runoff Area (ac)</th>
<th>Impervious (%)</th>
<th>Runoff Depth (&quot;&quot;)</th>
<th>Tc (min)</th>
<th>CN</th>
<th>Runoff (cfs)</th>
<th>Acre-ft</th>
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</thead>
<tbody>
<tr>
<td>1S: BB-1AF</td>
<td>7.450</td>
<td>8.19</td>
<td>0.88</td>
<td>20.4</td>
<td>76</td>
<td>4.81</td>
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<td>4S: BB-1DF</td>
<td>7.080</td>
<td>2.68</td>
<td>0.65</td>
<td>20.4</td>
<td>71</td>
<td>3.06</td>
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Reach 94R: Reach E4  
72.0" Round Pipe  n=0.013  L=230.0’  S=0.0026 '/'  Capacity=216.31 cfs  Outflow=11.29 cfs  1.477 af

Reach 95R: Reach E5  
72.0" Round Pipe  n=0.013  L=90.0’  S=0.0033 '/'  Capacity=244.51 cfs  Outflow=11.29 cfs  1.477 af

Pond 48P: Pond C  
Peak Elev=329.95'  Storage=0.059 af  Inflow=25.24 cfs  2.919 af
Outflow=25.06 cfs  2.919 af

Pond 50P: Pond D  
Peak Elev=345.32'  Storage=0.053 af  Inflow=166.20 cfs  82.591 af
Outflow=166.13 cfs  82.588 af

Pond 51P: B1 Basin  
Peak Elev=427.11'  Storage=0.374 af  Inflow=7.36 cfs  0.715 af
Outflow=0.86 cfs  0.690 af

Pond 53P: D Basin  
Peak Elev=463.88'  Storage=0.345 af  Inflow=6.18 cfs  0.552 af
Outflow=0.32 cfs  0.490 af

Pond 54P: D Pond  
Peak Elev=381.76'  Storage=0.539 af  Inflow=33.71 cfs  3.901 af
Outflow=24.67 cfs  3.901 af

Pond 72P: Pond E  
Peak Elev=372.00'  Storage=0 cf  Inflow=11.32 cfs  1.477 af
Outflow=11.32 cfs  1.477 af

Pond DP_A: Proposed Pond A  
Peak Elev=369.78'  Storage=749,114 cf  Inflow=187.56 cfs  26.345 af
Outflow=14.52 cfs  21.419 af

Pond DP_B: Proposed Pond B  
Peak Elev=361.44'  Storage=613,460 cf  Inflow=220.91 cfs  47.141 af
Outflow=61.38 cfs  43.573 af

Link 39L: CON 6  
Inflow=218.43 cfs  95.783 af  Primary=218.43 cfs  95.783 af

Link 40L: CON 5  
Inflow=66.46 cfs  9.982 af  Primary=66.46 cfs  9.982 af

Link 41L: CON 2  
Inflow=93.50 cfs  13.193 af  Primary=93.50 cfs  13.193 af

Link 42L: CON 7  
Inflow=187.56 cfs  26.345 af  Primary=187.56 cfs  26.345 af

Link 43L: CON 3  
Inflow=102.74 cfs  35.160 af  Primary=102.74 cfs  35.160 af

Link 44L: CON 3A  
Inflow=165.25 cfs  82.342 af  Primary=165.25 cfs  82.342 af
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr 1-Year Rainfall=2.80"
Prepared by TRC  Printed 12/9/2014
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC

Inflow=213.51 cfs  28.151 af
Primary=213.51 cfs  28.151 af

Link 46L: CON 11

Inflow=166.20 cfs  82.591 af
Primary=166.20 cfs  82.591 af

Link 49L: L1

Inflow=10.27 cfs  1.492 af
Primary=10.27 cfs  1.492 af

Link 52L: B1 Out

Inflow=7.11 cfs  0.914 af
Primary=7.11 cfs  0.914 af

Link 61L: BS-A Out

Inflow=4.89 cfs  0.647 af
Primary=4.89 cfs  0.647 af

Link 62L: BS-B3 Out

Inflow=202.65 cfs  26.674 af
Primary=202.65 cfs  26.674 af

Link 63L: BB-8F

Inflow=17.74 cfs  2.232 af
Primary=17.74 cfs  2.232 af

Link 66L: Junction 2

Inflow=25.62 cfs  4.035 af
Primary=25.62 cfs  4.035 af

Link 70L: Junction 4

Inflow=33.66 cfs  5.254 af
Primary=33.66 cfs  5.254 af

Link 71L: Final

Inflow=25.24 cfs  2.919 af
Primary=25.24 cfs  2.919 af

Link 76L: L2

Inflow=3.38 cfs  0.352 af
Primary=3.38 cfs  0.352 af

Link 77L: L3

Inflow=116.28 cfs  16.102 af
Primary=116.28 cfs  16.102 af

Link 87L: CON 1 - Rye Lake

Total Runoff Area = 1,038.120 ac  Runoff Volume = 101.619 af  Average Runoff Depth = 1.17"
73.60% Pervious = 764.020 ac   26.40% Impervious = 274.100 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.910 ac, 46.86% Impervious, Inflow Depth = 1.57" for 1-Year event
Inflow  = 187.56 cfs @ 12.53 hrs, Volume= 26.345 af
Outflow = 14.52 cfs @ 16.18 hrs, Volume= 21.419 af, Atten= 92%, Lag= 219.3 min
Primary = 14.52 cfs @ 16.18 hrs, Volume= 21.419 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 369.78' @ 16.18 hrs   Surf.Area= 213,447 sf   Storage= 749,114 cf
Plug-Flow detention time= 581.0 min calculated for 21.385 af (81% of inflow)
Center-of-Mass det. time= 507.4 min (1,361.5 - 854.1)

Volume   Invert   Avail.Storage   Storage Description
#1 365.00'  1,894,815 cf  Custom Stage Data (Irregular) Listed below (Recalc)

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Device Routing Invert Outlet Devices
#1 Primary 364.10' 54.0" Round 54" Culvert - OS1
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 364.10’ / 363.88’ S= 0.0200 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
#2 Primary 363.35' 60.0" Round 60" Culvert - OS2
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 363.35’ / 363.28’ S= 0.0064 '/' Cc= 0.900
n= 0.013, Flow Area= 19.63 sf
#3 Device 1 366.00' 12.0" Round 12" Low Flow
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 '/' Cc= 0.900
n= 0.013, Flow Area= 0.79 sf
#4 Device 1 369.66' 3.3’ long x 0.5’ breadth Broad-Crested Rect. Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32
#5 Device 1 370.64' 6.8’ long x 0.5’ breadth Broad-Crested Rect. Weir OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32
#6 Device 1 373.25' 72.0" x 84.0" Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

#7 Primary  373.75'  
200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1
Head (feet)  0.20  0.40  0.60  0.80  1.00  1.20  1.40  1.60
Coef. (English)  2.49  2.56  2.70  2.69  2.68  2.69  2.67  2.64

#8 Device 2  366.00'
12.0'' Round 12'' Low Flow
L= 10.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00' / 365.85'  S= 0.0150 '/'  Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#9 Device 2  369.66'
3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet)  0.20  0.40  0.60  0.80  1.00
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#10 Device 2  370.64'
6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet)  0.20  0.40  0.60  0.80  1.00
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#11 Device 2  373.25'
72.0'' x 90.0'' Horiz. Orifice/Grate  C= 0.600
Limited to weir flow at low heads

Primary OutFlow  Max=14.52 cfs @ 16.18 hrs  HW=369.78'  TW=0.00'  (Dynamic Tailwater)

1=54'' Culvert - OS1 (Passes 7.26 cfs of 129.17 cfs potential flow)
2=60'' Culvert - OS2 (Passes 7.26 cfs of 163.01 cfs potential flow)
3=12'' Low Flow (Inlet Controls 6.85 cfs @ 8.73 fps)
4=Broad-Crested Rect. Weir - OS1 (Weir Controls 0.41 cfs @ 0.99 fps)
5=Broad-Crested Rect. Weir OS1 (Controls 0.00 cfs)
6=Orifice/Grate ( Controls 0.00 cfs)
8=12'' Low Flow (Inlet Controls 6.85 cfs @ 8.73 fps)
9=Broad-Crested Rect Weir - OS2 (Weir Controls 0.41 cfs @ 0.99 fps)
10=Broad-Crested Rect Weir - OS2 ( Controls 0.00 cfs)
11=Orifice/Grate ( Controls 0.00 cfs)
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  
Type III 24-hr 1-Year Rainfall=2.80"

Prepared by TRC
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Page 3

Pond DP_A: Proposed Pond A

Hydrograph

- Inflow Area=201.910 ac
- Peak Elev=369.78'
- Storage=749,114 cf

Stage-Discharge

- Broad-Crested Rect Weir - OS1
- Broad-Crested Rect Weir - OS2
- Orifice/Grate + Orifice/Grate
- 12" Low Flow + 12" Low Flow
Pond DP_A: Proposed Pond A

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Elevation (feet)

Storage (cubic-feet)

Custom Stage Data
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds

Type III 24-hr 1-Year Rainfall=2.80"

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Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.03% Impervious, Inflow Depth > 2.45" for 1-Year event
Inflow = 220.91 cfs @ 12.42 hrs, Volume= 47.141 af, Incl. 7.40 cfs Base Flow
Outflow = 61.38 cfs @ 13.22 hrs, Volume= 43.573 af, Atten= 72%, Lag= 48.1 min
Primary = 61.38 cfs @ 13.22 hrs, Volume= 43.573 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 361.44' @ 13.22 hrs Surf.Area= 215,940 sf Storage= 613,460 cf

Plug-Flow detention time= 268.2 min calculated for 43.557 af (92% of inflow)
Center-of-Mass det. time= 187.3 min ( 1,194.0 - 1,006.7 )

Volume Invert Avail.Storage Storage Description
#1 356.00' 1,942,029 cf Custom Stage Data (Irregular) Listed below (Recalc)

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Device Routing Invert Outlet Devices

#1 Primary 356.20' 60.0" Round 60" Culvert X 2.00
L= 50.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

#2 Device 1 356.47' 18.0" Round 18" Culvert
L= 15.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

#3 Device 1 360.30' 14.0' long x 6.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.38 2.52 2.70 2.68 2.67 2.66 2.65 2.65
2.65 2.66 2.65 2.67 2.68 2.71 2.75 2.81

#4 Primary 365.60' 220.0' long x 10.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr 1-Year Rainfall=2.80" 
Prepared by TRC 
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Primary OutFlow Max=61.35 cfs @ 13.22 hrs  HW=361.44' TW=358.11' (Dynamic Tailwater) 
1=60" Culvert (Passes 61.35 cfs of 269.91 cfs potential flow) 
2=18" Culvert (Inlet Controls 15.54 cfs @ 8.80 fps) 
3=Broad-Crested Rectangular Weir (Weir Controls 45.81 cfs @ 2.86 fps) 
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs) 

Pond DP_B: Proposed Pond B 

Hydrograph 

Inflow Area=230.930 ac 
Peak Elev=361.44' 
Storage=613,460 cf 

Primary OutFlow Max=61.35 cfs @ 13.22 hrs  HW=361.44' TW=358.11' (Dynamic Tailwater) 
1=60" Culvert (Passes 61.35 cfs of 269.91 cfs potential flow) 
2=18" Culvert (Inlet Controls 15.54 cfs @ 8.80 fps) 
3=Broad-Crested Rectangular Weir (Weir Controls 45.81 cfs @ 2.86 fps) 
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

| Inflow Area    | 389.460 ac, 31.77% Impervious, Inflow Depth > 1.08” for 1-Year event |
| Inflow         | 102.74 cfs @ 12.60 hrs, Volume= 35.160 af                          |
| Primary        | 102.74 cfs @ 12.60 hrs, Volume= 35.160 af, Atten= 0%, Lag= 0.0 min  |

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph

Inflow Area=389.460 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 673.510 ac, 33.20% Impervious, Inflow Depth > 1.47” for 1-Year event
Inflow = 165.25 cfs @ 12.82 hrs, Volume = 82.342 af
Primary = 165.25 cfs @ 12.82 hrs, Volume = 82.342 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 44L: CON 3A

Hydrograph

Flow (cfs)

Time (hours)
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.400 ac, 33.01% Impervious, Inflow Depth > 1.46” for 1-Year event
Inflow = 166.20 cfs @ 12.82 hrs, Volume= 82.591 af
Primary = 166.20 cfs @ 12.82 hrs, Volume= 82.591 af, Attenu= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Inflow Area=677.400 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.17% Impervious, Inflow Depth > 0.93" for 1-Year event
Inflow = 66.46 cfs @ 12.35 hrs, Volume= 9.982 af
Primary = 66.46 cfs @ 12.35 hrs, Volume= 9.982 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 845.090 ac, 29.40% Impervious, Inflow Depth > 1.36" for 1-Year event
Inflow = 218.43 cfs @ 12.76 hrs, Volume= 95.783 af
Primary = 218.43 cfs @ 12.76 hrs, Volume= 95.783 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 39L: CON 6

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Hydrograph

Inflow Area=845.090 ac
### Proposed 2014 Conditions 1&2 Year-Revised Ponds

**Type III 24-hr 2-Year Rainfall = 3.50"**

**Prepared by TRC**

**Printed 12/9/2014**

**Prepared by TRC**

**Printed 12/9/2014**

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---

**Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points x 3**

**Runoff by SCS TR-20 method, UH=SCS, Weighted-CN**

**Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method**

---

**Subcatchment 1S: BB-1AF**

- Runoff Area: 7.450 ac
- 8.19% Impervious
- Runoff Depth: 1.37"
- Tc: 20.4 min
- CN: 76
- Runoff: 7.73 cfs
- 0.848 af

---

**Subcatchment 4S: BB-1DF**

- Runoff Area: 7.080 ac
- 2.68% Impervious
- Runoff Depth: 1.06"
- Tc: 20.4 min
- CN: 71
- Runoff: 5.46 cfs
- 0.628 af

---

**Subcatchment 5S: BB-1EF**

- Runoff Area: 8.140 ac
- 12.16% Impervious
- Runoff Depth: 1.37"
- Tc: 27.0 min
- CN: 76
- Runoff: 7.50 cfs
- 0.926 af

---

**Subcatchment 6S: BB-1FF**

- Runoff Area: 19.500 ac
- 10.51% Impervious
- Runoff Depth: 1.43"
- Tc: 18.6 min
- CN: 77
- Runoff: 22.17 cfs
- 2.325 af

---

**Subcatchment 53S: BS-B2**

- Runoff Area: 13.580 ac
- 10.46% Impervious
- Runoff Depth: 1.24"
- Tc: 15.0 min
- CN: 74
- Runoff: 14.25 cfs
- 1.403 af

---

**Subcatchment 58S: BS-D Pond**

- Runoff Area: 21.420 ac
- 20.21% Impervious
- Runoff Depth: 1.43"
- Tc: 16.8 min
- CN: 77
- Runoff: 25.31 cfs
- 2.553 af

---

**Subcatchment 73S: BB-8FD**

- Runoff Area: 15.260 ac
- 29.55% Impervious
- Runoff Depth: 1.71"
- Tc: 31.2 min
- CN: 81
- Runoff: 16.87 cfs
- 2.173 af

---

**Subcatchment 78S: BB-1CF**

- Runoff Area: 39.150 ac
- 13.38% Impervious
- Runoff Depth: 1.37"
- Tc: 28.8 min
- CN: 76
- Runoff: 35.12 cfs
- 4.454 af

---

**Subcatchment 79S: BB-4F**

- Runoff Area: 28.190 ac
- 2.09% Impervious
- Runoff Depth: 1.24"
- Tc: 40.2 min
- CN: 74
- Runoff: 19.29 cfs
- 2.913 af

---

**Subcatchment 81S: BB-8F**

- Runoff Area: 186.200 ac
- 47.97% Impervious
- Runoff Depth: 2.18"
- Tc: 30.6 min
- CN: 87
- Runoff: 266.29 cfs
- 33.864 af

---

**Subcatchment 83S: BS-A**

- Runoff Area: 15.860 ac
- 0.00% Impervious
- Runoff Depth: 1.12"
- Tc: 23.4 min
- CN: 72
- Runoff: 12.33 cfs
- 1.481 af

---

**Subcatchment 84S: BS-B1 Bypass**

- Runoff Area: 10.900 ac
- 12.02% Impervious
- Runoff Depth: 1.37"
- Tc: 7.8 min
- CN: 76
- Runoff: 15.78 cfs
- 1.240 af

---

**Subcatchment 85S: BS-B1 DET**

- Runoff Area: 4.990 ac
- 56.31% Impervious
- Runoff Depth: 2.36"
- Tc: 16.2 min
- CN: 89
- Runoff: 10.03 cfs
- 0.980 af

---

**Subcatchment 87S: BS-B3**

- Runoff Area: 11.230 ac
- 2.76% Impervious
- Runoff Depth: 1.12"
- Tc: 25.2 min
- CN: 72
- Runoff: 8.47 cfs
- 1.049 af

---

**Subcatchment 88S: BS-C**

- Runoff Area: 18.670 ac
- 5.62% Impervious
- Runoff Depth: 1.24"
- Tc: 10.8 min
- CN: 74
- Runoff: 22.02 cfs
- 1.929 af

---

**Subcatchment 89S: BS-D Bypass**

- Runoff Area: 1.380 ac
- 11.59% Impervious
- Runoff Depth: 1.71"
- Tc: 15.6 min
- CN: 81
- Runoff: 2.04 cfs
- 0.196 af

---
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr 2-Year Rainfall=3.50"

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Printed 12/9/2014
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Printed 12/9/2014

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Subcatchment 90S: BS-D Channel
Runoff Area=18.000 ac  21.39% Impervious  Runoff Depth=1.71"
   Tc=16.2 min  CN=81  Runoff=26.15 cfs  2.563 af

Subcatchment 91S: BS-D Det1
Runoff Area=4.660 ac  29.83% Impervious  Runoff Depth=2.02"
   Tc=12.6 min  CN=85  Runoff=8.84 cfs  0.783 af

Subcatchment 92S: RL-1F
Runoff Area=35.870 ac  39.67% Impervious  Runoff Depth=1.94"
   Tc=30.0 min  CN=84  Runoff=45.95 cfs  5.788 af

Subcatchment 93S: BB-2F
Runoff Area=53.120 ac  0.96% Impervious  Runoff Depth=1.30"
   Tc=49.8 min  CN=75  Runoff=34.26 cfs  5.763 af

Subcatchment 94S: BB-5F
Runoff Area=37.050 ac  22.29% Impervious  Runoff Depth=1.43"
   Tc=19.2 min  CN=77  Runoff=41.46 cfs  4.417 af

Subcatchment 95S: BB-9F
Runoff Area=3.890 ac  0.00% Impervious  Runoff Depth=1.24"
   Tc=75.6 min  CN=74  Runoff=1.83 cfs  0.402 af

Subcatchment 96S: BB-3F
Runoff Area=33.540 ac  14.25% Impervious  Runoff Depth=1.57"
   Tc=22.8 min  CN=79  Runoff=38.69 cfs  4.377 af

Subcatchment 97S: BB-6F
Runoff Area=4.780 ac  9.83% Impervious  Runoff Depth=1.37"
   Tc=16.2 min  CN=77  Runoff=5.42 cfs  0.544 af

Subcatchment 99S: BB-7F
Runoff Area=201.910 ac  46.86% Impervious  Runoff Depth=2.18"
   Tc=37.8 min  CN=87  Runoff=261.04 cfs  36.721 af

Subcatchment 102S: RL-2F
Runoff Area=6.030 ac  4.48% Impervious  Runoff Depth=1.37"
   Tc=15.6 min  CN=76  Runoff=6.93 cfs  0.686 af

Subcatchment 103S: BB-1BF
Runoff Area=68.860 ac  19.21% Impervious  Runoff Depth=1.30"
   Tc=31.2 min  CN=75  Runoff=56.42 cfs  7.470 af

Subcatchment 104S: RL-3F
Runoff Area=26.640 ac  4.73% Impervious  Runoff Depth=1.50"
   Tc=22.8 min  CN=78  Runoff=29.25 cfs  3.324 af

Subcatchment 105S: RL-4F
Runoff Area=64.670 ac  5.52% Impervious  Runoff Depth=1.37"
   Tc=35.4 min  CN=76  Runoff=52.66 cfs  7.358 af

Subcatchment 107S: BB-1GF
Runoff Area=10.280 ac  63.13% Impervious  Runoff Depth=2.36"
   Tc=10.2 min  CN=89  Runoff=24.17 cfs  2.019 af

Subcatchment 108S: RL-5F
Runoff Area=59.820 ac  10.51% Impervious  Runoff Depth=1.43"
   Tc=33.6 min  CN=77  Runoff=52.64 cfs  7.131 af

Reach 24R: Reach I
54.0" Round Pipe  n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=56.38 cfs  7.470 af

Reach 25R: Reach H1
54.0" Round Pipe  n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=56.38 cfs  7.470 af
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr  2-Year Rainfall=3.50"
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Reach 26R: Reach G1  Avg. Flow Depth=0.16'  Max Vel=12.47 fps  Inflow=7.50 cfs  0.926 af
n=0.060  L=1,600.0'  S=0.0347 '/'  Capacity=619.40 cfs  Outflow=7.50 cfs  0.926 af

Reach 27R: Reach F  Avg. Flow Depth=0.25'  Max Vel=15.24 fps  Inflow=22.17 cfs  2.325 af
n=0.060  L=1,100.0'  S=0.0480 '/'  Capacity=866.62 cfs  Outflow=22.13 cfs  2.325 af

Reach 30R: Reach M  Avg. Flow Depth=0.06'  Max Vel=15.96 fps  Inflow=5.42 cfs  0.544 af
n=0.060  L=1,400.0'  S=0.0509 '/'  Capacity=892.04 cfs  Outflow=5.45 cfs  0.544 af

Reach 31R: Reach C  Avg. Flow Depth=2.37'  Max Vel=4.69 fps  Inflow=162.41 cfs  52.068 af
n=0.050  L=2,000.0'  S=0.0030 '/'  Capacity=345.35 cfs  Outflow=156.72 cfs  52.003 af

Reach 32R: Reach A1  Avg. Flow Depth=2.47'  Max Vel=18.75 fps  Inflow=150.97 cfs  20.353 af
54.0" Round Pipe  n=0.015  L=1,380.0'  S=0.0112 '/'  Capacity=161.62 cfs  Outflow=35.07 cfs  4.454 af

Reach 33R: Reach H2  Avg. Flow Depth=0.91'  Max Vel=15.64 fps  Inflow=35.07 cfs  4.454 af
54.0" Round Pipe  n=0.015  L=695.0'  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=35.04 cfs  4.454 af

Reach 34R: Reach G2  Avg. Flow Depth=0.32'  Max Vel=15.51 fps  Inflow=7.50 cfs  0.926 af
54.0" Round Pipe  n=0.015  L=695.0'  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=7.50 cfs  0.926 af

Reach 35R: Reach A2  Avg. Flow Depth=1.11'  Max Vel=20.47 fps  Inflow=150.86 cfs  20.353 af
87.0" x 87.0" Box Pipe  n=0.015  L=1,910.0'  S=0.0065 '/'  Capacity=758.61 cfs  Outflow=150.75 cfs  20.353 af

Reach 36R: Reach A3  Avg. Flow Depth=2.24'  Max Vel=6.97 fps  Inflow=150.75 cfs  20.353 af
n=0.050  L=1,670.0'  S=0.0030 '/'  Capacity=346.73 cfs  Outflow=146.21 cfs  20.353 af

Reach 37R: Reach J  Avg. Flow Depth=1.21'  Max Vel=19.30 fps  Inflow=289.01 cfs  112.546 af
n=0.050  L=250.0’  S=0.0552 '/'  Capacity=1,481.40 cfs  Outflow=289.02 cfs  112.540 af

Reach 38R: Reach E  Avg. Flow Depth=0.78'  Max Vel=12.21 fps  Inflow=106.17 cfs  15.246 af
n=0.060  L=1,750.0'  S=0.0293 '/'  Capacity=898.75 cfs  Outflow=106.25 cfs  15.245 af

Reach 45R: Reach K  Avg. Flow Depth=1.78'  Max Vel=4.16 fps  Inflow=113.37 cfs  54.804 af
n=0.060  L=380.0’  S=0.0039 '/'  Capacity=404.87 cfs  Outflow=113.28 cfs  54.781 af

Reach 47R: Reach N  Avg. Flow Depth=0.51'  Max Vel=13.98 fps  Inflow=38.41 cfs  4.377 af
n=0.060  L=2,000.0'  S=0.0290 '/'  Capacity=673.61 cfs  Outflow=38.35 cfs  4.377 af

Reach 51R: Reach D  Avg. Flow Depth=1.67'  Max Vel=13.21 fps  Inflow=290.99 cfs  112.939 af
n=0.060  L=2,000.0'  S=0.0362 '/'  Capacity=999.72 cfs  Outflow=290.85 cfs  112.876 af

Reach 72R: Reach A4  Avg. Flow Depth=0.32'  Max Vel=25.68 fps  Inflow=146.21 cfs  20.353 af
216.0" x 54.0" Box Pipe  n=0.011  L=340.0’  S=0.0051 '/'  Capacity=1,161.64 cfs  Outflow=146.15 cfs  20.353 af

Reach 91R: Reach E1  Avg. Flow Depth=1.56'  Max Vel=5.23 fps  Inflow=16.84 cfs  2.173 af
30.0" Round Pipe  n=0.013  L=175.0’  S=0.0018 '/'  Capacity=17.26 cfs  Outflow=16.83 cfs  2.173 af

Reach 92R: Reach E2  Avg. Flow Depth=1.03'  Max Vel=7.83 fps  Inflow=16.83 cfs  2.173 af
36.0" Round Pipe  n=0.013  L=318.0’  S=0.0031 '/'  Capacity=37.22 cfs  Outflow=16.83 cfs  2.173 af
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr 2-Year Rainfall=3.50"
Prepared by TRC Printed 12/9/2014
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC

Reach 93R: Reach E3
Avg. Flow Depth=0.59’  Max Vel=11.79 fps  Inflow=16.83 cfs  2.173 af
72.0” Round Pipe  n=0.013  L=500.0’  S=0.0028 '/'  Capacity=224.10 cfs  Outflow=16.81 cfs  2.173 af

Reach 94R: Reach E4
Avg. Flow Depth=0.60’  Max Vel=11.38 fps  Inflow=16.81 cfs  2.173 af
72.0” Round Pipe  n=0.013  L=230.0’  S=0.0026 '/'  Capacity=216.31 cfs  Outflow=16.81 cfs  2.173 af

Reach 95R: Reach E5
Avg. Flow Depth=0.55’  Max Vel=12.86 fps  Inflow=16.81 cfs  2.173 af
72.0” Round Pipe  n=0.013  L=90.0’  S=0.0033 '/'  Capacity=244.51 cfs  Outflow=16.81 cfs  2.173 af

Pond 48P: Pond C
Peak Elev=330.99’  Storage=0.090 af  Inflow=38.69 cfs  4.377 af
Outflow=38.41 cfs  4.377 af

Pond 50P: Pond D
Peak Elev=348.02’  Storage=0.233 af  Inflow=290.58 cfs  112.942 af
Outflow=290.99 cfs  112.939 af

Pond 51P: B1 Basin
Peak Elev=427.55’  Storage=0.529 af  Inflow=10.03 cfs  0.980 af
Outflow=1.05 cfs  0.952 af

Pond 53P: D Basin
Peak Elev=464.53’  Storage=0.483 af  Inflow=8.84 cfs  0.783 af
Outflow=0.55 cfs  0.674 af

Pond 54P: D Pond
Peak Elev=382.25’  Storage=0.780 af  Inflow=5.16 cfs  5.791 af
Outflow=38.35 cfs  5.791 af

Pond 72P: Pond E
Peak Elev=372.00’  Storage=26 cf  Inflow=16.87 cfs  2.173 af
Outflow=16.84 cfs  2.173 af

Pond DP_A: Proposed Pond A
Peak Elev=370.67’  Storage=939,879 cf  Inflow=261.04 cfs  36.721 af
Outflow=37.67 cfs  30.868 af

Pond DP_B: Proposed Pond B
Peak Elev=362.21’  Storage=783,627 cf  Inflow=307.38 cfs  58.621 af
Outflow=113.37 cfs  54.804 af

Link 39L: CON 6
Inflow=371.63 cfs  133.042 af  Primary=371.63 cfs  133.042 af

Link 40L: CON 5
Inflow=106.17 cfs  15.246 af  Primary=106.17 cfs  15.246 af

Link 41L: CON 2
Inflow=150.97 cfs  20.353 af  Primary=150.97 cfs  20.353 af

Link 42L: CON 7
Inflow=261.04 cfs  36.721 af  Primary=261.04 cfs  36.721 af

Link 43L: CON 3
Inflow=162.41 cfs  52.068 af  Primary=162.41 cfs  52.068 af

Link 44L: CON 3A
Inflow=289.01 cfs  112.546 af  Primary=289.01 cfs  112.546 af
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  Type III 24-hr 2-Year Rainfall=3.50"
Prepared by TRC  Printed 12/9/2014
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC

Link 46L: CON 11
Inflow=299.98 cfs  39.632 af
Primary=299.98 cfs  39.632 af

Link 49L: L1
Inflow=290.58 cfs  112.942 af
Primary=290.58 cfs  112.942 af

Link 52L: B1 Out
Inflow=16.38 cfs  2.192 af
Primary=16.38 cfs  2.192 af

Link 61L: BS-A Out
Inflow=12.33 cfs  1.481 af
Primary=12.33 cfs  1.481 af

Link 62L: BS-B3 Out
Inflow=8.47 cfs  1.049 af
Primary=8.47 cfs  1.049 af

Link 63L: BB-8F
Inflow=283.79 cfs  37.459 af
Primary=283.79 cfs  37.459 af

Link 66L: Junction 2
Inflow=26.43 cfs  3.237 af
Primary=26.43 cfs  3.237 af

Link 70L: Junction 4
Inflow=39.76 cfs  5.987 af
Primary=39.76 cfs  5.987 af

Link 71L: Final
Inflow=53.04 cfs  7.916 af
Primary=53.04 cfs  7.916 af

Link 76L: L2
Inflow=38.69 cfs  4.377 af
Primary=38.69 cfs  4.377 af

Link 77L: L3
Inflow=5.42 cfs  0.544 af
Primary=5.42 cfs  0.544 af

Link 87L: CON 1 - Rye Lake
Inflow=179.74 cfs  24.288 af
Primary=179.74 cfs  24.288 af

Total Runoff Area = 1,038.120 ac  Runoff Volume = 148.309 af  Average Runoff Depth = 1.71"
73.60% Pervious = 764.020 ac   26.40% Impervious = 274.100 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.910 ac, 46.86% Impervious, Inflow Depth = 2.18" for 2-Year event
Inflow = 261.04 cfs @ 12.52 hrs, Volume= 36.721 af
Outflow = 37.67 cfs @ 14.12 hrs, Volume= 30.868 af, Attenu= 86%, Lag= 96.1 min
Primary = 37.67 cfs @ 14.12 hrs, Volume= 30.868 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 370.67' @ 14.12 hrs Surf.Area= 219,649 sf Storage= 939,879 cf
Plug-Flow detention time= 484.0 min calculated for 30.819 af (84% of inflow)
Center-of-Mass det. time= 418.1 min (1,262.8 - 844.6)

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<th>Avail.Storage</th>
<th>Storage Description</th>
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<tr>
<td>#1 365.00'</td>
<td>1,894,815 cf</td>
<td>Custom Stage Data (Irregular) Listed below (Recalc)</td>
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<td>1,894,815</td>
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Device Routing Invert Outlet Devices

<table>
<thead>
<tr>
<th>#1 Primary 364.10'</th>
<th>54.0&quot; Round 54&quot; Culvert - OS1</th>
</tr>
</thead>
<tbody>
<tr>
<td>L= 11.0' RCP, square edge headwall, Ke= 0.500</td>
<td></td>
</tr>
<tr>
<td>Inlet / Outlet Invert= 364.10' / 363.88' S= 0.0200 '/' Cc= 0.900</td>
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<tr>
<td>n= 0.013 Concrete pipe, straight &amp; clean, Flow Area= 15.90 sf</td>
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<thead>
<tr>
<th>#2 Primary 363.35'</th>
<th>60.0&quot; Round 60&quot; Culvert - OS2</th>
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<tbody>
<tr>
<td>L= 11.0' RCP, square edge headwall, Ke= 0.500</td>
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<tr>
<td>Inlet / Outlet Invert= 363.35' / 363.28' S= 0.0064 '/' Cc= 0.900</td>
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<tr>
<td>n= 0.013, Flow Area= 19.63 sf</td>
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</tbody>
</table>

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<th>#3 Device 366.00'</th>
<th>12.0&quot; Round 12&quot; Low Flow</th>
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<tbody>
<tr>
<td>L= 10.0' RCP, square edge headwall, Ke= 0.500</td>
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<tr>
<td>Inlet / Outlet Invert= 366.00' / 365.85' S= 0.0150 '/' Cc= 0.900</td>
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<tr>
<td>n= 0.013, Flow Area= 0.79 sf</td>
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<thead>
<tr>
<th>#4 Device 369.66'</th>
<th>3.3' long x 0.5' breadth Broad-Crested Rect. Weir - OS1</th>
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</thead>
<tbody>
<tr>
<td>Head (feet) 0.20</td>
<td>0.40 0.60 0.80 1.00</td>
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<tr>
<td>Coef. (English) 2.80 2.92 3.08 3.30 3.32</td>
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<tr>
<th>#5 Device 370.64'</th>
<th>6.8' long x 0.5' breadth Broad-Crested Rect. Weir OS1</th>
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</thead>
<tbody>
<tr>
<td>Head (feet) 0.20</td>
<td>0.40 0.60 0.80 1.00</td>
</tr>
<tr>
<td>Coef. (English) 2.80 2.92 3.08 3.30 3.32</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>#6 Device 373.25'</th>
<th>72.0&quot; x 84.0&quot; Horiz. Orifice/Grate C= 0.600</th>
</tr>
</thead>
</table>
Appendix H

Proposed 2014 Conditions 1&2 Year-Revised Ponds  
Type III 24-hr 2-Year Rainfall=3.50"

Limited to weir flow at low heads

#7  Primary  373.75'  200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1  
Head (feet)  0.20  0.40  0.60  0.80  1.00  1.20  1.40  1.60  
Coef. (English)  2.49  2.56  2.70  2.69  2.68  2.69  2.67  2.64

#8  Device 2  366.00'  12.0" Round 12" Low Flow  
L= 10.0' RCP, square edge headwall, Ke= 0.500  
Inlet / Outlet Invert= 366.00' / 365.85'  S= 0.0150 '/'  Cc= 0.900  
n= 0.013, Flow Area= 0.79 sf

#9  Device 2  369.66'  3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2  
Head (feet)  0.20  0.40  0.60  0.80  1.00  
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#10  Device 2  370.64'  6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2  
Head (feet)  0.20  0.40  0.60  0.80  1.00  
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#11  Device 2  373.25'  72.0" x 90.0" Horiz. Orifice/Grate  C= 0.600  
Limited to weir flow at low heads

Primary OutFlow  Max=37.66 cfs @ 14.12 hrs  HW=370.66' TW=0.00' (Dynamic Tailwater)

1=54" Culvert - OS1 (Passes 18.83 cfs of 155.14 cfs potential flow)

2=60" Culvert - OS2 (Passes 18.83 cfs of 196.06 cfs potential flow)

3=12" Low Flow (Inlet Controls 7.72 cfs @ 9.83 fps)

4=Broad-Crested Rect. Weir - OS1 (Weir Controls 11.04 cfs @ 3.33 fps)

5=Broad-Crested Rect Weir OS1 (Weir Controls 0.08 cfs @ 0.44 fps)

6=Orifice/Grate ( Controls 0.00 cfs)

7=Broad-Crested Rect Weir - OS1 ( Controls 0.00 cfs)

8=12" Low Flow (Inlet Controls 7.72 cfs @ 9.83 fps)

9=Broad-Crested Rect Weir - OS2 (Weir Controls 11.04 cfs @ 3.33 fps)

10=Broad-Crested Rect Weir - OS2 (Weir Controls 0.08 cfs @ 0.44 fps)

11=Orifice/Grate ( Controls 0.00 cfs)
Pond DP_A: Proposed Pond A

Hydrograph

Inflow Area=201.910 ac  
Peak Elev=370.67'  
Storage=939,879 cf

Stage-Discharge

Discharge (cfs)
0 200 400 600 800 1,000

Elevation (feet)
365 366 367 368 369 370 371 372 373 374

- Broad-Crested Rect Weir - OS1
- Orifice/Grate + Orifice/Grate
- 12" Low Flow + 12" Low Flow
- Broad-Crested Rect. Weir OS1 + Broad-Crested Rect Weir - OS2
- Broad-Crested Rect Weir - OS1 + Broad-Crested Rect Weir - OS2

Primary
Pond DP_A: Proposed Pond A

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Storage (cubic-feet)

Elevation (feet)

0 50,000 100,000 150,000 200,000 250,000

374 373 372 371 370 369 368 367 366 365

0 500,000 1,000,000 1,500,000

Custom Stage Data
Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.03% Impervious, Inflow Depth > 3.05" for 2-Year event
Inflow = 307.38 cfs @ 12.41 hrs, Volume= 58.621 af, Incl. 7.40 cfs Base Flow
Outflow = 113.37 cfs @ 13.00 hrs, Volume= 54.804 af, Atten= 63%, Lag= 35.4 min
Primary = 113.37 cfs @ 13.00 hrs, Volume= 54.804 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 362.21' @ 13.00 hrs Surf.Area= 229,884 sf Storage= 783,627 cf

Plug-Flow detention time= 232.9 min calculated for 54.701 af (93% of inflow)
Center-of-Mass det. time= 162.7 min (1,133.8 - 971.0)

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<td>239,098</td>
<td></td>
<td>233,288</td>
<td>969,838</td>
<td>907,277</td>
</tr>
</tbody>
</table>

Device Routing Invert Outlet Devices
#1 Primary 356.20' 60.0' Round 60" Culvert X 2.00
L= 50.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

#2 Device 1 356.47' 18.0' Round 18" Culvert
L= 15.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

#3 Device 1 360.30' 14.0' long x 6.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.38 2.52 2.70 2.68 2.66 2.66 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65

#4 Primary 365.60' 220.0' long x 10.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.67 2.67 2.67 2.67 2.67 2.67 2.67 2.67 2.67 2.67 2.67
Proposed 2014 Conditions 1&2 Year-Revised Ponds  

Type III 24-hr 2-Year Rainfall=3.50"  

Prepared by TRC  

Printed 12/9/2014  

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Primary OutFlow  
Max=113.35 cfs @ 13.00 hrs  
HW=362.21'  
TW=358.78'  
(Dynamic Tailwater)

1=60" Culvert  
(Passes 113.35 cfs of 319.66 cfs potential flow)

2=18" Culvert  
(Inlet Controls 15.76 cfs @ 8.92 fps)

3=Broad-Crested Rectangular Weir  
(Weir Controls 97.59 cfs @ 3.66 fps)

4=Broad-Crested Rectangular Weir  
(Controls 0.00 cfs)

Pond DP_B: Proposed Pond B

Inflow Area=230.930 ac  
Peak Elev=362.21'  
Storage=783,627 cf

Hydrograph

Inflow
Primary

Flow (cfs)

300
250
200
150
100
50
0

307.38 cfs
113.37 cfs

Time (hours)

6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

36 34 32 30 28 26 24 22 20 18 16 14 12 10 8 6

300
250
200
150
100
50
0

362.21'
Pond DP_B: Proposed Pond B

**Stage-Discharge**

- Broad-Crested Rectangular Weir
- Initial Tailwater
- 18" Culvert

**Stage-Area-Storage**

- Surface/Horizontal/Wetted Area (sq-ft)
- Custom Stage Data
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.460 ac, 31.77% Impervious, Inflow Depth > 1.60" for 2-Year event
Inflow = 162.41 cfs @ 12.58 hrs, Volume= 52.068 af
Primary = 162.41 cfs @ 12.58 hrs, Volume= 52.068 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph

Inflow Area=389.460 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

- Inflow Area = 673.510 ac, 33.20% Impervious, Inflow Depth > 2.01" for 2-Year event
- Inflow = 289.01 cfs @ 12.78 hrs, Volume= 112.546 af
- Primary = 289.01 cfs @ 12.78 hrs, Volume= 112.546 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 44L: CON 3A

Hydrograph

- Inflow Area=673.510 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.400 ac, 33.01% Impervious, Inflow Depth > 2.00” for 2-Year event
Inflow = 290.58 cfs @ 12.78 hrs, Volume = 112.942 af
Primary = 290.58 cfs @ 12.78 hrs, Volume = 112.942 af, Attenu = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 5.00-36.00 hrs, dt = 0.05 hrs

Link 49L: L1

Inflow Area = 677.400 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.17% Impervious, Inflow Depth > 1.41" for 2-Year event
Inflow = 106.17 cfs @ 12.33 hrs, Volume= 15.246 af
Primary = 106.17 cfs @ 12.33 hrs, Volume= 15.246 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 845.090 ac, 29.40% Impervious, Inflow Depth > 1.89" for 2-Year event
Inflow = 371.63 cfs @ 12.77 hrs, Volume = 133.042 af
Primary = 371.63 cfs @ 12.77 hrs, Volume = 133.042 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 5.00-36.00 hrs, dt = 0.05 hrs

Link 39L: CON 6

Hydrograph
Proposed 2014 Conditions 10&100 Year-Revised PorType III 24-hr 10-Year Rainfall=5.00"

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: BB-1AF
Runoff Area=7.450 ac  8.19% Impervious  Runoff Depth=2.54"
  Tc=20.4 min  CN=76  Runoff=14.71 cfs  1.574 af

Subcatchment 4S: BB-1DF
Runoff Area=7.080 ac  2.68% Impervious  Runoff Depth=2.12"
  Tc=20.4 min  CN=71  Runoff=11.50 cfs  1.249 af

Subcatchment 5S: BB-1EF
Runoff Area=8.140 ac  12.16% Impervious  Runoff Depth=2.54"
  Tc=27.0 min  CN=76  Runoff=14.27 cfs  1.720 af

Subcatchment 6S: BB-1FF
Runoff Area=19.500 ac  10.51% Impervious  Runoff Depth=2.62"
  Tc=18.6 min  CN=77  Runoff=41.49 cfs  4.262 af

Subcatchment 8S: BB-2F
Runoff Area=53.310 ac  1.37% Impervious  Runoff Depth=2.45"
  Tc=49.8 min  CN=75  Runoff=66.67 cfs  10.881 af

Subcatchment 10S: RL-2F
Runoff Area=6.030 ac  4.48% Impervious  Runoff Depth=2.36"
  Tc=15.6 min  CN=76  Runoff=13.28 cfs  1.274 af

Subcatchment 11S: BB-4F
Runoff Area=28.190 ac  2.09% Impervious  Runoff Depth=2.36"
  Tc=40.2 min  CN=74  Runoff=38.10 cfs  5.554 af

Subcatchment 12S: BB-5F
Runoff Area=37.050 ac  22.29% Impervious  Runoff Depth=2.62"
  Tc=19.2 min  CN=77  Runoff=77.85 cfs  8.098 af

Subcatchment 14S: RL-3F
Runoff Area=26.640 ac  4.73% Impervious  Runoff Depth=2.71"
  Tc=22.8 min  CN=78  Runoff=53.92 cfs  6.020 af

Subcatchment 53S: BS-B2
Runoff Area=13.580 ac  10.46% Impervious  Runoff Depth=2.36"
  Tc=15.0 min  CN=74  Runoff=28.18 cfs  2.676 af

Subcatchment 56S: BS-D Det1
Runoff Area=4.660 ac  29.83% Impervious  Runoff Depth=3.37"
  Tc=12.6 min  CN=85  Runoff=14.65 cfs  1.308 af

Subcatchment 58S: BS-D Pond
Runoff Area=21.420 ac  20.21% Impervious  Runoff Depth=2.62"
  Tc=16.8 min  CN=77  Runoff=47.34 cfs  4.682 af

Subcatchment 73S: BB-8FD
Runoff Area=15.260 ac  29.55% Impervious  Runoff Depth=2.99"
  Tc=31.2 min  CN=81  Runoff=29.61 cfs  3.796 af

Subcatchment 79S: 8FA
Runoff Area=158.080 ac  52.88% Impervious  Runoff Depth=3.67"
  Tc=30.6 min  CN=88  Runoff=374.03 cfs  48.332 af

Subcatchment 81S: 8FB
Runoff Area=18.920 ac  23.63% Impervious  Runoff Depth=3.08"
  Tc=27.6 min  CN=82  Runoff=39.97 cfs  4.855 af

Subcatchment 83S: 8FC
Runoff Area=9.200 ac  13.59% Impervious  Runoff Depth=2.45"
  Tc=22.8 min  CN=75  Runoff=16.75 cfs  1.878 af
### Subcatchment 85S: BB-6F
- Runoff Area: 4.780 ac
- 9.83% Impervious
- Runoff Depth: 2.54"
- Tc: 16.2 min
- CN: 76
- Runoff: 10.33 cfs, 1.010 af

### Subcatchment 86S: BB-9F
- Runoff Area: 3.870 ac
- 0.00% Impervious
- Runoff Depth: 2.36"
- Tc: 75.6 min
- CN: 74
- Runoff: 3.62 cfs, 0.762 af

### Subcatchment 87S: BB-1BF
- Runoff Area: 68.860 ac
- 19.21% Impervious
- Runoff Depth: 2.45"
- Tc: 31.2 min
- CN: 75
- Runoff: 109.18 cfs, 14.055 af

### Subcatchment 88S: BB-3F
- Runoff Area: 33.540 ac
- 14.25% Impervious
- Runoff Depth: 2.80"
- Tc: 22.8 min
- CN: 79
- Runoff: 70.18 cfs, 7.831 af

### Subcatchment 89S: BB-1CF
- Runoff Area: 39.150 ac
- 13.38% Impervious
- Runoff Depth: 2.54"
- Tc: 28.8 min
- CN: 76
- Runoff: 66.79 cfs, 8.272 af

### Subcatchment 90S: BB-7FC
- Runoff Area: 13.860 ac
- 11.59% Impervious
- Runoff Depth: 2.99"
- Tc: 15.6 min
- CN: 72
- Runoff: 46.12 cfs, 4.478 af

### Subcatchment 91S: RL-4F
- Runoff Area: 64.670 ac
- 5.52% Impervious
- Runoff Depth: 2.54"
- Tc: 35.4 min
- CN: 76
- Runoff: 100.11 cfs, 13.664 af

### Subcatchment 92S: BS-A
- Runoff Area: 198.170 ac
- 58.77% Impervious
- Runoff Depth: 3.77"
- Tc: 37.8 min
- CN: 89
- Runoff: 214.89 cfs, 30.858 af

### Subcatchment 93S: BS-B1 Bypass
- Runoff Area: 10.900 ac
- 12.02% Impervious
- Runoff Depth: 2.54"
- Tc: 7.8 min
- CN: 76
- Runoff: 30.01 cfs, 2.303 af

### Subcatchment 94S: BS-B1 DET
- Runoff Area: 4.990 ac
- 56.31% Impervious
- Runoff Depth: 3.77"
- Tc: 16.2 min
- CN: 69
- Runoff: 15.78 cfs, 1.568 af

### Subcatchment 95S: BS-B3
- Runoff Area: 11.230 ac
- 2.76% Impervious
- Runoff Depth: 2.20"
- Tc: 25.2 min
- CN: 72
- Runoff: 17.43 cfs, 2.057 af

### Subcatchment 96S: BS-C
- Runoff Area: 18.670 ac
- 5.62% Impervious
- Runoff Depth: 2.36"
- Tc: 10.8 min
- CN: 74
- Runoff: 43.49 cfs, 3.678 af

### Subcatchment 97S: BS-D Bypass
- Runoff Area: 18.000 ac
- 21.39% Impervious
- Runoff Depth: 2.99"
- Tc: 15.6 min
- CN: 81
- Runoff: 3.59 cfs, 0.343 af

### Subcatchment 98S: BS-D Channel
- Runoff Area: 18.000 ac
- 21.39% Impervious
- Runoff Depth: 2.99"
- Tc: 16.2 min
- CN: 81
- Runoff: 46.12 cfs, 4.478 af

### Subcatchment 99S: RL-4F
- Runoff Area: 64.670 ac
- 5.52% Impervious
- Runoff Depth: 2.54"
- Tc: 35.4 min
- CN: 76
- Runoff: 100.11 cfs, 13.664 af

### Subcatchment 100S: RL-1F
- Runoff Area: 35.870 ac
- 39.67% Impervious
- Runoff Depth: 3.27"
- Tc: 30.0 min
- CN: 84
- Runoff: 77.26 cfs, 9.776 af

### Subcatchment 101S: BB-7FA
- Runoff Area: 98.170 ac
- 58.77% Impervious
- Runoff Depth: 3.77"
- Tc: 37.8 min
- CN: 89
- Runoff: 214.89 cfs, 30.858 af

### Subcatchment 103S: BB-7FB
- Runoff Area: 89.910 ac
- 39.31% Impervious
- Runoff Depth: 3.37"
- Tc: 33.0 min
- CN: 85
- Runoff: 190.53 cfs, 25.235 af
### Subcatchment 109S: RL-5F
- Runoff Area: 59.820 ac
- 10.51% Impervious
- Runoff Depth: 2.62" 
- Tc=33.6 min 
- CN=77 
- Runoff: 98.44 cfs 13.076 af

### Subcatchment 111S: BB-1GF
- Runoff Area: 9.940 ac 
- 61.87% Impervious 
- Runoff Depth: 3.67" 
- Tc=10.2 min 
- CN=88 
- Runoff: 35.92 cfs 3.039 af

### Reach 24R: Reach I
- Avg. Flow Depth: 2.09’ 
- Max Vel: 15.84 fps 
- Inflow: 109.18 cfs 14.055 af 
- 54.0” Round Pipe 
- n=0.015 
- L=695.0’ 
- S=0.0090 ‘/’ 
- Capacity: 161.62 cfs 
- Outflow: 109.16 cfs 14.055 af

### Reach 25R: Reach H1
- Avg. Flow Depth: 0.86’ 
- Max Vel: 12.91 fps 
- Inflow: 66.79 cfs 8.272 af 
- n=0.060 
- L=1,800.0’ 
- S=0.0255 ‘/’ 
- Capacity: 631.65 cfs 
- Outflow: 66.71 cfs 8.272 af

### Reach 26R: Reach G1
- Avg. Flow Depth: 0.28’ 
- Max Vel: 12.65 fps 
- Inflow: 14.27 cfs 1.720 af 
- n=0.060 
- L=1,600.0’ 
- S=0.0347 ‘/’ 
- Capacity: 619.40 cfs 
- Outflow: 14.28 cfs 1.720 af

### Reach 27R: Reach F
- Avg. Flow Depth: 0.44’ 
- Max Vel: 15.50 fps 
- Inflow: 41.49 cfs 4.262 af 
- n=0.060 
- L=1,100.0’ 
- S=0.0480 ‘/’ 
- Capacity: 866.62 cfs 
- Outflow: 41.40 cfs 4.262 af

### Reach 30R: Reach M
- Avg. Flow Depth: 0.12’ 
- Max Vel: 16.03 fps 
- Inflow: 10.33 cfs 1.010 af 
- n=0.060 
- L=1,400.0’ 
- S=0.0509 ‘/’ 
- Capacity: 922.04 cfs 
- Outflow: 10.38 cfs 1.010 af

### Reach 31R: Reach C
- Avg. Flow Depth: 4.02’ 
- Max Vel: 4.77 fps 
- Inflow: 328.32 cfs 90.336 af 
- n=0.050 
- L=2,000.0’ 
- S=0.0030 ‘/’ 
- Capacity: 345.35 cfs 
- Outflow: 325.62 cfs 90.260 af

### Reach 32R: Reach A1
- Avg. Flow Depth: 4.50’ 
- Max Vel: 16.75 fps 
- Inflow: 288.52 cfs 37.559 af 
- 54.0” Round Pipe 
- n=0.015 
- L=1,380.0’ 
- S=0.0112 ‘/’ 
- Capacity: 325.62 cfs 
- Outflow: 263.65 cfs 37.388 af

### Reach 33R: Reach H2
- Avg. Flow Depth: 1.45’ 
- Max Vel: 15.77 fps 
- Inflow: 66.71 cfs 8.272 af 
- 54.0” Round Pipe 
- n=0.015 
- L=695.0’ 
- S=0.0090 ‘/’ 
- Capacity: 161.62 cfs 
- Outflow: 66.68 cfs 8.272 af

### Reach 34R: Reach G2
- Avg. Flow Depth: 0.49’ 
- Max Vel: 15.52 fps 
- Inflow: 14.28 cfs 1.720 af 
- 54.0” Round Pipe 
- n=0.015 
- L=695.0’ 
- S=0.0090 ‘/’ 
- Capacity: 161.62 cfs 
- Outflow: 14.26 cfs 1.720 af

### Reach 35R: Reach A2
- Avg. Flow Depth: 1.85’ 
- Max Vel: 21.23 fps 
- Inflow: 263.65 cfs 37.388 af 
- 87.0” x 87.0” Box Pipe 
- n=0.015 
- L=1,910.0’ 
- S=0.0065 ‘/’ 
- Capacity: 246.43 cfs 
- Outflow: 246.43 cfs 37.388 af

### Reach 37R: Reach J
- Avg. Flow Depth: 2.17’ 
- Max Vel: 19.32 fps 
- Inflow: 599.32 cfs 184.361 af 
- n=0.050 
- L=250.0’ 
- S=0.0552 ‘/’ 
- Capacity: 1,481.40 cfs 
- Outflow: 599.30 cfs 184.355 af

### Reach 38R: Reach E
- Avg. Flow Depth: 1.31’ 
- Max Vel: 12.25 fps 
- Inflow: 194.47 cfs 28.003 af 
- n=0.060 
- L=1,750.0’ 
- S=0.0293 ‘/’ 
- Capacity: 898.75 cfs 
- Outflow: 194.37 cfs 28.002 af

### Reach 45R: Reach K
- Avg. Flow Depth: 3.07’ 
- Max Vel: 4.16 fps 
- Inflow: 245.34 cfs 83.245 af 
- n=0.060 
- L=380.0’ 
- S=0.0039 ‘/’ 
- Capacity: 404.87 cfs 
- Outflow: 245.12 cfs 83.220 af

### Reach 47R: Reach N
- Avg. Flow Depth: 0.84’ 
- Max Vel: 13.98 fps 
- Inflow: 69.51 cfs 7.831 af 
- n=0.060 
- L=2,000.0’ 
- S=0.0290 ‘/’ 
- Capacity: 673.61 cfs 
- Outflow: 69.41 cfs 7.831 af

### Reach 51R: Reach D
- Avg. Flow Depth: 2.92’ 
- Max Vel: 13.47 fps 
- Inflow: 607.18 cfs 185.117 af 
- n=0.060 
- L=2,000.0’ 
- S=0.0362 ‘/’ 
- Capacity: 999.72 cfs 
- Outflow: 606.74 cfs 185.049 af
<table>
<thead>
<tr>
<th>Reach 78R: Reach A3</th>
<th>Avg. Flow Depth=3.24’</th>
<th>Max Vel=6.97 fps</th>
<th>Inflow=273.03 cfs</th>
<th>Outflow=239.44 cfs</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>n=0.050</td>
<td>L=1,670.0’</td>
<td>S=0.0030 '/'</td>
<td>Capacity=346.73 cfs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Outflow=239.44 cfs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 79R: Reach A4</td>
<td>Avg. Flow Depth=0.51’</td>
<td>Max Vel=25.68 fps</td>
<td>Inflow=239.44 cfs</td>
<td>Outflow=237.91 cfs</td>
</tr>
<tr>
<td></td>
<td>216.0” x 54.0”</td>
<td></td>
<td></td>
<td>Capacity=38.433 af</td>
</tr>
<tr>
<td></td>
<td>Box Pipe n=0.011</td>
<td>L=340.0’</td>
<td>S=0.0051 '/'</td>
<td>Outflow=237.91 cfs</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 86R: Reach E1</td>
<td>Avg. Flow Depth=1.92’</td>
<td>Max Vel=5.23 fps</td>
<td>Inflow=21.12 cfs</td>
<td>Outflow=21.12 cfs</td>
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<td>30.0” Round Pipe n=0.013</td>
<td>L=175.0’</td>
<td>S=0.0018 '/'</td>
<td>Capacity=17.26 cfs</td>
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<tr>
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<td>Outflow=21.12 cfs</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 87R: Reach E2</td>
<td>Avg. Flow Depth=1.26’</td>
<td>Max Vel=7.51 fps</td>
<td>Inflow=21.12 cfs</td>
<td>Outflow=21.12 cfs</td>
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<td>36.0” Round Pipe n=0.013</td>
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<td>S=0.0029 '/'</td>
<td>Capacity=35.68 cfs</td>
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<td>Outflow=21.12 cfs</td>
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<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 88R: Reach E3</td>
<td>Avg. Flow Depth=0.69’</td>
<td>Max Vel=11.79 fps</td>
<td>Inflow=21.12 cfs</td>
<td>Outflow=21.12 cfs</td>
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<tr>
<td></td>
<td>72.0” Round Pipe n=0.013</td>
<td>L=500.0’</td>
<td>S=0.0028 '/'</td>
<td>Capacity=224.10 cfs</td>
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<td>Outflow=21.12 cfs</td>
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<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 89R: Reach E4</td>
<td>Avg. Flow Depth=0.70’</td>
<td>Max Vel=11.38 fps</td>
<td>Inflow=21.12 cfs</td>
<td>Outflow=21.12 cfs</td>
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<td>72.0” Round Pipe n=0.013</td>
<td>L=230.0’</td>
<td>S=0.0026 '/'</td>
<td>Capacity=216.31 cfs</td>
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<td></td>
<td>Storage=38.433 af</td>
</tr>
<tr>
<td>Reach 90R: Reach E5</td>
<td>Avg. Flow Depth=0.65’</td>
<td>Max Vel=12.86 fps</td>
<td>Inflow=21.12 cfs</td>
<td>Outflow=21.12 cfs</td>
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<td>L=90.0’</td>
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<td>Storage=38.433 af</td>
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<td>Pond 48P: Pond C</td>
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<td>Inflow=14.65 cfs</td>
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<td>Pond DP_A: Proposed Pond A</td>
<td>Peak Elev=371.83’</td>
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<td>Inflow=341.84 cfs</td>
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<td>Primary=372.30 cfs</td>
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<td>Storage=44.930 af</td>
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<td>Storage=1.120 af</td>
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Appendix H

Proposed 2014 Conditions 10&100 Year-Revised PourType III 24-hr 10-Year Rainfall=5.00"

Printed 12/9/2014
Prepared by TRC

Total Runoff Area = 1,037.970 ac  Runoff Volume = 256.097 af  Average Runoff Depth = 2.96"
73.60% Pervious = 763.990 ac  26.40% Impervious = 273.980 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.930 ac, 46.85% Impervious, Inflow Depth = 3.38" for 10-Year event
Inflow = 341.84 cfs @ 12.32 hrs, Volume= 56.955 af
Outflow = 145.59 cfs @ 13.12 hrs, Volume= 50.329 af, Atten= 57%, Lag= 48.0 min
Primary = 145.59 cfs @ 13.12 hrs, Volume= 50.329 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 371.83' @ 13.12 hrs Surf.Area= 227,364 sf Storage= 1,199,259 cf

Plug-Flow detention time= 347.6 min calculated for 50.329 af (88% of inflow)
Center-of-Mass det. time= 293.1 min (1,124.3 - 831.3)

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<th>avail. storage</th>
<th>storage description</th>
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<td>#1</td>
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<td>1,894,815 cf</td>
<td>custom stage data (irregular) listed below (recalc)</td>
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<td>(feet)</td>
<td>(cubic-ft)</td>
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<th>invert</th>
<th>outlet devices</th>
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<tr>
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<td>primary</td>
<td>364.10'</td>
<td>54.0&quot; round 54&quot; culvert - os1</td>
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<tr>
<td></td>
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<td>l= 11.0’ rcp, square edge headwall, ke= 0.500</td>
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<tr>
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<td></td>
<td></td>
<td>inlet / outlet invert= 364.10' / 363.88' s= 0.0200 '/' cc= 0.900</td>
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<td>n= 0.013 concrete pipe, straight &amp; clean, flow area= 15.90 sf</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>inlet / outlet invert= 363.35' / 363.28' s= 0.0064 '/' cc= 0.900</td>
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<td>#3</td>
<td>device1</td>
<td>366.00'</td>
<td>12.0&quot; round 12&quot; low flow</td>
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<td></td>
<td>l= 10.0’ rcp, square edge headwall, ke= 0.500</td>
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<tr>
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<td></td>
<td></td>
<td>inlet / outlet invert= 366.00' / 365.85' s= 0.0150 '/' cc= 0.900</td>
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<td>n= 0.013, flow area= 0.79 sf</td>
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<td>3.3' long x 0.5' breadth broad-crested rect. weir - os1</td>
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<td>coeff. (english) 2.80 2.92 3.08 3.30 3.32</td>
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<tr>
<td>#5</td>
<td>device1</td>
<td>370.64'</td>
<td>6.8' long x 0.5' breadth broad-crested rect. weir os1</td>
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<td>head (feet) 0.20 0.40 0.60 0.80 1.00</td>
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<td>72.0&quot; x 84.0&quot; horiz. orifice/grate c= 0.600</td>
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</table>
Appendix H

Proposed 2014 Conditions 10&100 Year-Revised

Type III 24-hr 10-Year Rainfall=5.00"

Limited to weir flow at low heads

#7  Primary  373.75' 200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1
Head (feet)  0.20  0.40  0.60  0.80  1.00  1.20  1.40  1.60
Coef. (English)  2.49  2.56  2.70  2.69  2.68  2.69  2.67  2.64

#8  Device 2  366.00' 12.0'' Round 12'' Low Flow
L= 10.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00' / 365.85'  S= 0.0150 '/'  Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#9  Device 2  369.66' 3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet)  0.20  0.40  0.60  0.80  1.00
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#10 Device 2 370.64' 6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet)  0.20  0.40  0.60  0.80  1.00
Coef. (English)  2.80  2.92  3.08  3.30  3.32

#11 Device 2  373.25' 72.0'' x 90.0'' Horiz. Orifice/Grate  C= 0.600
Limited to weir flow at low heads

Primary OutFlow  Max=145.42 cfs @ 13.12 hrs  HW=371.82'  TW=0.00'  (Dynamic Tailwater)

1=54'' Culvert - OS1 (Passes 72.71 cfs of 179.17 cfs potential flow)
2=60'' Culvert - OS2 (Passes 72.71 cfs of 231.08 cfs potential flow)
3=12'' Low Flow (Inlet Controls 8.73 cfs @ 11.11 fps)
4=Broad-Crested Rect. Weir - OS1 (Weir Controls 34.89 cfs @ 4.88 fps)
5=Broad-Crested Rect OS1 (Weir Controls 29.10 cfs @ 3.61 fps)
6=Orifice/Grate  ( Controls 0.00 cfs)
7=Broad-Crested Rect Weir - OS1  ( Controls 0.00 cfs)
8=12'' Low Flow (Inlet Controls 8.73 cfs @ 11.11 fps)
9=Broad-Crested Rect Weir - OS2 (Weir Controls 34.89 cfs @ 4.88 fps)
10=Broad-Crested Rect Weir - OS2 (Weir Controls 29.10 cfs @ 3.61 fps)
11=Orifice/Grate  ( Controls 0.00 cfs)
Proposed 2014 Conditions 10&100 Year-Revised Pond Type III 24-hr 10-Year Rainfall=5.00"

Inflow Area=201.930 ac
Peak Elev=371.83'
Storage=1,199,259 cf

Pond DP_A: Proposed Pond A

Hydrograph

Inflow Area=201.930 ac
Peak Elev=371.83'
Storage=1,199,259 cf

Stage-Discharge

Broad-Crested Rect Weir - OS1
Orifice/Grate + Orifice/Grate

12" Low Flow + 12" Low Flow
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Custom Stage Data

Pond DP_A: Proposed Pond A

Stage-Area-Storage
### Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.03% Impervious, Inflow Depth > 4.54" for 10-Year event

Inflow = 488.69 cfs @ 12.39 hrs, Volume= 87.421 af, Incl. 7.40 cfs Base Flow

Outflow = 245.34 cfs @ 12.84 hrs, Volume= 83.245 af, Atten= 50%, Lag= 26.7 min

Primary = 245.34 cfs @ 12.84 hrs, Volume= 83.245 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3

Peak Elev= 363.66' @ 12.84 hrs  Surf.Area= 245,190 sf  Storage= 1,128,467 cf

Plug-Flow detention time= 182.4 min calculated for 83.229 af (95% of inflow)

Center-of-Mass det. time= 128.7 min (1,024.2 - 895.6)

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<td>L= 50.0' RCP, square edge headwall, Ke= 0.500</td>
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<td>Inlet / Outlet Invert= 356.20' / 355.82'  S= 0.0076 '/'  Cc= 0.900</td>
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<td>n= 0.013 Concrete pipe, straight &amp; clean, Flow Area= 19.63 sf</td>
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<td><strong>18.0&quot; Round 18&quot; Culvert</strong></td>
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<td>L= 15.0' RCP, sq.cut end projecting, Ke= 0.500</td>
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<td>Inlet / Outlet Invert= 356.47' / 356.32'  S= 0.0100 '/'  Cc= 0.900</td>
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<tr>
<td></td>
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<td>n= 0.013 Concrete pipe, straight &amp; clean, Flow Area= 1.77 sf</td>
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<tr>
<td>#3 Device 1</td>
<td>360.30'</td>
<td><strong>14.0' long x 6.5' breadth Broad-Crested Rectangular Weir</strong></td>
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<td>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50</td>
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<td>Coef. (English) 2.38 2.52 2.70 2.68 2.67 2.66 2.65 2.65 2.65 2.66 2.65 2.68 2.71 2.75 2.81</td>
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<td>#4 Primary</td>
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<td><strong>220.0&quot; long x 10.0&quot; breadth Broad-Crested Rectangular Weir</strong></td>
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<tr>
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<td>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64</td>
</tr>
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Appendix H

Proposed 2014 Conditions 10&100 Year-Revised PorType III 24-hr 10-Year Rainfall=5.00" 
Prepared by TRC 
Printed 12/9/2014 
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Page 6

Primary OutFlow
Max=245.17 cfs @ 12.84 hrs  HW=363.65'  TW=360.07'  (Dynamic Tailwater)
1=60" Culvert  (Passes 245.17 cfs of 358.13 cfs potential flow)
2=18" Culvert  (Inlet Controls 16.12 cfs @ 9.12 fps)
3=Broad-Crested Rectangular Weir  (Weir Controls 229.05 cfs @ 4.88 fps)
4=Broad-Crested Rectangular Weir  (Controls 0.00 cfs)

Pond DP_B: Proposed Pond B

Hydrograph

Inflow Area=230.930 ac
Peak Elev=363.66'
Storage=1,128,467 cf

488.69 cfs
245.34 cfs

Flow (cfs)

0 50 100 150 200 250 300 350 400 450 500

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

Time (hours)
Appendix H

Proposed 2014 Conditions 10&100 Year-Revised Pond Type III 24-hr 10-Year Rainfall=5.00"

Prepared by TRC
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC
Printed 12/9/2014
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Pond DP_B: Proposed Pond B

Stage-Discharge

Discharge (cfs)

Elevation (feet)

0 500 1000

366 365 364 363 362 361 360 359 358 357 356

Broad-Crested Rectangular Weir

18" Culvert

Initial Tailwater

Surface/Area-Storage

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

0 50,000 100,000 150,000 200,000 250,000

366 365 364 363 362 361 360 359 358 357 356

Custom Stage Data

Storage (cubic-feet)
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.140 ac, 31.71% Impervious, Inflow Depth > 2.79" for 10-Year event
Inflow = 328.32 cfs @ 13.11 hrs, Volume= 90.336 af
Primary = 328.32 cfs @ 13.11 hrs, Volume= 90.336 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph

Inflow Area=389.140 ac

Flow (cfs)

Time (hours)
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 673.380 ac, 33.19% Impervious, Inflow Depth > 3.29" for 10-Year event
Inflow = 599.32 cfs @ 12.99 hrs, Volume = 184.361 af
Primary = 599.32 cfs @ 12.99 hrs, Volume = 184.361 af, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.05 hrs

Link 44L: CON 3A

Hydrograph

Inflow Area = 673.380 ac

Flow (cfs)

650 600 550 500 450 400 350 300 250 200 150 100 50 0

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

Time (hours)
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.250 ac, 33.00% Impervious, Inflow Depth > 3.28” for 10-Year event
Inflow = 602.91 cfs @ 12.99 hrs, Volume= 185.118 af
Primary = 602.91 cfs @ 12.99 hrs, Volume= 185.118 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 49L: L1

Hydrograph

Inflow Area=677.250 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.17% Impervious, Inflow Depth > 2.60" for 10-Year event
Inflow = 194.47 cfs @ 12.30 hrs, Volume= 28.003 af
Primary = 194.47 cfs @ 12.30 hrs, Volume= 28.003 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 844.940 ac, 29.39% Impervious, Inflow Depth > 3.15” for 10-Year event
Inflow = 740.99 cfs @ 12.65 hrs, Volume= 221.892 af
Primary = 740.99 cfs @ 12.65 hrs, Volume= 221.892 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 39L: CON 6

Hydrograph

Inflow Area=844.940 ac
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

<table>
<thead>
<tr>
<th>Subcatchment</th>
<th>Type</th>
<th>Runoff Area (ac)</th>
<th>Impervious (%)</th>
<th>Runoff Depth (&quot;in&quot;)</th>
<th>Tc (min)</th>
<th>CN</th>
<th>Runoff (cfs)</th>
<th>Storage (af)</th>
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<td>1S: BB-1AF</td>
<td>8.19%</td>
<td>7.450</td>
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<td>2.68</td>
<td>4.15</td>
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<td>6S: BB-1FF</td>
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<td>10.51</td>
<td>4.82</td>
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<td>77</td>
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<tr>
<td>8S: BB-2F</td>
<td>1.37%</td>
<td>53.310</td>
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<td>10S: RL-2F</td>
<td>4.48%</td>
<td>6.030</td>
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<td>12S: BB-5F</td>
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<td>53S: BS-B2</td>
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<td>4.660</td>
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<td>79S: 8FA</td>
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### Proposed 2014 Conditions 10&100 Year-Revised Po

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<tr>
<th>Subcatchment</th>
<th>Runoff Area</th>
<th>Impervious (%)</th>
<th>Runoff Depth</th>
<th>Tc (min)</th>
<th>CN</th>
<th>Runoff (cfs)</th>
<th>Runoff (af)</th>
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<td>85S: BB-6F</td>
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<tr>
<td>86S: BB-9F</td>
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<td>75.6</td>
<td>74</td>
<td>6.95 cfs</td>
<td>1.445 af</td>
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<tr>
<td>87S: BB-1BF</td>
<td>68.860 ac</td>
<td>19.21%</td>
<td>4.59&quot;</td>
<td>31.2</td>
<td>75</td>
<td>205.41 cfs</td>
<td>26.356 af</td>
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<tr>
<td>88S: BB-3F</td>
<td>33.540 ac</td>
<td>14.25%</td>
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<td>79</td>
<td>125.48 cfs</td>
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<td>89S: BB-1CF</td>
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<td>76</td>
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<td>77</td>
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<td>95S: BS-B3</td>
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<td>96S: BS-C</td>
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<td>81</td>
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<td>98S: BS-D Channel</td>
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<td>99S: RL-4F</td>
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<td>Subcatchment 109S: RL-5F</td>
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<td>Tc=33.6 min</td>
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<td>24.017 af</td>
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<thead>
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<th>Subcatchment 111S: BB-1GF</th>
<th>Runoff Area=9.940 ac</th>
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<td></td>
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<td></td>
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<tr>
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<td>L=695.0’</td>
<td>S=0.0090 ’”</td>
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<td>Capacity=161.62 cfs</td>
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<td>S=0.0255 ’”</td>
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<td></td>
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<td>Outflow=19.26 cfs</td>
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<th>Max Vel=4.88 fps</th>
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<th>Avg. Flow Depth=4.50’</th>
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<th>Inflow=540.08 cfs</th>
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<td>Outflow=214.13 cfs</td>
<td>69.644 af</td>
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<th>Avg. Flow Depth=2.30’</th>
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<tr>
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<td>S=0.0090 ’”</td>
<td>Capacity=161.62 cfs</td>
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<tr>
<td></td>
<td></td>
<td>Outflow=123.82 cfs</td>
<td>15.351 af</td>
</tr>
<tr>
<td></td>
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<th>Avg. Flow Depth=0.75’</th>
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<td>S=0.0090 ’”</td>
<td>Capacity=161.62 cfs</td>
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<tr>
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<td>Outflow=26.50 cfs</td>
<td>3.192 af</td>
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<th>Reach 35R: Reach A2</th>
<th>Avg. Flow Depth=1.49’</th>
<th>Max Vel=22.87 fps</th>
<th>Inflow=214.13 cfs</th>
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<tbody>
<tr>
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<td>n=0.015 L=1,910.0’</td>
<td>S=0.0065 ’”</td>
<td>Capacity=758.61 cfs</td>
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<tr>
<td></td>
<td></td>
<td>Outflow=205.79 cfs</td>
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<th>Reach 37R: Reach J</th>
<th>Avg. Flow Depth=3.29’</th>
<th>Max Vel=19.33 fps</th>
<th>Inflow=1,050.20 cfs</th>
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<td>n=0.050 L=250.0’</td>
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<td>Capacity=1,481.40 cfs</td>
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<td>Outflow=1,050.23 cfs</td>
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<th>Reach 38R: Reach E</th>
<th>Avg. Flow Depth=2.22’</th>
<th>Max Vel=12.29 fps</th>
<th>Inflow=378.76 cfs</th>
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<tr>
<td></td>
<td>n=0.060 L=1,750.0’</td>
<td>S=0.0293 ’”</td>
<td>Capacity=898.75 cfs</td>
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<td>Outflow=378.14 cfs</td>
<td>51.550 af</td>
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<th>Reach 45R: Reach K</th>
<th>Avg. Flow Depth=4.07’</th>
<th>Max Vel=4.16 fps</th>
<th>Inflow=375.70 cfs</th>
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<td>S=0.0039 ’”</td>
<td>Capacity=404.87 cfs</td>
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<td>Outflow=375.58 cfs</td>
<td>127.368 af</td>
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<th>Reach 47R: Reach N</th>
<th>Avg. Flow Depth=1.33’</th>
<th>Max Vel=15.14 fps</th>
<th>Inflow=131.80 cfs</th>
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<td>14.098 af</td>
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<tr>
<th>Reach 51R: Reach D</th>
<th>Avg. Flow Depth=4.34’</th>
<th>Max Vel=13.85 fps</th>
<th>Inflow=1,065.14 cfs</th>
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<td>Outflow=1,065.41 cfs</td>
<td>307.121 af</td>
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Proposed 2014 Conditions 10&100 Year-Revised PoType III 24-hr 100-Year Rainfall=7.50"

Reach 78R: Reach A3
Avg. Flow Depth=4.37'  Max Vel=7.42 fps  Inflow=380.30 cfs  77.137 af
n=0.050  L=1,670.0'  S=0.0030 '/'  Capacity=346.73 cfs  Outflow=368.18 cfs  77.137 af

Reach 79R: Reach A4
Avg. Flow Depth=0.80'  Max Vel=25.68 fps  Inflow=368.18 cfs  77.137 af
216.0" x 54.0" Box Pipe  n=0.011  L=340.0'  S=0.0051 '/'  Capacity=1,161.64 cfs  Outflow=368.17 cfs  77.137 af

Reach 86R: Reach E1
Avg. Flow Depth=2.50'  Max Vel=5.23 fps  Inflow=35.04 cfs  12.112 af
30.0" Round Pipe  n=0.013  L=175.0'  S=0.0018 '/'  Capacity=17.26 cfs  Outflow=25.96 cfs  12.107 af

Reach 87R: Reach E2
Avg. Flow Depth=1.44'  Max Vel=7.51 fps  Inflow=25.96 cfs  12.107 af
36.0" Round Pipe  n=0.013  L=318.0'  S=0.0029 '/'  Capacity=35.68 cfs  Outflow=25.12 cfs  12.107 af

Reach 88R: Reach E3
Avg. Flow Depth=0.76'  Max Vel=11.79 fps  Inflow=25.12 cfs  12.107 af
72.0" Round Pipe  n=0.013  L=500.0'  S=0.0028 '/'  Capacity=224.10 cfs  Outflow=24.44 cfs  12.107 af

Reach 89R: Reach E4
Avg. Flow Depth=0.77'  Max Vel=11.38 fps  Inflow=24.44 cfs  12.107 af
72.0" Round Pipe  n=0.013  L=230.0'  S=0.0026 '/'  Capacity=216.31 cfs  Outflow=24.19 cfs  12.107 af

Reach 90R: Reach E5
Avg. Flow Depth=0.71'  Max Vel=12.86 fps  Inflow=24.19 cfs  12.107 af
72.0" Round Pipe  n=0.013  L=90.0'  S=0.0033 '/'  Capacity=244.51 cfs  Outflow=24.11 cfs  12.107 af

Pond 48P: Pond C
Peak Elev=336.07'  Storage=0.480 af  Inflow=125.48 cfs  14.098 af
Outflow=131.80 cfs  14.098 af

Pond 51P: B1 Basin
Peak Elev=429.65'  Storage=1.359 af  Inflow=25.29 cfs  2.577 af
Outflow=4.04 cfs  2.526 af

Pond 53P: D Basin
Peak Elev=466.02'  Storage=0.823 af  Inflow=24.44 cfs  2.226 af
Outflow=18.25 cfs  2.063 af

Pond 54P: D Pond
Peak Elev=385.07'  Storage=2.769 af  Inflow=182.37 cfs  18.571 af
Outflow=141.92 cfs  18.571 af

Pond 72P: Pond E
Peak Elev=374.98'  Storage=272,019 cf  Inflow=256.76 cfs  12.107 af
Outflow=30.54 cfs  12.112 af

Pond 78P: Pond D
Peak Elev=349.90'  Storage=9,790 cf  Inflow=1,056.32 cfs  307.193 af
Outflow=1,065.14 cfs  307.193 af

Pond DP_A: Proposed Pond A
Peak Elev=372.71'  Storage=1,403,804 cf  Inflow=372.59 cfs  85.386 af
Outflow=270.57 cfs  78.008 af

Pond DP_B: Proposed Pond B
Peak Elev=365.02'  Storage=1,470,406 cf  Inflow=563.03 cfs  131.903 af
Outflow=375.70 cfs  127.393 af

Link 7L: CON 1 - Rye Lake
Inflow=763.89 cfs  86.622 af
Primary=763.89 cfs  86.622 af

Link 20L: BB-7FA
below 168.00 cfs  Inflow=344.98 cfs  50.695 af
Primary=168.00 cfs  43.545 af  Secondary=176.98 cfs  7.150 af
Appendix H

Proposed 2014 Conditions 10&100 Year-Revised Po

Type III 24-hr 100-Year Rainfall=7.50"

Prepared by TRC
Printed 12/9/2014
Prepared by TRC

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Total Runoff Area = 1,037.970 ac
Runoff Volume = 451.688 af
Average Runoff Depth = 5.22"
73.60% Pervious = 763.990 ac
26.40% Impervious = 273.980 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.930 ac, 46.85% Impervious, Inflow Depth = 5.07" for 100-Year event
Inflow = 372.59 cfs @ 12.20 hrs, Volume= 85.386 af
Outflow = 270.57 cfs @ 13.04 hrs, Volume= 78.008 af, Atten= 27%, Lag= 50.4 min
Primary = 270.57 cfs @ 13.04 hrs, Volume= 78.008 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 372.71' @ 13.04 hrs Surf.Area= 233,489 sf Storage= 1,403,804 cf
Plug-Flow detention time= 262.6 min calculated for 78.008 af (91% of inflow)
Center-of-Mass det. time= 217.8 min (1,042.3 - 824.5)

Volume Invert Avail.Storage Storage Description
#1 365.00' 1,894,815 cf Custom Stage Data (Irregular) Listed below (Recalc)

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<td>1,194,650</td>
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Device Routing Invert Outlet Devices

#1 Primary 364.10' 54.0" Round 54" Culvert - OS1
L= 11.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 364.10' / 363.88' S= 0.0200 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

#2 Primary 363.35' 60.0" Round 60" Culvert - OS2
L= 11.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 363.35' / 363.28' S= 0.0064 '/' Cc= 0.900
n= 0.013, Flow Area= 19.63 sf

#3 Device 1 366.00' 12.0" Round 12" Low Flow
L= 10.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00' / 365.85' S= 0.0150 '/' Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#4 Device 1 369.66' 3.3' long x 0.5' breadth Broad-Crested Rect. Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#5 Device 1 370.64' 6.8' long x 0.5' breadth Broad-Crested Rect. Weir OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#6 Device 1 373.25' 72.0" x 84.0" Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

#7 Primary 373.75’ 200.0’ long x 10.0’ breadth Broad-Crested Rect Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

#8 Device 2 366.00’ 12.0” Round 12” Low Flow
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 '/' Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#9 Device 2 369.66’ 3.3’ long x 0.5’ breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#10 Device 2 370.64’ 6.8’ long x 0.5’ breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#11 Device 2 373.25’ 72.0” x 90.0” Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=270.31 cfs @ 13.04 hrs HW=372.71’ TW=0.00’ (Dynamic Tailwater)

1=54” Culvert - OS1 (Passes 135.15 cfs of 193.15 cfs potential flow)
   3=12” Low Flow (Inlet Controls 9.43 cfs @ 12.00 fps)
   4=Broad-Crested Rect. Weir - OS1 (Weir Controls 58.41 cfs @ 5.80 fps)
   5=Broad-Crested Rect. Weir OS1 (Weir Controls 67.32 cfs @ 4.78 fps)
   6=Orifice/Grate ( Controls 0.00 cfs)

2=60” Culvert - OS2 (Passes 135.15 cfs of 247.65 cfs potential flow)
   8=12” Low Flow (Inlet Controls 9.43 cfs @ 12.00 fps)
   9=Broad-Crested Rect Weir - OS2 (Weir Controls 58.41 cfs @ 5.80 fps)
   10=Broad-Crested Rect Weir - OS2 (Weir Controls 67.32 cfs @ 4.78 fps)
   11=Orifice/Grate ( Controls 0.00 cfs)

7=Broad-Crested Rect Weir - OS1 ( Controls 0.00 cfs)
Appendix H

Proposed 2014 Conditions 10&100 Year-Revised Po

Type III 24-hr 100-Year Rainfall=7.50"

Printed 12/9/2014
Prepared by TRC

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Pond DP_A: Proposed Pond A

Hydrograph

Inflow Area=201.930 ac
Peak Elev=372.71'
Storage=1,403,804 cf

372.59 cfs
270.57 cfs

Time (hours)

Flow (cfs)

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

Discharge (cfs)

0 200 400 600 800 1,000

Elevation (feet)

365 366 367 368 369 370 371 372 373 374

Broad-Crested Rect. Weir OS1 + Broad-Crested Rect. Weir - OS2

Broad-Crested Rect. Weir OS1 + Broad-Crested Rect. Weir - OS2

Orifice/Grate + Orifice/Grate

12" Low Flow + 12" Low Flow

Primary

Broad-Crested Rect. Weir - OS1 + Broad-Crested Rect. Weir - OS2
Pond DP_A: Proposed Pond A

Stage-Area-Storage

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<td>373</td>
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Surface/Horizontal/Wetted Area (sq-ft)

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Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.03% Impervious, Inflow Depth > 6.85" for 100-Year event
Inflow = 563.03 cfs @ 12.31 hrs, Volume= 131.903 af, Incl. 7.40 cfs Base Flow
Outflow = 375.70 cfs @ 12.83 hrs, Volume= 127.393 af, Atten= 33%, Lag= 31.1 min
Primary = 375.70 cfs @ 12.83 hrs, Volume= 127.393 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 365.02' @ 12.84 hrs Surf.Area= 256,898 sf Storage= 1,470,406 cf

Plug-Flow detention time= 143.9 min calculated for 127.201 af (96% of inflow)
Center-of-Mass det. time= 106.2 min (981.4 - 875.2)

Volume | Invert | Avail.Storage | Storage Description
--- | --- | --- | ---
#1 | 356.00' | 1,942,029 cf | Custom Stage Data (Irregular) Listed below (Recalc)

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Device Routing | Invert | Outlet Devices
--- | --- | ---
#1 Primary | 356.20' | **60.0'' Round 60'' Culvert X 2.00**
L= 50.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

#2 Device 1 | 356.47' | **18.0'' Round 18'' Culvert**
L= 15.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

#3 Device 1 | 360.30' | **14.0' long x 6.5' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coeff. (English) 2.38 2.52 2.70 2.68 2.67 2.66 2.65 2.65 2.66 2.67 2.68 2.66 2.67 2.71 2.75 2.81

#4 Primary | 365.60' | **220.0'' long x 10.0'' breadth Broad-Crested Rectangular Weir**
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coeff. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
Proposed 2014 Conditions 10&100 Year-Revised Pool Type III 24-hr 100-Year Rainfall=7.50"

Prepared by TRC

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Appendix H

Primary OutFlow Max=375.57 cfs @ 12.83 hrs  HW=365.01’  TW=361.07’   (Dynamic Tailwater)

1=60" Culvert (Inlet Controls 375.57 cfs @ 9.56 fps)

2=18" Culvert (Passes < 16.90 cfs potential flow)

3=Broad-Crested Rectangular Weir (Passes < 380.51 cfs potential flow)

4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Pond DP_B: Proposed Pond B**

Inflow Area=230.930 ac  
Peak Elev=365.02’  
Storage=1,470,406 cf

Hydrograph

<table>
<thead>
<tr>
<th>Time (hours)</th>
<th>Flow (cfs)</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
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</tbody>
</table>

563.03 cfs  375.70 cfs
Appendix H

Proposed 2014 Conditions 10&100 Year-Revised PoType III 24-hr 100-Year Rainfall=7.50"
Prepared by TRC
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Pond DP_B: Proposed Pond B

Stage-Discharge

Elevation (feet)

Discharge (cfs)

Broad-Crested Rectangular Weir

18" Culvert

Initial Tailwater

Pond DP_B: Proposed Pond B

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Custom Stage Data
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.140 ac, 31.71% Impervious, Inflow Depth > 4.87" for 100-Year event
Inflow = 568.54 cfs @ 12.61 hrs, Volume= 158.066 af
Primary = 568.54 cfs @ 12.61 hrs, Volume= 158.066 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Inflow Area=389.140 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 673.380 ac, 33.19% Impervious, Inflow Depth > 5.45" for 100-Year event
Inflow = 1,050.20 cfs @ 12.75 hrs, Volume = 305.754 af
Primary = 1,050.20 cfs @ 12.75 hrs, Volume = 305.754 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.05 hrs

Link 44L: CON 3A

Inflow Area = 673.380 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.250 ac, 33.00% Impervious, Inflow Depth > 5.44” for 100-Year event
Inflow = 1,056.32 cfs @ 12.75 hrs, Volume = 307.193 af
Primary = 1,056.32 cfs @ 12.75 hrs, Volume = 307.193 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-36.00 hrs, dt = 0.05 hrs

Link 49L: L1

Hydrograph

Inflow Area = 677.250 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.17% Impervious, Inflow Depth > 4.78” for 100-Year event
Inflow = 378.76 cfs @ 12.35 hrs, Volume= 51.550 af
Primary = 378.76 cfs @ 12.35 hrs, Volume= 51.550 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 844.940 ac, 29.39% Impervious, Inflow Depth > 5.32" for 100-Year event
Inflow = 1,365.90 cfs @ 12.75 hrs, Volume= 374.643 af
Primary = 1,365.90 cfs @ 12.75 hrs, Volume= 374.643 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs

Link 39L: CON 6

Inflow Area=844.940 ac

Hydrograph

Time (hours)

Flow (cfs)

0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36

1,400
1,200
1,000
800
600
400
200
0

1,365.90 cfs
### Future 2014 Conditions 1&2 Year-Revised Ponds

**Type III 24-hr 1-Year Rainfall=2.80”**

**Prepared by TRC**

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- **Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points x 3**
- **Runoff by SCS TR-20 method, UH=SCS, Weighted-CN**
- **Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method**

**Subcatchment 4S: BB-1DF**
- Runoff Area = 7.080 ac
- 2.68% Impervious
- Runoff Depth = 0.65”
- $T_c$ = 20.4 min
- $CN$ = 71
- Runoff = 3.06 cfs
- 0.382 af

**Subcatchment 5S: BB-1EF**
- Runoff Area = 8.140 ac
- 12.16% Impervious
- Runoff Depth = 0.88”
- $T_c$ = 27.0 min
- $CN$ = 76
- Runoff = 4.68 cfs
- 0.599 af

**Subcatchment 6S: BB-1FF**
- Runoff Area = 19.500 ac
- 10.51% Impervious
- Runoff Depth = 0.93”
- $T_c$ = 18.6 min
- $CN$ = 71
- Runoff = 13.97 cfs
- 1.519 af

**Subcatchment 53S: BS-B2**
- Runoff Area = 13.580 ac
- 10.46% Impervious
- Runoff Depth = 0.78”
- $T_c$ = 15.0 min
- $CN$ = 74
- Runoff = 8.48 cfs
- 0.887 af

**Subcatchment 58S: BS-D Pond**
- Runoff Area = 21.420 ac
- 20.21% Impervious
- Runoff Depth = 0.93”
- $T_c$ = 16.8 min
- $CN$ = 77
- Runoff = 16.01 cfs
- 1.669 af

**Subcatchment 73S: BB-8FD**
- Runoff Area = 15.260 ac
- 29.55% Impervious
- Runoff Depth = 1.16”
- $T_c$ = 31.2 min
- $CN$ = 81
- Runoff = 21.88 cfs
- 2.880 af

**Subcatchment 78S: BB-1CF**
- Runoff Area = 39.150 ac
- 13.38% Impervious
- Runoff Depth = 0.88”
- $T_c$ = 28.8 min
- $CN$ = 76
- Runoff = 28.8 cfs
- 2.880 af

**Subcatchment 81S: BB-8F**
- Runoff Area = 187.810 ac
- 48.46% Impervious
- Runoff Depth = 1.57”
- $T_c$ = 30.6 min
- $CN$ = 87
- Runoff = 24.505 cfs

**Subcatchment 83S: BS-A**
- Runoff Area = 15.860 ac
- 0.00% Impervious
- Runoff Depth = 0.69”
- $T_c$ = 23.4 min
- $CN$ = 72
- Runoff = 7.11 cfs
- 0.914 af

**Subcatchment 84S: BS-B1 Bypass**
- Runoff Area = 10.900 ac
- 12.02% Impervious
- Runoff Depth = 0.88”
- $T_c$ = 7.8 min
- $CN$ = 76
- Runoff = 9.82 cfs
- 0.802 af

**Subcatchment 85S: BS-B1 DET**
- Runoff Area = 4.990 ac
- 56.31% Impervious
- Runoff Depth = 1.72”
- $T_c$ = 16.2 min
- $CN$ = 89
- Runoff = 7.36 cfs
- 0.715 af

**Subcatchment 87S: BS-B3**
- Runoff Area = 11.230 ac
- 2.76% Impervious
- Runoff Depth = 0.69”
- $T_c$ = 25.2 min
- $CN$ = 72
- Runoff = 4.89 cfs
- 0.647 af

**Subcatchment 88S: BS-C**
- Runoff Area = 18.670 ac
- 5.62% Impervious
- Runoff Depth = 0.78”
- $T_c$ = 10.8 min
- $CN$ = 74
- Runoff = 13.20 cfs

**Subcatchment 89S: BS-D Bypass**
- Runoff Area = 1.380 ac
- 11.59% Impervious
- Runoff Depth = 1.16”
- $T_c$ = 15.6 min
- $CN$ = 81
- Runoff = 1.37 cfs
- 0.134 af

**Subcatchment 90S: BS-D Channel**
- Runoff Area = 18.000 ac
- 21.39% Impervious
- Runoff Depth = 1.16”
- $T_c$ = 16.2 min
- $CN$ = 81
- Runoff = 17.52 cfs
- 1.743 af

**Subcatchment 91S: BS-D Det1**
- Runoff Area = 4.660 ac
- 29.83% Impervious
- Runoff Depth = 1.42”
- $T_c$ = 12.6 min
- $CN$ = 85
- Runoff = 6.18 cfs
- 0.552 af
### Future 2014 Conditions 1&2 Year-Revised Ponds

**Appendix H**

**Type III 24-hr 1-Year Rainfall=2.80”**

*Prepared by TRC*

Printed 12/9/2014

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<table>
<thead>
<tr>
<th>Subcatchment</th>
<th>Runoff Area</th>
<th>Impervious</th>
<th>Runoff Depth</th>
<th>Tc</th>
<th>CN</th>
<th>Runoff</th>
</tr>
</thead>
<tbody>
<tr>
<td>93S: BB-2F</td>
<td>Runoff Area=53.120 ac</td>
<td>0.96%</td>
<td>Runoff Depth=0.83”</td>
<td>Tc=49.8 min</td>
<td>CN=75</td>
<td>Runoff=20.97 cfs 3.685 af</td>
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<tr>
<td>94S: BB-5F</td>
<td>Runoff Area=37.050 ac</td>
<td>22.29%</td>
<td>Runoff Depth=0.93”</td>
<td>Tc=19.2 min</td>
<td>CN=77</td>
<td>Runoff=26.23 cfs 2.886 af</td>
</tr>
<tr>
<td>95S: BB-9F</td>
<td>Runoff Area=3.890 ac</td>
<td>0.00%</td>
<td>Runoff Depth=0.78”</td>
<td>Tc=75.6 min</td>
<td>CN=74</td>
<td>Runoff=1.10 cfs 0.254 af</td>
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<tr>
<td>96S: BB-1BF</td>
<td>Runoff Area=68.860 ac</td>
<td>21.83%</td>
<td>Runoff Depth=0.88”</td>
<td>Tc=31.2 min</td>
<td>CN=76</td>
<td>Runoff=37.15 cfs 5.060 af</td>
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<tr>
<td>97S: RL-1F</td>
<td>Runoff Area=35.870 ac</td>
<td>39.67%</td>
<td>Runoff Depth=1.35”</td>
<td>Tc=30.0 min</td>
<td>CN=84</td>
<td>Runoff=31.94 cfs 4.046 af</td>
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<tr>
<td>98S: BB-1AF</td>
<td>Runoff Area=7.450 ac</td>
<td>9.13%</td>
<td>Runoff Depth=0.88”</td>
<td>Tc=20.4 min</td>
<td>CN=76</td>
<td>Runoff=4.81 cfs 0.548 af</td>
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<tr>
<td>99S: BB-7F</td>
<td>Runoff Area=201.910 ac</td>
<td>47.63%</td>
<td>Runoff Depth=1.57”</td>
<td>Tc=37.8 min</td>
<td>CN=76</td>
<td>Runoff=187.56 cfs 26.345 af</td>
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<tr>
<td>102S: RL-2F</td>
<td>Runoff Area=6.030 ac</td>
<td>4.48%</td>
<td>Runoff Depth=0.88”</td>
<td>Tc=15.6 min</td>
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<td>Runoff=4.31 cfs 0.444 af</td>
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<tr>
<td>104S: RL-3F</td>
<td>Runoff Area=26.640 ac</td>
<td>4.73%</td>
<td>Runoff Depth=0.99”</td>
<td>Tc=22.8 min</td>
<td>CN=76</td>
<td>Runoff=18.81 cfs 2.195 af</td>
</tr>
<tr>
<td>105S: RL-4F</td>
<td>Runoff Area=64.670 ac</td>
<td>5.52%</td>
<td>Runoff Depth=0.88”</td>
<td>Tc=35.4 min</td>
<td>CN=76</td>
<td>Runoff=32.87 cfs 4.758 af</td>
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<td>107S: BB-1GF</td>
<td>Runoff Area=9.940 ac</td>
<td>61.87%</td>
<td>Runoff Depth=1.64”</td>
<td>Tc=10.2 min</td>
<td>CN=88</td>
<td>Runoff=16.43 cfs 1.360 af</td>
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<tr>
<td>108S: RL-5F</td>
<td>Runoff Area=59.820 ac</td>
<td>10.51%</td>
<td>Runoff Depth=0.93”</td>
<td>Tc=33.6 min</td>
<td>CN=77</td>
<td>Runoff=33.38 cfs 4.660 af</td>
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<tr>
<td>111S: BB-3F</td>
<td>Runoff Area=33.540 ac</td>
<td>14.97%</td>
<td>Runoff Depth=1.04”</td>
<td>Tc=22.8 min</td>
<td>CN=79</td>
<td>Runoff=25.24 cfs 2.919 af</td>
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<tr>
<td>115S: BB-4F</td>
<td>Runoff Area=28.190 ac</td>
<td>2.70%</td>
<td>Runoff Depth=0.83”</td>
<td>Tc=40.2 min</td>
<td>CN=75</td>
<td>Runoff=12.51 cfs 1.956 af</td>
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<td>116S: BB-6F</td>
<td>Runoff Area=4.780 ac</td>
<td>16.11%</td>
<td>Runoff Depth=0.99”</td>
<td>Tc=16.2 min</td>
<td>CN=78</td>
<td>Runoff=3.87 cfs 0.394 af</td>
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</tbody>
</table>

**Reach 24R: Reach I**

Avg. Flow Depth=0.95’   Max Vel=15.66 fps   Inflow=37.15 cfs  5.066 af
54.0” Round Pipe  n=0.015   L=695.0’  S=0.0090 ’/’  Capacity=161.62 cfs  Outflow=37.14 cfs  5.066 af

**Reach 25R: Reach H1**

Avg. Flow Depth=0.33’   Max Vel=11.85 fps   Inflow=21.88 cfs  2.880 af
n=0.060   L=1,800.0’  S=0.0255 ’/’  Capacity=631.65 cfs  Outflow=21.86 cfs  2.880 af
Appendix H

Type III 24-hr 1-Year Rainfall=2.80"

Future 2014 Conditions 1&2 Year-Revised Ponds

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Reach 26R: Reach G1

Avg. Flow Depth=0.10’  Max Vel=12.42 fps  Inflow=4.68 cfs  0.599 af
n=0.060  L=1,600.0’  S=0.0347 '/'  Capacity=619.40 cfs  Outflow=4.68 cfs  0.599 af

Reach 27R: Reach F

Avg. Flow Depth=0.16’  Max Vel=15.13 fps  Inflow=13.97 cfs  1.519 af
n=0.060  L=1,100.0’  S=0.0480 '/'  Capacity=866.62 cfs  Outflow=14.01 cfs  1.519 af

Reach 30R: Reach M

Avg. Flow Depth=0.04’  Max Vel=15.96 fps  Inflow=3.87 cfs  0.394 af
n=0.060  L=1,400.0’  S=0.0509 '/'  Capacity=892.04 cfs  Outflow=3.88 cfs  0.394 af

Reach 31R: Reach C

Avg. Flow Depth=1.69’  Max Vel=4.72 fps  Inflow=104.79 cfs  35.335 af
n=0.050  L=2,000.0’  S=0.0030 '/'  Capacity=345.35 cfs  Outflow=101.09 cfs  35.282 af

Reach 32R: Reach A1

Avg. Flow Depth=1.74’  Max Vel=18.35 fps  Inflow=95.64 cfs  13.368 af
54.0” Round Pipe  n=0.015  L=1,380.0’  S=0.0112 '/'  Capacity=180.04 cfs  Outflow=95.65 cfs  13.368 af

Reach 33R: Reach H2

Avg. Flow Depth=0.66’  Max Vel=15.56 fps  Inflow=21.86 cfs  2.880 af
54.0” Round Pipe  n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=21.86 cfs  2.880 af

Reach 34R: Reach G2

Avg. Flow Depth=0.23’  Max Vel=15.13 fps  Inflow=4.68 cfs  0.599 af
54.0” Round Pipe  n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=4.68 cfs  0.599 af

Reach 35R: Reach A2

Avg. Flow Depth=0.70’  Max Vel=20.47 fps  Inflow=95.65 cfs  13.368 af
87.0” x 87.0” Box Pipe  n=0.015  L=1,910.0’  S=0.0065 '/'  Capacity=758.61 cfs  Outflow=95.49 cfs  13.368 af

Reach 36R: Reach A3

Avg. Flow Depth=1.57’  Max Vel=6.50 fps  Inflow=95.49 cfs  13.368 af
n=0.050  L=1,670.0’  S=0.0030 '/'  Capacity=346.73 cfs  Outflow=92.69 cfs  13.368 af

Reach 37R: Reach J

Avg. Flow Depth=0.76’  Max Vel=19.30 fps  Inflow=168.08 cfs  82.721 af
n=0.050  L=250.0’  S=0.0552 '/'  Capacity=1,481.40 cfs  Outflow=168.09 cfs  82.716 af

Reach 38R: Reach E

Avg. Flow Depth=0.52’  Max Vel=12.27 fps  Inflow=67.26 cfs  10.096 af
n=0.060  L=1,750.0’  S=0.0293 '/'  Capacity=898.75 cfs  Outflow=67.21 cfs  10.096 af

Reach 45R: Reach K

Avg. Flow Depth=1.12’  Max Vel=4.16 fps  Inflow=62.22 cfs  43.777 af
n=0.060  L=380.0’  S=0.0039 '/'  Capacity=404.87 cfs  Outflow=62.19 cfs  43.753 af

Reach 47R: Reach N

Avg. Flow Depth=0.35’  Max Vel=13.30 fps  Inflow=168.95 cfs  82.966 af
n=0.060  L=2,000.0’  S=0.0362 '/'  Capacity=999.72 cfs  Outflow=168.97 cfs  82.909 af

Reach 51R: Reach D

Avg. Flow Depth=1.07’  Max Vel=13.21 fps  Inflow=168.95 cfs  82.966 af
n=0.060  L=2,000.0’  S=0.0362 '/'  Capacity=999.72 cfs  Outflow=168.97 cfs  82.909 af

Reach 72R: Reach A4

Avg. Flow Depth=0.20’  Max Vel=25.68 fps  Inflow=92.69 cfs  13.368 af
216.0” x 54.0” Box Pipe  n=0.011  L=340.0’  S=0.0051 '/'  Capacity=1,161.64 cfs  Outflow=92.69 cfs  13.368 af

Reach 91R: Reach E1

Avg. Flow Depth=1.13’  Max Vel=5.23 fps  Inflow=11.32 cfs  1.477 af
30.0” Round Pipe  n=0.013  L=175.0’  S=0.0018 '/'  Capacity=17.26 cfs  Outflow=11.31 cfs  1.477 af

Reach 92R: Reach E2

Avg. Flow Depth=0.77’  Max Vel=7.83 fps  Inflow=11.31 cfs  1.477 af
36.0” Round Pipe  n=0.013  L=318.0’  S=0.0031 '/'  Capacity=37.22 cfs  Outflow=11.30 cfs  1.477 af
**Future 2014 Conditions 1&2 Year-Revised Ponds**  
*Type III 24-hr 1-Year Rainfall=2.80"*

Prepared by TRC  
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<table>
<thead>
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<th>HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC</th>
</tr>
</thead>
</table>

| Reach 93R: Reach E3 | Avg. Flow Depth=0.45'  Max Vel=11.79 fps  Inflow=11.30 cfs  1.477 af |
|---|---|---|---|---|---|---|
| 72.0" Round Pipe  |  n=0.013  | L=500.0'  | S=0.0028 '/'  | Capacity=224.10 cfs  | Outflow=11.29 cfs  | 1.477 af |

| Reach 94R: Reach E4 | Avg. Flow Depth=0.46'  Max Vel=11.38 fps  Inflow=11.29 cfs  1.477 af |
|---|---|---|---|---|---|---|
| 72.0" Round Pipe  |  n=0.013  | L=230.0'  | S=0.0026 '/'  | Capacity=216.31 cfs  | Outflow=11.29 cfs  | 1.477 af |

| Reach 95R: Reach E5 | Avg. Flow Depth=0.42'  Max Vel=12.86 fps  Inflow=11.29 cfs  1.477 af |
|---|---|---|---|---|---|---|
| 72.0" Round Pipe  |  n=0.013  | L=90.0'  | S=0.0033 '/'  | Capacity=244.51 cfs  | Outflow=11.29 cfs  | 1.477 af |

| Pond 48P: Pond C | Peak Elev=329.95'  Storage=0.059 af  Inflow=25.24 cfs  2.919 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=25.06 cfs  2.919 af |

| Pond 50P: Pond D | Peak Elev=345.38'  Storage=0.054 af  Inflow=169.03 cfs  82.970 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=168.95 cfs  82.966 af |

| Pond 51P: B1 Basin | Peak Elev=427.11'  Storage=0.374 af  Inflow=7.36 cfs  0.715 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=0.86 cfs  0.690 af |

| Pond 53P: D Basin | Peak Elev=463.88'  Storage=0.345 af  Inflow=6.18 cfs  0.552 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=0.32 cfs  0.490 af |

| Pond 54P: D Pond | Peak Elev=381.76'  Storage=0.539 af  Inflow=33.71 cfs  3.901 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=24.67 cfs  3.901 af |

| Pond 72P: Pond E | Peak Elev=372.00'  Storage=0 cf  Inflow=11.32 cfs  1.477 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=11.32 cfs  1.477 af |

| Pond DP_A: Proposed Pond A | Peak Elev=369.78'  Storage=749,114 cf  Inflow=187.56 cfs  26.345 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=14.52 cfs  21.419 af |

| Pond DP_B: Proposed Pond B | Peak Elev=361.46'  Storage=616,509 cf  Inflow=222.57 cfs  47.351 af |
|---|---|---|---|---|---|---|
|  |  |  |  |  |  | Outflow=62.22 cfs  43.777 af |

| Link 39L: CON 6 | Inflow=222.02 cfs  96.318 af  Primary=222.02 cfs  96.318 af |
|---|---|---|---|---|---|---|

| Link 40L: CON 5 | Inflow=67.26 cfs  10.096 af  Primary=67.26 cfs  10.096 af |
|---|---|---|---|---|---|---|

| Link 41L: CON 2 | Inflow=95.64 cfs  13.368 af  Primary=95.64 cfs  13.368 af |
|---|---|---|---|---|---|---|

| Link 42L: CON 7 | Inflow=187.56 cfs  26.345 af  Primary=187.56 cfs  26.345 af |
|---|---|---|---|---|---|---|

| Link 43L: CON 3 | Inflow=104.79 cfs  35.335 af  Primary=104.79 cfs  35.335 af |
|---|---|---|---|---|---|---|

| Link 44L: CON 3A | Inflow=168.08 cfs  82.721 af  Primary=168.08 cfs  82.721 af |
Link 46L: CON 11
Inflow=215.17 cfs  28.361 af
Primary=215.17 cfs  28.361 af

Link 49L: L1
Inflow=169.03 cfs  82.970 af
Primary=169.03 cfs  82.970 af

Link 52L: B1 Out
Inflow=10.27 cfs  1.492 af
Primary=10.27 cfs  1.492 af

Link 61L: BS-A Out
Inflow=7.11 cfs  0.914 af
Primary=7.11 cfs  0.914 af

Link 62L: BS-B3 Out
Inflow=4.89 cfs  0.647 af
Primary=4.89 cfs  0.647 af

Link 63L: BB-8F
Inflow=204.31 cfs  26.884 af
Primary=204.31 cfs  26.884 af

Link 66L: Junction 2
Inflow=17.74 cfs  2.232 af
Primary=17.74 cfs  2.232 af

Link 70L: Junction 4
Inflow=25.62 cfs  4.035 af
Primary=25.62 cfs  4.035 af

Link 71L: Final
Inflow=33.66 cfs  5.254 af
Primary=33.66 cfs  5.254 af

Link 76L: L2
Inflow=25.24 cfs  2.919 af
Primary=25.24 cfs  2.919 af

Link 77L: L3
Inflow=3.87 cfs  0.394 af
Primary=3.87 cfs  0.394 af

Link 87L: CON 1 - Rye Lake
Inflow=116.28 cfs  16.102 af
Primary=116.28 cfs  16.102 af

Total Runoff Area = 1,039.390 ac  Runoff Volume = 102.160 af  Average Runoff Depth = 1.18"
73.10% Pervious = 759.790 ac  26.90% Impervious = 279.600 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.910 ac, 47.63% Impervious, Inflow Depth = 1.57" for 1-Year event
Inflow = 187.56 cfs @ 12.53 hrs, Volume= 26.345 af
Outflow = 14.52 cfs @ 16.18 hrs, Volume= 21.419 af, Atten= 92%, Lag= 219.3 min
Primary = 14.52 cfs @ 16.18 hrs, Volume= 21.419 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 369.78' @ 16.18 hrs Surf.Area= 213,447 sf Storage= 749,114 cf
Plug-Flow detention time= 581.0 min calculated for 21.385 af (81% of inflow)
Center-of-Mass det. time= 507.4 min (1,361.5 - 854.1)

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<th>Storage Description</th>
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<td>1,894,815 cf</td>
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<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
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<tbody>
<tr>
<td>#1</td>
<td>Primary 364.10’</td>
<td>54.0” Round 54“ Culvert - OS1</td>
<td></td>
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</tbody>
</table>
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 364.10’ / 363.88’ S= 0.0200 ’/’ Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf
| #2     | Primary 363.35’ | 60.0” Round 60“ Culvert - OS2 |
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 363.35’ / 363.28’ S= 0.0064 ’/’ Cc= 0.900
n= 0.013, Flow Area= 19.63 sf
| #3     | Device 1 366.00’ | 12.0” Round 12“ Low Flow |
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 ’/’ Cc= 0.900
n= 0.013, Flow Area= 0.79 sf
| #4     | Device 1 369.66’ | 3.3’ long x 0.5’ breadth Broad-Crested Rect. Weir - OS1 |
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32
| #5     | Device 1 370.64’ | 6.8’ long x 0.5’ breadth Broad-Crested Rect. Weir OS1 |
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32
| #6     | Device 1 373.25’ | 72.0” x 84.0” Horiz. Orifice/Grate C= 0.600 |
## Limited to weir flow at low heads

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<th>Length (feet)</th>
<th>Breadth (feet)</th>
<th>Coef. (English)</th>
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<td>366.00'</td>
<td>12.0&quot; Round 12&quot; Low Flow</td>
<td>2.49 2.60 2.69 2.68 2.69 2.67 2.64</td>
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<td>#9</td>
<td>Device 2</td>
<td>369.66'</td>
<td>3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2</td>
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<td>72.0&quot; x 90.0&quot; Horiz. Orifice/Grate</td>
<td>2.49 2.60 2.69 2.68 2.69 2.67 2.64</td>
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### Primary OutFlow

- **Max=14.52 cfs @ 16.18 hrs** HW=369.78' TW=0.00' (Dynamic Tailwater)
- **1=54" Culvert - OS1** (Passes 7.26 cfs of 129.17 cfs potential flow)
- **3=12" Low Flow** (Inlet Controls 6.85 cfs @ 8.73 fps)
- **4=Broad-Crested Rect. Weir - OS1** (Weir Controls 0.41 cfs @ 0.99 fps)
- **5=Broad-Crested Rect. Weir OS1** (Controls 0.00 cfs)
- **6=Orifice/Grate** (Controls 0.00 cfs)
- **7=Broad-Crested Rect Weir - OS1** (Controls 0.00 cfs)
- **8=12" Culvert - OS2** (Passes 7.26 cfs of 163.01 cfs potential flow)
- **9=Broad-Crested Rect Weir - OS2** (Weir Controls 0.41 cfs @ 0.99 fps)
- **10=Broad-Crested Rect Weir - OS2** (Controls 0.00 cfs)
- **11=Orifice/Grate** (Controls 0.00 cfs)
Type III 24-hr 1-Year Rainfall=2.80"

Future 2014 Conditions 1&2 Year-Revised Ponds

Pond DP_A: Proposed Pond A

Inflow Area=201.910 ac
Peak Elev=369.78'
Storage=749,114 cf

Inflow
Primary

Discharge (cfs)

Elevation (feet)

187.56 cfs
14.52 cfs

12" Low Flow + 12" Low Flow

Orifice/Grate + Orifice/Grate

Broad-Crested Rect. Weir - OS1 + Broad-Crested Rect Weir - OS2

Broad-Crested Rect Weir OS1 + Broad-Crested Rect Weir - OS2

Broad-Crested Rect Weir - OS1
Pond DP_A: Proposed Pond A

Stage/Area/Storage

Surface/Horizontal/Wetted Area (sq-ft)

Elevation (feet)

Storage (cubic-feet)

Custom Stage Data
Summary for Pond DP_B: Proposed Pond B

Inflow Area = 232.540 ac, 43.46% Impervious, Inflow Depth > 2.44" for 1-Year event
Inflow = 222.57 cfs @ 12.42 hrs, Volume= 47.351 af, Incl. 7.40 cfs Base Flow
Outflow = 62.22 cfs @ 13.22 hrs, Volume= 43.777 af, Atten= 72%, Lag= 47.8 min
Primary = 62.22 cfs @ 13.22 hrs, Volume= 43.777 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 361.46' @ 13.22 hrs Surf.Area= 216,231 sf Storage= 616,509 cf

Plug-Flow detention time= 267.4 min calculated for 43.761 af (92% of inflow)
Center-of-Mass det. time= 186.7 min (1,192.7 - 1,006.0)

Volume Invert Avail.Storage Storage Description
#1 356.00' 1,942,029 cf Custom Stage Data (Irregular) Listed below (Recalc)

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Device Routing Invert Outlet Devices
#1 Primary 356.20' 60.0" Round 60" Culvert X 2.00
L= 50.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf

#2 Device 1 356.47' 18.0" Round 18" Culvert
L= 15.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf

#3 Device 1 360.30' 14.0' long x 6.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.38 2.52 2.70 2.68 2.67 2.66 2.65 2.65 2.66 2.65 2.67 2.68 2.71 2.75 2.81

#4 Primary 365.60' 220.0' long x 10.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
**Future 2014 Conditions 1&2 Year-Revised Ponds**

Prepared by TRC

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Appendix H

Type III 24-hr 1-Year Rainfall=2.80"

Printed 12/9/2014

Page 6

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**Primary OutFlow**

Max=62.20 cfs @ 13.22 hrs  HW=361.46'  TW=358.12'  (Dynamic Tailwater)

1=60" Culvert  (Passes 62.20 cfs of 270.90 cfs potential flow)

2=18" Culvert  (Inlet Controls 15.55 cfs @ 8.80 fps)

3=Broad-Crested Rectangular Weir  (Weir Controls 46.65 cfs @ 2.88 fps)

4=Broad-Crested Rectangular Weir  (Controls 0.00 cfs)

---

**Pond DP_B: Proposed Pond B**

Hydrograph

- Inflow Area=232.540 ac
- Peak Elev=361.46'
- Storage=616,509 cf

---

Inflow

Primary
Pond DP_B: Proposed Pond B

Stage-Discharge

- Broad-Crested Rectangular Weir
- 18" Culvert
- Initial Tailwater

Pond DP_B: Proposed Pond B

Stage-Area-Storage

- Surface
- Storage

Custom Stage Data
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.120 ac, 32.59% Impervious, Inflow Depth > 1.09" for 1-Year event

Inflow = 104.79 cfs @ 12.60 hrs, Volume= 35.335 af

Primary = 104.79 cfs @ 12.60 hrs, Volume= 35.335 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph

Inflow Area=389.120 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 674.780 ac, 33.85% Impervious, Inflow Depth > 1.47" for 1-Year event
Inflow = 168.08 cfs @ 12.82 hrs, Volume= 82.721 af
Primary = 168.08 cfs @ 12.82 hrs, Volume= 82.721 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 44L: CON 3A

Hydrograph

Inflow Area=674.780 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 678.670 ac, 33.65% Impervious, Inflow Depth > 1.47” for 1-Year event
Inflow = 169.03 cfs @ 12.82 hrs, Volume= 82.970 af
Primary = 169.03 cfs @ 12.82 hrs, Volume= 82.970 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Inflow Area=678.670 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.30% Impervious, Inflow Depth > 0.94" for 1-Year event
Inflow = 67.26 cfs @ 12.35 hrs, Volume = 10.096 af
Primary = 67.26 cfs @ 12.35 hrs, Volume = 10.096 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 846.360 ac, 30.01% Impervious, Inflow Depth > 1.37" for 1-Year event

Inflow = 222.02 cfs @ 12.76 hrs, Volume = 96.318 af

Primary = 222.02 cfs @ 12.76 hrs, Volume = 96.318 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 5.00-36.00 hrs, dt = 0.05 hrs

Link 39L: CON 6

Hydrograph
### Appendix H

**Future 2014 Conditions 1&2 Year-Revised Ponds**

**Type III 24-hr 2-Year Rainfall=3.50”**

Prepared by TRC  
Printed 12/9/2014  
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Time span=5.00-36.00 hrs, dt=0.05 hrs, 621 points x 3  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

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<th>Impervious (%)</th>
<th>Runoff Depth (”)</th>
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<th>CN</th>
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<th>Af (af)</th>
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<td>10.46</td>
<td>1.24</td>
<td>15.0</td>
<td>74</td>
<td>14.25</td>
<td>1.403</td>
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<td>Subcatchment 58S: BS-D Pond</td>
<td>21.420</td>
<td>20.21</td>
<td>1.43</td>
<td>16.8</td>
<td>77</td>
<td>25.31</td>
<td>2.553</td>
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<td>Subcatchment 73S: BB-8FD</td>
<td>15.260</td>
<td>29.55</td>
<td>1.71</td>
<td>31.2</td>
<td>81</td>
<td>16.87</td>
<td>2.173</td>
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<td>Subcatchment 78S: BB-1CF</td>
<td>39.150</td>
<td>13.38</td>
<td>1.37</td>
<td>28.8</td>
<td>76</td>
<td>35.12</td>
<td>4.454</td>
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<td>Subcatchment 81S: BB-8F</td>
<td>187.810</td>
<td>48.46</td>
<td>2.18</td>
<td>30.6</td>
<td>87</td>
<td>268.59</td>
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<td>Subcatchment 83S: BS-A</td>
<td>15.860</td>
<td>0.00</td>
<td>1.12</td>
<td>23.4</td>
<td>72</td>
<td>12.33</td>
<td>1.481</td>
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<td>Subcatchment 84S: BS-B1 Bypass</td>
<td>10.900</td>
<td>12.02</td>
<td>1.37</td>
<td>7.8</td>
<td>76</td>
<td>15.78</td>
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<td>Subcatchment 85S: BS-B1 DET</td>
<td>4.990</td>
<td>56.31</td>
<td>2.36</td>
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<td>11.230</td>
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<td>5.62</td>
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Appendix H

Future 2014 Conditions 1&2 Year-Revised Ponds

Type III 24-hr 2-Year Rainfall=3.50"

Prepared by TRC
Printed 12/9/2014
Prepared by TRC

Runoff Area=53.120 ac  0.96% Impervious  Runoff Depth=1.30"  
Tc=49.8 min  CN=75  Runoff=34.26 cfs  5.763 af

Subcatchment 93S: BB-2F

Runoff Area=37.050 ac  22.29% Impervious  Runoff Depth=1.43"  
Tc=19.2 min  CN=77  Runoff=41.46 cfs  4.17 af

Subcatchment 94S: BB-5F

Runoff Area=3.890 ac  0.00% Impervious  Runoff Depth=1.24"  
Tc=75.6 min  CN=74  Runoff=1.83 cfs  0.402 af

Subcatchment 95S: BB-9F

Runoff Area=68.860 ac  21.83% Impervious  Runoff Depth=1.37"  
Tc=31.2 min  CN=76  Runoff=59.56 cfs  7.835 af

Subcatchment 96S: BB-1BF

Runoff Area=35.870 ac  39.67% Impervious  Runoff Depth=1.94"  
Tc=10.3 min  CN=76  Runoff=52.66 cfs  3.834 af

Subcatchment 97S: RL-1F

Runoff Area=7.450 ac  9.13% Impervious  Runoff Depth=1.37"  
Tc=20.4 min  CN=76  Runoff=7.73 cfs  0.848 af

Subcatchment 98S: BB-1AF

Runoff Area=201.910 ac  47.63% Impervious  Runoff Depth=2.18"  
Tc=20.4 min  CN=77  Runoff=261.04 cfs  36.721 af

Subcatchment 99S: BB-7F

Runoff Area=6.030 ac  4.48% Impervious  Runoff Depth=1.37"  
Tc=15.6 min  CN=76  Runoff=6.93 cfs  0.686 af

Subcatchment 102S: RL-2F

Runoff Area=26.640 ac  4.73% Impervious  Runoff Depth=1.50"  
Tc=22.8 min  CN=76  Runoff=29.25 cfs  3.324 af

Subcatchment 104S: RL-3F

Runoff Area=64.670 ac  5.52% Impervious  Runoff Depth=1.37"  
Tc=35.4 min  CN=76  Runoff=52.66 cfs  7.358 af

Subcatchment 105S: RL-4F

Runoff Area=9.940 ac  61.87% Impervious  Runoff Depth=2.27"  
Tc=10.2 min  CN=88  Runoff=22.58 cfs  1.879 af

Subcatchment 107S: BB-1GF

Runoff Area=59.820 ac  10.51% Impervious  Runoff Depth=1.43"  
Tc=33.6 min  CN=77  Runoff=52.64 cfs  7.131 af

Subcatchment 108S: RL-5F

Runoff Area=33.540 ac  14.97% Impervious  Runoff Depth=1.57"  
Tc=22.8 min  CN=79  Runoff=38.69 cfs  4.377 af

Subcatchment 111S: BB-3F

Runoff Area=28.190 ac  2.70% Impervious  Runoff Depth=1.30"  
Tc=40.2 min  CN=75  Runoff=20.40 cfs  3.058 af

Subcatchment 115S: BB-4F

Runoff Area=4.780 ac  16.11% Impervious  Runoff Depth=1.50"  
Tc=16.2 min  CN=78  Runoff=6.02 cfs  0.596 af

Subcatchment 116S: BB-6F

Runoff Area=4.780 ac  16.11% Impervious  Runoff Depth=1.50"  
Tc=16.2 min  CN=78  Runoff=6.02 cfs  0.596 af

Reach 24R: Reach I

Avg. Flow Depth=1.33'  Max Vel=15.66 fps  Inflow=59.56 cfs  7.835 af  
54.0" Round Pipe  n=0.015  L=695.0'  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=59.55 cfs  7.835 af

Reach 25R: Reach H1

Avg. Flow Depth=0.50'  Max Vel=12.25 fps  Inflow=35.12 cfs  4.454 af  
n=0.060  L=1,800.0'  S=0.0255 '/'  Capacity=631.65 cfs  Outflow=35.07 cfs  4.454 af
Appendix H

Future 2014 Conditions 1&2 Year-Revised Ponds

Type III 24-hr 2-Year Rainfall=3.50"
Prepared by TRC
Printed 12/9/2014
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Reach 26R: Reach G1
Avg. Flow Depth=0.16'  Max Vel=12.47 fps  Inflow=7.50 cfs  0.926 af
n=0.060  L=1,600.0'  S=0.0347 '/'  Capacity=619.40 cfs  Outflow=7.50 cfs  0.926 af

Reach 27R: Reach F
Avg. Flow Depth=0.25'  Max Vel=15.24 fps  Inflow=22.17 cfs  2.325 af
n=0.060  L=1,100.0'  S=0.0480 '/'  Capacity=866.62 cfs  Outflow=22.13 cfs  2.325 af

Reach 30R: Reach M
Avg. Flow Depth=0.07'  Max Vel=15.96 fps  Inflow=6.02 cfs  0.596 af
n=0.060  L=1,400.0'  S=0.0509 '/'  Capacity=892.04 cfs  Outflow=6.05 cfs  0.596 af

Reach 28R: Reach N
Avg. Flow Depth=0.14'  Max Vel=13.58 fps  Inflow=7.50 cfs  0.926 af
n=0.060  L=1,800.0'  S=0.0333 '/'  Capacity=682.29 cfs  Outflow=7.50 cfs  0.926 af

Reach 31R: Reach C
Avg. Flow Depth=2.40'  Max Vel=12.47 fps  Inflow=164.90 cfs  52.293 af
n=0.050  L=2,000.0'  S=0.0030 '/'  Capacity=345.35 cfs  Outflow=159.07 cfs  52.227 af

Reach 32R: Reach A1
Avg. Flow Depth=2.51'  Max Vel=18.74 fps  Inflow=153.59 cfs  20.577 af
54.0" Round Pipe  n=0.015  L=1,380.0'  S=0.0112 '/'  Capacity=161.62 cfs  Outflow=153.48 cfs  20.577 af

Reach 33R: Reach H2
Avg. Flow Depth=0.91'  Max Vel=15.64 fps  Inflow=35.07 cfs  4.454 af
54.0" Round Pipe  n=0.015  L=695.0'  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=35.04 cfs  4.454 af

Reach 34R: Reach G2
Avg. Flow Depth=0.32'  Max Vel=15.51 fps  Inflow=7.50 cfs  0.926 af
54.0" Round Pipe  n=0.015  L=695.0'  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=7.50 cfs  0.926 af

Reach 35R: Reach A2
Avg. Flow Depth=1.13'  Max Vel=20.47 fps  Inflow=130.71 cfs  17.004 af
87.0" x 87.0" Box Pipe  n=0.015  L=1,910.0'  S=0.0065 '/'  Capacity=758.61 cfs  Outflow=153.36 cfs  20.577 af

Reach 36R: Reach A3
Avg. Flow Depth=2.27'  Max Vel=6.97 fps  Inflow=153.48 cfs  20.577 af
n=0.050  L=1,670.0'  S=0.0036 '/'  Capacity=406.87 cfs  Outflow=148.70 cfs  20.577 af

Reach 37R: Reach J
Avg. Flow Depth=1.22'  Max Vel=19.30 fps  Inflow=114.74 cfs  15.390 af
n=0.050  L=250.0'  S=0.0552 '/'  Capacity=1,161.64 cfs  Outflow=292.83 cfs  113.053 af

Reach 38R: Reach E
Avg. Flow Depth=0.79'  Max Vel=12.20 fps  Inflow=114.74 cfs  15.390 af
n=0.060  L=1,750.0'  S=0.0293 '/'  Capacity=999.72 cfs  Outflow=295.44 cfs  113.388 af

Reach 39R: Reach D
Avg. Flow Depth=1.58'  Max Vel=6.97 fps  Inflow=114.74 cfs  15.390 af
n=0.060  L=1,670.0'  S=0.0036 '/'  Capacity=406.87 cfs  Outflow=148.70 cfs  20.577 af

Reach 40R: Reach K
Avg. Flow Depth=1.79'  Max Vel=4.16 fps  Inflow=35.07 cfs  4.454 af
n=0.060  L=380.0'  S=0.0039 '/'  Capacity=161.62 cfs  Outflow=35.04 cfs  4.454 af

Reach 41R: Reach N
Avg. Flow Depth=0.51'  Max Vel=13.98 fps  Inflow=38.41 cfs  4.377 af
n=0.060  L=2,000.0'  S=0.0036 '/'  Capacity=999.72 cfs  Outflow=295.44 cfs  113.388 af

Reach 42R: Reach A4
Avg. Flow Depth=0.32'  Max Vel=25.68 fps  Inflow=148.70 cfs  20.577 af
216.0" x 54.0" Box Pipe  n=0.011  L=340.0'  S=0.0051 '/'  Capacity=1,161.64 cfs  Outflow=148.64 cfs  20.577 af

Reach 43R: Reach E1
Avg. Flow Depth=1.56'  Max Vel=5.23 fps  Inflow=16.84 cfs  2.173 af
30.0" Round Pipe  n=0.013  L=175.0'  S=0.0018 '/'  Capacity=17.26 cfs  Outflow=16.83 cfs  2.173 af

Reach 44R: Reach E2
Avg. Flow Depth=1.03'  Max Vel=7.83 fps  Inflow=16.84 cfs  2.173 af
36.0" Round Pipe  n=0.013  L=318.0'  S=0.0031 '/'  Capacity=37.22 cfs  Outflow=16.83 cfs  2.173 af
Future 2014 Conditions 1&2 Year-Revised Ponds

Appendix H

Prepared by TRC
Printed 12/9/2014

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Reach 93R: Reach E3
Avg. Flow Depth=0.59’ Max Vel=11.79 fps Inflow=16.83 cfs 2.173 af
72.0" Round Pipe n=0.013 L=500.0’ S=0.0028 '/' Capacity=224.10 cfs Outflow=16.81 cfs 2.173 af

Reach 94R: Reach E4
Avg. Flow Depth=0.60’ Max Vel=11.38 fps Inflow=16.81 cfs 2.173 af
72.0" Round Pipe n=0.013 L=230.0’ S=0.0026 '/' Capacity=216.31 cfs Outflow=16.81 cfs 2.173 af

Reach 95R: Reach E5
Avg. Flow Depth=0.55’ Max Vel=12.86 fps Inflow=16.81 cfs 2.173 af
72.0" Round Pipe n=0.013 L=90.0’ S=0.0033 '/' Capacity=244.51 cfs Outflow=16.81 cfs 2.173 af

Pond 48P: Pond C
Peak Elev=330.99’ Storage=0.090 af Inflow=38.69 cfs 4.377 af
Outflow=38.41 cfs 4.377 af

Pond 50P: Pond D
Peak Elev=348.03’ Storage=0.235 af Inflow=294.39 cfs 113.455 af
Outflow=295.31 cfs 113.451 af

Pond 51P: B1 Basin
Peak Elev=427.55’ Storage=0.529 af Inflow=10.03 cfs 0.980 af
Outflow=1.05 cfs 0.952 af

Pond 53P: D Basin
Peak Elev=464.53’ Storage=0.483 af Inflow=8.84 cfs 0.783 af
Outflow=0.55 cfs 0.674 af

Pond 54P: D Pond
Peak Elev=382.25’ Storage=0.780 af Inflow=51.68 cfs 5.791 af
Outflow=38.35 cfs 5.791 af

Pond 72P: Pond E
Peak Elev=372.00’ Storage=26 cf Inflow=16.87 cfs 2.173 af
Outflow=16.84 cfs 2.173 af

Pond DP_A: Proposed Pond A
Peak Elev=370.67’ Storage=939,879 cf Inflow=261.04 cfs 36.721 af
Outflow=37.67 cfs 30.868 af

Pond DP_B: Proposed Pond B
Peak Elev=362.22’ Storage=787,702 cf Inflow=309.68 cfs 58.914 af
Outflow=114.74 cfs 55.092 af

Link 39L: CON 6
Inflow=378.11 cfs 133.752 af
Primary=378.11 cfs 133.752 af

Link 40L: CON 5
Inflow=107.13 cfs 15.391 af
Primary=107.13 cfs 15.391 af

Link 41L: CON 2
Inflow=153.59 cfs 20.577 af
Primary=153.59 cfs 20.577 af

Link 42L: CON 7
Inflow=261.04 cfs 36.721 af
Primary=261.04 cfs 36.721 af

Link 43L: CON 3
Inflow=164.90 cfs 52.293 af
Primary=164.90 cfs 52.293 af

Link 44L: CON 3A
Inflow=292.82 cfs 113.058 af
Primary=292.82 cfs 113.058 af

Type III 24-hr 2-Year Rainfall=3.50”
Appendix H  

**Future 2014 Conditions 1&2 Year-Revised Ponds**  
Type III 24-hr 2-Year Rainfall=3.50"  
Prepared by TRC  
Printed 12/9/2014  
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC  

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**Link 46L: CON 11**  
Inflow=302.28 cfs 39.924 af  
Primary=302.28 cfs 39.924 af

**Link 49L: L1**  
Inflow=294.39 cfs 113.455 af  
Primary=294.39 cfs 113.455 af

**Link 52L: B1 Out**  
Inflow=16.38 cfs 2.192 af  
Primary=16.38 cfs 2.192 af

**Link 61L: BS-A Out**  
Inflow=12.33 cfs 1.481 af  
Primary=12.33 cfs 1.481 af

**Link 62L: BS-B3 Out**  
Inflow=8.47 cfs 1.049 af  
Primary=8.47 cfs 1.049 af

**Link 63L: BB-8F**  
Inflow=286.09 cfs 37.752 af  
Primary=286.09 cfs 37.752 af

**Link 66L: Junction 2**  
Inflow=26.43 cfs 3.237 af  
Primary=26.43 cfs 3.237 af

**Link 70L: Junction 4**  
Inflow=39.76 cfs 5.987 af  
Primary=39.76 cfs 5.987 af

**Link 71L: Final**  
Inflow=53.04 cfs 7.916 af  
Primary=53.04 cfs 7.916 af

**Link 76L: L2**  
Inflow=38.69 cfs 4.377 af  
Primary=38.69 cfs 4.377 af

**Link 77L: L3**  
Inflow=6.02 cfs 0.596 af  
Primary=6.02 cfs 0.596 af

**Link 87L: CON 1 - Rye Lake**  
Inflow=179.74 cfs 24.288 af  
Primary=179.74 cfs 24.288 af

---

**Total Runoff Area = 1,039.390 ac  Runoff Volume = 149.024 af  Average Runoff Depth = 1.72"**  
73.10% Pervious = 759.790 ac  26.90% Impervious = 279.600 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.910 ac, 47.63% Impervious, Inflow Depth = 2.18" for 2-Year event
Inflow = 261.04 cfs @ 12.52 hrs, Volume= 36.721 af
Outflow = 37.67 cfs @ 14.12 hrs, Volume= 30.868 af, Atten= 86%, Lag= 96.1 min
Primary = 37.67 cfs @ 14.12 hrs, Volume= 30.868 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 370.67' @ 14.12 hrs Surf.Area= 219,649 sf Storage= 939,879 cf

Plug-Flow detention time= 484.0 min calculated for 30.819 af (84% of inflow)
Center-of-Mass det. time= 418.1 min (1,262.8 - 844.6)

Volume Invert Avail.Storage Storage Description
#1 365.00’ 1,894,815 cf Custom Stage Data (Irregular) Listed below (Recalc)

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Device Routing Invert Outlet Devices
#1 Primary 364.10’ 54.0” Round 54” Culvert - OS1
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 364.10’ / 363.88’ S= 0.0100 ’/’ Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

#2 Primary 363.35’ 60.0” Round 60” Culvert - OS2
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 363.35’ / 363.28’ S= 0.0064 ’/’ Cc= 0.900
n= 0.013, Flow Area= 19.63 sf

#3 Device 1 366.00’ 12.0” Round 12” Low Flow
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 ’/’ Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#4 Device 1 369.66’ 3.3’ long x 0.5’ breadth Broad-Crested Rect. Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#5 Device 1 370.64’ 6.8’ long x 0.5’ breadth Broad-Crested Rect. Weir OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#6 Device 1 373.25’ 72.0” x 84.0” Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

#7 Primary 373.75' 200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

#8 Device 2 366.00' 12.0" Round 12" Low Flow
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 ’/’ Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#9 Device 2 369.66' 3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#10 Device 2 370.64' 6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#11 Device 2 373.25' 72.0" x 90.0" Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=37.66 cfs @ 14.12 hrs HW=370.66’ TW=0.00’ (Dynamic Tailwater)

1=54" Culvert - OS1 (Passes 18.83 cfs of 155.14 cfs potential flow)
  3=12" Low Flow (Inlet Controls 7.72 cfs @ 9.83 fps)
  4=Broad-Crested Rect. Weir - OS1 (Weir Controls 11.04 cfs @ 3.33 fps)
  5=Broad-Crested Rect. Weir OS1 (Weir Controls 0.08 cfs @ 0.44 fps)
  6=Orifice/Grate ( Controls 0.00 cfs)

2=60" Culvert - OS2 (Passes 18.83 cfs of 196.06 cfs potential flow)
  8=12" Low Flow (Inlet Controls 7.72 cfs @ 9.83 fps)
  9=Broad-Crested Rect Weir - OS2 (Weir Controls 11.04 cfs @ 3.33 fps)
  10=Broad-Crested Rect Weir - OS2 (Weir Controls 0.08 cfs @ 0.44 fps)
  11=Orifice/Grate ( Controls 0.00 cfs)

7=Broad-Crested Rect Weir - OS1 ( Controls 0.00 cfs)
Pond DP_A: Proposed Pond A

Hydrograph

- Inflow Area = 201.910 ac
- Peak Elev = 370.67'
- Storage = 939,879 cf

Stage-Discharge

- Broad-Crested Rect Weir - OS1
- Orifice/Grate + Orifice/Grate
- Broad-Crested Rect Weir OS1 + Broad-Crested Rect Weir - OS2
- Broad-Crested Rect Weir - OS1 + Broad-Crested Rect Weir - OS2

- 12" Low Flow + 12" Low Flow
Summary for Pond DP_B: Proposed Pond B

Inflow Area = 232.540 ac, 43.46% Impervious, Inflow Depth > 3.04" for 2-Year event
Inflow = 309.68 cfs @ 12.41 hrs, Volume= 58.914 af, Incl. 7.40 cfs Base Flow
Outflow = 114.74 cfs @ 13.00 hrs, Volume= 55.092 af, Atten= 63%, Lag= 35.2 min
Primary = 114.74 cfs @ 13.00 hrs, Volume= 55.092 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 362.22' @ 13.00 hrs Surf.Area= 230,087 sf Storage= 787,702 cf

Plug-Flow detention time= 232.4 min calculated for 55.077 af (93% of inflow)
Center-of-Mass det. time= 162.2 min (1,132.6 - 970.4)

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<td>L= 50.0' RCP, square edge headwall, Ke= 0.500</td>
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<td>Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/ Cc= 0.900</td>
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<td>L= 15.0' RCP, sq.cut end projecting, Ke= 0.500</td>
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<td>Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/ Cc= 0.900</td>
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<td>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50</td>
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<td>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60</td>
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</table>
|        |         |        | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.67
Primary OutFlow

Max=114.73 cfs @ 13.00 hrs  HW=362.22’  TW=358.79’  (Dynamic Tailwater)

1=60” Culvert  (Passes 114.73 cfs of 320.70 cfs potential flow)

2=18” Culvert  (Inlet Controls 15.76 cfs @ 8.92 fps)

3=Broad-Crested Rectangular Weir  (Weir Controls 98.97 cfs @ 3.68 fps)

4=Broad-Crested Rectangular Weir  (Controls 0.00 cfs)

Pond DP_B: Proposed Pond B

Hydrograph

Inflow Area=232.540 ac
Peak Elev=362.22'
Storage=787,702 cf

Time (hours)
Future 2014 Conditions 1&2 Year-Revised Ponds

Type III 24-hr 2-Year Rainfall=3.50"

Printed 12/9/2014
Prepared by TRC

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Pond DP_B: Proposed Pond B

Stage-Discharge

Elevation (feet)

Discharge (cfs)

Initial Tailwater

18" Culvert

Broad-Crested Rectangular Weir

Pond DP_B: Proposed Pond B

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Storage (cubic-feet)

Custom Stage Data
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.120 ac, 32.59% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 164.90 cfs @ 12.58 hrs, Volume= 52.293 af
Primary = 164.90 cfs @ 12.58 hrs, Volume= 52.293 af, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 674.780 ac, 33.85% Impervious, Inflow Depth > 2.01" for 2-Year event
Inflow = 292.82 cfs @ 12.78 hrs, Volume= 113.058 af
Primary = 292.82 cfs @ 12.78 hrs, Volume= 113.058 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 44L: CON 3A

Hydrograph

[Graph showing hydrograph with inflow and primary flow marked]

Inflow Area=674.780 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 678.670 ac, 33.65% Impervious, Inflow Depth > 2.01" for 2-Year event
Inflow = 294.39 cfs @ 12.78 hrs, Volume = 113.455 af
Primary = 294.39 cfs @ 12.78 hrs, Volume = 113.455 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 5.00-36.00 hrs, dt = 0.05 hrs

Link 49L: L1

Hydrograph

Inflow Area=678.670 ac
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.30% Impervious, Inflow Depth > 1.43" for 2-Year event
Inflow = 107.13 cfs @ 12.33 hrs, Volume = 15.391 af
Primary = 107.13 cfs @ 12.33 hrs, Volume = 15.391 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 5.00-36.00 hrs, dt = 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area = 129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 846.360 ac, 30.01% Impervious, Inflow Depth > 1.90" for 2-Year event
Inflow = 378.11 cfs @ 12.78 hrs, Volume= 133.752 af
Primary = 378.11 cfs @ 12.78 hrs, Volume= 133.752 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-36.00 hrs, dt= 0.05 hrs

Link 39L: CON 6

Hydrograph

Inflow Area=846.360 ac
Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points x 3  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Dyn-Muskingum-Cunge method - Pond routing by Dyn-Stor-Ind method

<table>
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<th>Runoff Area (ac)</th>
<th>Impervious (%)</th>
<th>Runoff Depth (”)</th>
<th>Tc (min)</th>
<th>CN</th>
<th>Runoff (cfs)</th>
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Subcatchment 85S: BB-6F  
Runoff Area=4.780 ac  16.11% Impervious  Runoff Depth=2.71”  
Tc=16.2 min  CN=78  Runoff=11.12 cfs  1.080 af

Subcatchment 86S: BB-9F  
Runoff Area=3.870 ac  0.00% Impervious  Runoff Depth=2.36”  
Tc=75.6 min  CN=74  Runoff=3.62 cfs  0.762 af

Subcatchment 89S: BB-1CF  
Runoff Area=39.150 ac  13.38% Impervious  Runoff Depth=2.54”  
Tc=28.8 min  CN=76  Runoff=66.79 cfs  8.272 af

Subcatchment 90S: BB-7FC  
Runoff Area=13.850 ac  11.41% Impervious  Runoff Depth=2.62”  
Tc=14.4 min  CN=77  Runoff=32.53 cfs  3.027 af

Subcatchment 92S: BS-A  
Runoff Area=15.860 ac  0.00% Impervious  Runoff Depth=2.20”  
Tc=23.4 min  CN=72  Runoff=25.36 cfs  2.905 af

Subcatchment 93S: BS-B1 Bypass  
Runoff Area=10.900 ac  12.02% Impervious  Runoff Depth=2.54”  
Tc=7.8 min  CN=76  Runoff=30.01 cfs  2.303 af

Subcatchment 94S: BS-B1 DET  
Runoff Area=4.990 ac  56.31% Impervious  Runoff Depth=3.77”  
Tc=16.2 min  CN=89  Runoff=15.78 cfs  1.568 af

Subcatchment 95S: BS-B3  
Runoff Area=11.230 ac  2.76% Impervious  Runoff Depth=2.20”  
Tc=25.2 min  CN=72  Runoff=17.43 cfs  2.057 af

Subcatchment 96S: BS-C  
Runoff Area=18.670 ac  5.62% Impervious  Runoff Depth=2.36”  
Tc=10.8 min  CN=74  Runoff=43.49 cfs  3.678 af

Subcatchment 97S: BS-D Bypass  
Runoff Area=1.380 ac  11.59% Impervious  Runoff Depth=2.99”  
Tc=15.6 min  CN=81  Runoff=3.59 cfs  0.343 af

Subcatchment 98S: BS-D Channel  
Runoff Area=18.000 ac  21.39% Impervious  Runoff Depth=2.99”  
Tc=16.2 min  CN=81  Runoff=46.12 cfs  4.478 af

Subcatchment 99S: RL-4F  
Runoff Area=64.670 ac  5.52% Impervious  Runoff Depth=2.54”  
Tc=35.4 min  CN=76  Runoff=100.11 cfs  13.664 af

Subcatchment 101S: BB-7FA  
Runoff Area=98.170 ac  58.92% Impervious  Runoff Depth=3.77”  
Tc=37.8 min  CN=89  Runoff=214.89 cfs  30.858 af

Subcatchment 103S: BB-7FB  
Runoff Area=89.910 ac  40.87% Impervious  Runoff Depth=3.47”  
Tc=33.0 min  CN=86  Runoff=195.54 cfs  25.977 af

Subcatchment 109S: RL-5F  
Runoff Area=59.820 ac  10.51% Impervious  Runoff Depth=2.62”  
Tc=33.6 min  CN=77  Runoff=98.44 cfs  13.076 af

Subcatchment 111S: BB-1GF  
Runoff Area=9.940 ac  61.87% Impervious  Runoff Depth=3.67”  
Tc=10.2 min  CN=88  Runoff=35.92 cfs  3.039 af

Subcatchment 112S: BB-3F  
Runoff Area=33.540 ac  14.97% Impervious  Runoff Depth=2.80”  
Tc=22.8 min  CN=79  Runoff=70.18 cfs  7.831 af
Appendix H

**Future 2014 Conditions 10&100 Year-Revised Ponds**

Type III 24-hr 10-Year Rainfall=5.00”

Prepared by TRC

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**Subcatchment 113S: BB-1BF**

Runoff Area=68.860 ac  21.83% Impervious  Runoff Depth=2.54”  
Tc=31.2 min  CN=76  Runoff=113.23 cfs  14.550 af

**Subcatchment 114S: BB-1AF**

Runoff Area=7.450 ac  9.13% Impervious  Runoff Depth=2.54”  
Tc=20.4 min  CN=76  Runoff=14.71 cfs  1.574 af

**Reach 24R: Reach I**

Avg. Flow Depth=2.15’  Max Vel=15.84 fps  Inflow=113.23 cfs  14.550 af

54.0" Round Pipe  
n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=113.20 cfs  14.550 af

**Reach 25R: Reach H1**

Avg. Flow Depth=0.86’  Max Vel=12.91 fps  Inflow=66.79 cfs  8.272 af

n=0.060  L=1,800.0’  S=0.0255 '/'  Capacity=631.65 cfs  Outflow=66.71 cfs  8.272 af

**Reach 26R: Reach G1**

Avg. Flow Depth=0.28’  Max Vel=12.65 fps  Inflow=14.27 cfs  1.720 af

n=0.060  L=1,600.0’  S=0.0347 '/'  Capacity=619.40 cfs  Outflow=14.28 cfs  1.720 af

**Reach 27R: Reach F**

Avg. Flow Depth=0.44’  Max Vel=15.50 fps  Inflow=41.49 cfs  4.262 af

n=0.060  L=1,100.0’  S=0.0480 '/'  Capacity=866.62 cfs  Outflow=41.40 cfs  4.262 af

**Reach 30R: Reach M**

Avg. Flow Depth=0.12’  Max Vel=16.03 fps  Inflow=11.12 cfs  1.080 af

n=0.060  L=1,400.0’  S=0.0509 '/'  Capacity=892.04 cfs  Outflow=11.12 cfs  1.080 af

**Reach 31R: Reach C**

Avg. Flow Depth=4.06’  Max Vel=4.79 fps  Inflow=332.35 cfs  96.280 af

n=0.050  L=2,000.0’  S=0.0030 '/'  Capacity=345.35 cfs  Outflow=330.20 cfs  96.278 af

**Reach 32R: Reach A1**

Avg. Flow Depth=4.50’  Max Vel=16.75 fps  Inflow=292.66 cfs  38.054 af

54.0” Round Pipe  
n=0.015  L=1,380.0’  S=0.0112 '/'  Capacity=180.04 cfs  Outflow=237.85 cfs  37.896 af

**Reach 33R: Reach H2**

Avg. Flow Depth=1.45’  Max Vel=15.77 fps  Inflow=66.71 cfs  8.272 af

54.0” Round Pipe  
n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=66.68 cfs  8.272 af

**Reach 34R: Reach G2**

Avg. Flow Depth=0.49’  Max Vel=15.52 fps  Inflow=14.28 cfs  1.720 af

54.0” Round Pipe  
n=0.015  L=695.0’  S=0.0090 '/'  Capacity=161.62 cfs  Outflow=14.26 cfs  1.720 af

**Reach 35R: Reach A2**

Avg. Flow Depth=1.66’  Max Vel=21.79 fps  Inflow=237.85 cfs  37.896 af

87.0” x 87.0” Box Pipe  
n=0.015  L=1,910.0’  S=0.0065 '/'  Capacity=758.61 cfs  Outflow=223.41 cfs  37.896 af

**Reach 37R: Reach J**

Avg. Flow Depth=2.18’  Max Vel=19.32 fps  Inflow=605.43 cfs  215.426 af

n=0.050  L=250.0’  S=0.0552 '/'  Capacity=1,481.40 cfs  Outflow=605.41 cfs  215.423 af

**Reach 38R: Reach E**

Avg. Flow Depth=1.32’  Max Vel=12.25 fps  Inflow=195.68 cfs  28.328 af

n=0.060  L=1,750.0’  S=0.0293 '/'  Capacity=898.75 cfs  Outflow=195.57 cfs  28.328 af

**Reach 45R: Reach K**

Avg. Flow Depth=3.07”  Max Vel=4.16 fps  Inflow=245.74 cfs  108.282 af

n=0.060  L=380.0’  S=0.0039 '/'  Capacity=404.87 cfs  Outflow=245.52 cfs  108.266 af

**Reach 47R: Reach N**

Avg. Flow Depth=0.84’  Max Vel=13.98 fps  Inflow=69.51 cfs  7.831 af

n=0.060  L=2,000.0’  S=0.0290 '/'  Capacity=673.61 cfs  Outflow=69.41 cfs  7.831 af

**Reach 51R: Reach D**

Avg. Flow Depth=2.94’  Max Vel=13.56 fps  Inflow=615.42 cfs  216.185 af

n=0.060  L=2,000.0’  S=0.0362 '/'  Capacity=999.72 cfs  Outflow=614.74 cfs  216.159 af
Appendix H

**Future 2014 Conditions 10&100 Year-Revised Ponds**  
*Type III 24-hr 10-Year Rainfall=5.00"*

Prepared by TRC  
Printed 12/9/2014  
HydroCAD® 10.00-13  s/n 06251 © 2014 HydroCAD Software Solutions LLC  

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### Reach 78R: Reach A3
- **Avg. Flow Depth:** 3.10'  
- **Max Vel:** 6.97 fps  
- **Inflow:** 242.81 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.050  
  - **L =** 1,670.0'  
  - **S =** 0.0030 '/'  
  - **Capacity:** 346.73 cfs  
  - **Outflow:** 226.63 cfs  
  
### Reach 79R: Reach A4
- **Avg. Flow Depth:** 0.49'  
- **Max Vel:** 25.68 fps  
- **Inflow:** 226.63 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.011  
  - **L =** 340.0'  
  - **S =** 0.0051 '/'  
  - **Capacity:** 1,161.64 cfs  
  - **Outflow:** 226.63 cfs  

### Reach 86R: Reach E1
- **Avg. Flow Depth:** 1.92'  
- **Max Vel:** 5.23 fps  
- **Inflow:** 21.12 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.013  
  - **L =** 175.0'  
  - **S =** 0.0018 '/'  
  - **Capacity:** 17.26 cfs  
  - **Outflow:** 21.12 cfs  

### Reach 87R: Reach E2
- **Avg. Flow Depth:** 1.26'  
- **Max Vel:** 7.51 fps  
- **Inflow:** 21.12 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.013  
  - **L =** 318.0'  
  - **S =** 0.0029 '/'  
  - **Capacity:** 35.68 cfs  
  - **Outflow:** 21.12 cfs  

### Reach 88R: Reach E3
- **Avg. Flow Depth:** 0.69'  
- **Max Vel:** 11.79 fps  
- **Inflow:** 21.12 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.013  
  - **L =** 500.0'  
  - **S =** 0.0028 '/'  
  - **Capacity:** 224.10 cfs  
  - **Outflow:** 21.12 cfs  

### Reach 89R: Reach E4
- **Avg. Flow Depth:** 0.65'  
- **Max Vel:** 12.86 fps  
- **Inflow:** 21.12 cfs  
  
- **Reach Specification:**  
  
  - **n =** 0.013  
  - **L =** 90.0'  
  - **S =** 0.0033 '/'  
  - **Capacity:** 244.51 cfs  
  - **Outflow:** 21.12 cfs  

### Pond 48P: Pond C
- **Peak Elev:** 333.42'  
- **Storage:** 0.163 af  
- **Inflow:** 70.18 cfs  
- **Outflow:** 69.51 cfs  

### Pond 51P: B1 Basin
- **Peak Elev:** 428.47'  
- **Storage:** 0.877 af  
- **Inflow:** 15.78 cfs  
- **Outflow:** 1.46 cfs  

### Pond 53P: D Basin
- **Peak Elev:** 465.50'  
- **Storage:** 0.702 af  
- **Inflow:** 14.65 cfs  
- **Outflow:** 2.06 cfs  

### Pond 54P: D Pond
- **Peak Elev:** 383.35'  
- **Storage:** 1.431 af  
- **Inflow:** 93.70 cfs  
- **Outflow:** 63.74 cfs  

### Pond 72P: Pond E
- **Peak Elev:** 372.53'  
- **Storage:** 11,493 cf  
- **Inflow:** 93.70 cfs  
- **Outflow:** 63.74 cfs  

### Pond 78P: Pond D
- **Peak Elev:** 349.29'  
- **Storage:** 9,790 cf  
- **Inflow:** 609.02 cfs  
- **Outflow:** 615.42 cfs  

### Pond DP_A: Proposed Pond A
- **Peak Elev:** 371.86'  
- **Storage:** 1,206,544 cf  
- **Inflow:** 341.63 cfs  
- **Outflow:** 149.57 cfs  

### Pond DP_B: Proposed Pond B
- **Peak Elev:** 363.66'  
- **Storage:** 1,129,400 cf  
- **Inflow:** 489.24 cfs  
- **Outflow:** 245.74 cfs  

### Link 7L: CON 1 - Rye Lake
- **Inflow:** 372.30 cfs  
- **Primary:** 372.30 cfs  
- **Secondary:** 46.89 cfs  

### Link 20L: BB-7FA
- **Inflow:** 214.89 cfs  
- **Primary:** 168.00 cfs  
- **Secondary:** 29.738 cfs  

---
Future 2014 Conditions 10&100 Year-Revised Ponds

Type III 24-hr 10-Year Rainfall=5.00" Print 12/9/2014

Prepared by TRC

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Link 21L: BB-7FB
below 145.00 cfs  Inflow=195.54 cfs  25.977 af
Primary=145.00 cfs  24.768 af  Secondary=50.54 cfs  1.209 af

Link 39L: CON 6
Inflow=747.45 cfs  253.397 af
Primary=747.45 cfs  253.397 af

Link 40L: CON 5
Inflow=195.68 cfs  28.328 af
Primary=195.68 cfs  28.328 af

Link 41L: CON 2
Inflow=292.66 cfs  38.054 af
Primary=292.66 cfs  38.054 af

Link 43L: CON 3
Inflow=332.35 cfs  96.280 af
Primary=332.35 cfs  96.280 af

Link 44L: CON 3A
Inflow=605.43 cfs  215.426 af
Primary=605.43 cfs  215.426 af

Link 46L: CON 11
Inflow=481.84 cfs  65.471 af
Primary=481.84 cfs  65.471 af

Link 49L: L1
Inflow=609.02 cfs  216.186 af
Primary=609.02 cfs  216.186 af

Link 52L: B1 Out
Inflow=30.87 cfs  3.863 af
Primary=30.87 cfs  3.863 af

Link 66L: Junction 2
Inflow=46.61 cfs  5.772 af
Primary=46.61 cfs  5.772 af

Link 70L: Junction 4
Inflow=66.04 cfs  10.797 af
Primary=66.04 cfs  10.797 af

Link 71L: Final
Inflow=94.68 cfs  14.475 af
Primary=94.68 cfs  14.475 af

Link 77L: L3
Inflow=11.12 cfs  1.080 af
Primary=11.12 cfs  1.080 af

Link 78L: L2
Inflow=70.18 cfs  7.831 af
Primary=70.18 cfs  7.831 af

Link 80L: 8FA
below 460.00 cfs  Inflow=406.37 cfs  54.871 af
Primary=406.37 cfs  54.871 af  Secondary=0.00 cfs  0.000 af

Link 85L: 8FB
below 40.00 cfs  Inflow=39.97 cfs  4.855 af
Primary=39.97 cfs  4.855 af  Secondary=0.00 cfs  0.000 af

Total Runoff Area = 1,037.970 ac  Runoff Volume = 257.669 af  Average Runoff Depth = 2.98"
73.18% Pervious = 759.560 ac  26.82% Impervious = 278.410 ac
Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.930 ac, 47.63% Impervious, Inflow Depth = 3.42" for 10-Year event
Inflow = 341.63 cfs @ 12.32 hrs, Volume= 57.533 af
Outflow = 149.57 cfs @ 13.11 hrs, Volume= 55.600 af, Atten= 56%, Lag= 47.5 min
Primary = 149.57 cfs @ 13.11 hrs, Volume= 55.600 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 371.86' @ 13.11 hrs Surf.Area= 227,580 sf Storage= 1,206,544 cf

Plug-Flow detention time= 436.5 min calculated for 55.600 af (97% of inflow)
Center-of-Mass det. time= 417.0 min ( 1,247.1 - 830.1 )

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Device Routing Invert Outlet Devices
---
#1 Primary 364.10' **54.0" Round 54" Culvert - OS1**
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 364.10’ / 363.88’ S= 0.0200 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 15.90 sf

#2 Primary 363.35' **60.0" Round 60" Culvert - OS2**
L= 11.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 363.35’ / 363.28’ S= 0.0064 '/' Cc= 0.900
n= 0.013, Flow Area= 19.63 sf

#3 Device 1 366.00' **12.0" Round 12" Low Flow**
L= 10.0’ RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00’ / 365.85’ S= 0.0150 '/' Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#4 Device 1 369.66' **3.3' long x 0.5' breadth Broad-Crested Rect. Weir - OS1**
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#5 Device 1 370.64' **6.8' long x 0.5' breadth Broad-Crested Rect. Weir OS1**
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#6 Device 1 373.25' **72.0" x 84.0" Horiz. Orifice/Grate** C= 0.600
Limited to weir flow at low heads

#7 Primary 373.75' 200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

#8 Device 2 366.00' 12.0'' Round 12'' Low Flow
L= 10.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 366.00' / 365.85' S= 0.0150 '/' Cc= 0.900
n= 0.013, Flow Area= 0.79 sf

#9 Device 2 369.66' 3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#10 Device 2 370.64' 6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2
Head (feet) 0.20 0.40 0.60 0.80 1.00
Coef. (English) 2.80 2.92 3.08 3.30 3.32

#11 Device 2 373.25' 72.0'' x 90.0'' Horiz. Orifice/Grate C= 0.600
Limited to weir flow at low heads

Primary OutFlow Max=149.47 cfs @ 13.11 hrs HW=371.86' TW=0.00' (Dynamic Tailwater)

1=54'' Culvert - OS1 (Passes 74.74 cfs of 179.71 cfs potential flow)
3=12'' Low Flow (Inlet Controls 8.75 cfs @ 11.14 fps)
4=Broad-Crested Rect. Weir - OS1 (Weir Controls 35.68 cfs @ 4.92 fps)
5=Broad-Crested Rect Weir OS1 (Weir Controls 30.31 cfs @ 3.66 fps)
6=Orifice/Grate (Controls 0.00 cfs)

2=60'' Culvert - OS2 (Passes 74.74 cfs of 231.71 cfs potential flow)
8=12'' Low Flow (Inlet Controls 8.75 cfs @ 11.14 fps)
9=Broad-Crested Rect Weir - OS2 (Weir Controls 35.68 cfs @ 4.92 fps)
10=Broad-Crested Rect Weir OS2 (Weir Controls 30.31 cfs @ 3.66 fps)
11=Orifice/Grate (Controls 0.00 cfs)

7=Broad-Crested Rect Weir - OS1 (Controls 0.00 cfs)
Pond DP_A: Proposed Pond A

**Hydrograph**

- Inflow Area: 201.930 ac
- Peak Elev: 371.86'
- Storage: 1,206,544 cf

**Stage-Discharge**

- Discharge: 1,000, 800, 600, 400, 200, 0
- Elevation: 374, 373, 372, 371, 370, 369, 368, 367, 366
- **12" Low Flow + 12" Low Flow**
- **Orifice/Grate + Orifice/Grate**
- **Broad-Crested Rect Weir - OS1**
- **Broad-Crested Rect Weir OS1 + Broad-Crested Rect Weir - OS2**
- **Primary**
Pond DP_A: Proposed Pond A

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Elevation (feet)

Storage (cubic-feet)

Custom Stage Data
Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.16% Impervious, Inflow Depth > 5.69" for 10-Year event
Inflow = 489.24 cfs @ 12.39 hrs, Volume= 109.534 af, Incl. 7.40 cfs Base Flow
Outflow = 245.74 cfs @ 12.84 hrs, Volume= 108.282 af, Attenuation= 50%, Lag= 26.7 min
Primary = 245.74 cfs @ 12.84 hrs, Volume= 108.282 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 363.66' @ 12.84 hrs  Surf.Area= 245,226 sf  Storage= 1,129,400 cf
Plug-Flow detention time= 184.1 min calculated for 108.267 af (99% of inflow)
Center-of-Mass det. time= 150.0 min (1,517.5 - 1,367.5)

Volume Invert Avail.Storage Storage Description
#1 356.00' 1,942,029 cf Custom Stage Data (Irregular) Listed below (Recalc)

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<td>S= 0.0076 '/' Cc= 0.900</td>
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<td>Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64</td>
</tr>
</tbody>
</table>
**Primary OutFlow**  
Max=245.57 cfs @ 12.84 hrs  HW=363.66'  TW=360.07'  (Dynamic Tailwater)  
1=60" Culvert  (Passes 245.57 cfs of 358.15 cfs potential flow)  
2=18" Culvert  (Inlet Controls 16.12 cfs @ 9.12 fps)  
3=Broad-Crested Rectangular Weir  (Weir Controls 229.45 cfs @ 4.88 fps)  
4=Broad-Crested Rectangular Weir  (Controls 0.00 cfs)  

**Pond DP_B: Proposed Pond B**

**Hydrograph**

- Inflow Area=230.930 ac  
- Peak Elev=363.66'  
- Storage=1,129,400 cf
Pond DP_B: Proposed Pond B

**Stage-Discharge**

- **Discharge (cfs)**
  - 1,000
  - 500
  - 0

- **Elevation (feet)**
  - 366
  - 365
  - 364
  - 363
  - 362
  - 361
  - 360
  - 359
  - 358
  - 357
  - 356

- **Culvert Sizes**
  - 18" Culvert
  - Initial Tailwater

- **Weir Types**
  - Broad-Crested Rectangular Weir

**Surface/Area-Storage**

- **Surface/Horizontal/Wetted Area (sq-ft)**
  - 250,000
  - 200,000
  - 150,000
  - 100,000
  - 50,000
  - 0

- **Elevation (feet)**
  - 366
  - 365
  - 364
  - 363
  - 362
  - 361
  - 360
  - 359
  - 358
  - 357
  - 356

- **Storage (cubic-feet)**
  - 1,500,000
  - 1,000,000
  - 500,000
  - 0

- **Custom Stage Data**

---

**Future 2014 Conditions 10&100 Year-Revised Ponds**

- **Type III 24-hr 10-Year Rainfall=5.00"**
- **Future 2014 Conditions 10&100 Year-Revised Ponds**
- **Prepared by TRC**
- **Printed 12/9/2014**
- **Prepared by TRC**
- **HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC**
- **Page 7**
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.140 ac, 32.59% Impervious, Inflow Depth > 2.97” for 10-Year event
Inflow = 332.35 cfs @ 13.10 hrs, Volume= 96.280 af
Primary = 332.35 cfs @ 13.10 hrs, Volume= 96.280 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 43L: CON 3

Hydrograph

Inflow Area=389.140 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 673.380 ac, 33.74% Impervious, Inflow Depth > 3.84” for 10-Year event
Inflow = 605.43 cfs @ 12.98 hrs, Volume = 215.426 af
Primary = 605.43 cfs @ 12.98 hrs, Volume = 215.426 af, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs

Link 44L: CON 3A

Hydrograph

Inflow Area = 673.380 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.250 ac, 33.55% Impervious, Inflow Depth > 3.83" for 10-Year event
Inflow = 609.02 cfs @ 12.98 hrs, Volume = 216.186 af
Primary = 609.02 cfs @ 12.98 hrs, Volume = 216.186 af, Attenuation = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs

Link 49L: L1

Hydrograph

Inflow Area = 677.250 ac

Flow (cfs)

Time (hours)
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.30% Impervious, Inflow Depth = 2.63" for 10-Year event
Inflow = 195.68 cfs @ 12.30 hrs, Volume= 28.328 af
Primary = 195.68 cfs @ 12.30 hrs, Volume= 28.328 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 844.940 ac, 29.92% Impervious, Inflow Depth > 3.60" for 10-Year event
Inflow = 747.45 cfs @ 12.75 hrs, Volume = 253.397 af
Primary = 747.45 cfs @ 12.75 hrs, Volume = 253.397 af, Atten = 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs

**Link 39L: CON 6**

**Hydrograph**
Appendix H

**Future 2014 Conditions 10&100 Year-Revised Pond**

Type III 24-hr 100-Year Rainfall=7.50"

Prepared by TRC
Printed 12/9/2014

Runoff Area, Tc, CN, Runoff Depth, Runoff Volume

Subcatchment 4S: BB-1DF
- Runoff Area=7.080 ac
- 2.68% Impervious
- Runoff Depth=4.15"
- Tc=20.4 min
- CN=71
- Runoff=22.93 cfs
- 2.447 af

Subcatchment 5S: BB-1EF
- Runoff Area=8.140 ac
- 12.16% Impervious
- Runoff Depth=4.71"
- Tc=27.0 min
- CN=76
- Runoff=26.53 cfs
- 3.192 af

Subcatchment 6S: BB-1FF
- Runoff Area=19.500 ac
- 10.51% Impervious
- Runoff Depth=4.82"
- Tc=18.6 min
- CN=77
- Runoff=76.05 cfs
- 7.829 af

Subcatchment 8S: BB-2F
- Runoff Area=53.310 ac
- 1.37% Impervious
- Runoff Depth=4.59"
- Tc=49.8 min
- CN=75
- Runoff=125.73 cfs
- 20.404 af

Subcatchment 9S: RL-1F
- Runoff Area=35.870 ac
- 39.67% Impervious
- Runoff Depth=5.62"
- Tc=30.0 min
- CN=84
- Runoff=130.44 cfs
- 16.788 af

Subcatchment 10S: RL-2F
- Runoff Area=6.030 ac
- 4.48% Impervious
- Runoff Depth=4.71"
- Tc=15.6 min
- CN=76
- Runoff=24.66 cfs
- 2.364 af

Subcatchment 11S: BB-4F
- Runoff Area=28.190 ac
- 2.70% Impervious
- Runoff Depth=4.59"
- Tc=40.2 min
- CN=75
- Runoff=74.49 cfs
- 10.789 af

Subcatchment 12S: BB-5F
- Runoff Area=37.050 ac
- 22.29% Impervious
- Runoff Depth=4.82"
- Tc=19.2 min
- CN=77
- Runoff=142.74 cfs
- 14.875 af

Subcatchment 14S: RL-3F
- Runoff Area=26.640 ac
- 4.73% Impervious
- Runoff Depth=4.93"
- Tc=22.8 min
- CN=78
- Runoff=97.62 cfs
- 10.946 af

Subcatchment 53S: BS-B2
- Runoff Area=13.580 ac
- 10.46% Impervious
- Runoff Depth=4.48"
- Tc=15.0 min
- CN=74
- Runoff=53.76 cfs
- 5.071 af

Subcatchment 56S: BS-D Det1
- Runoff Area=4.660 ac
- 29.83% Impervious
- Runoff Depth=5.73"
- Tc=12.6 min
- CN=85
- Runoff=24.44 cfs
- 2.226 af

Subcatchment 58S: BS-D Pond
- Runoff Area=21.420 ac
- 20.21% Impervious
- Runoff Depth=4.82"
- Tc=16.8 min
- CN=77
- Runoff=86.76 cfs
- 8.600 af

Subcatchment 73S: BB-8FD
- Runoff Area=15.260 ac
- 29.55% Impervious
- Runoff Depth=5.27"
- Tc=31.2 min
- CN=81
- Runoff=51.72 cfs
- 6.704 af

Subcatchment 79S: 8FA
- Runoff Area=158.080 ac
- 52.94% Impervious
- Runoff Depth=6.08"
- Tc=30.6 min
- CN=88
- Runoff=606.02 cfs
- 80.095 af

Subcatchment 81S: 8FB
- Runoff Area=18.920 ac
- 23.63% Impervious
- Runoff Depth=5.39"
- Tc=27.6 min
- CN=82
- Runoff=69.08 cfs
- 8.493 af

Subcatchment 83S: 8FC
- Runoff Area=9.200 ac
- 15.76% Impervious
- Runoff Depth=4.71"
- Tc=22.8 min
- CN=76
- Runoff=32.26 cfs
- 3.607 af
<table>
<thead>
<tr>
<th>Subcatchment</th>
<th>Runoff Area (ac)</th>
<th>Impervious (%)</th>
<th>Runoff Depth (&quot;in&quot;)</th>
<th>Tc (min)</th>
<th>CN</th>
<th>Runoff (cfs)</th>
<th>af</th>
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<tbody>
<tr>
<td>85S: BB-6F</td>
<td>4.780</td>
<td>16.11</td>
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<td>16.2</td>
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<td>3.870</td>
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<td>74</td>
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<td>89S: BB-1CF</td>
<td>39.150</td>
<td>13.38</td>
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<td>28.8</td>
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<td>90S: BB-7FC</td>
<td>13.850</td>
<td>11.41</td>
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<td>92S: BS-A</td>
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<td>79</td>
<td>125.48</td>
<td>14.098</td>
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</tbody>
</table>
Appendix H

**Future 2014 Conditions 10&100 Year-Revised Pond**

*Type III 24-hr 100-Year Rainfall*= 7.50”

**Prepared by TRC**

*Printed 12/9/2014*

**HydroCAD® 10.00-13**

**Page 9**

**Subcatchment 113S: BB-1BF**

- Runoff Area = 68.860 ac
- 21.83% Impervious
- Runoff Depth = 4.71”
- Tc = 31.2 min
- CN = 76
- Runoff = 210.22 cfs
- 27.000 af

**Subcatchment 114S: BB-1AF**

- Runoff Area = 7.450 ac
- 9.13% Impervious
- Runoff Depth = 4.71”
- Tc = 20.4 min
- CN = 76
- Runoff = 27.32 cfs
- 2.921 af

**Reach 24R: Reach I**

- Avg. Flow Depth = 3.68’
- Max Vel = 16.08 fps
- Inflow = 210.22 cfs
- 27.000 af

**Reach 25R: Reach H1**

- Avg. Flow Depth = 1.40’
- Max Vel = 14.19 fps
- Inflow = 124.02 cfs
- 15.351 af

**Reach 26R: Reach G1**

- Avg. Flow Depth = 0.48’
- Max Vel = 12.78 fps
- Inflow = 26.53 cfs
- 3.192 af

**Reach 27R: Reach F**

- Avg. Flow Depth = 0.74’
- Max Vel = 16.17 fps
- Inflow = 76.05 cfs
- 7.829 af

**Reach 28R: Reach M**

- Avg. Flow Depth = 5.85’
- Max Vel = 4.89 fps
- Inflow = 577.82 cfs
- 165.036 af

**Reach 30R: Reach C**

- Avg. Flow Depth = 4.50’
- Max Vel = 16.76 fps
- Inflow = 545.01 cfs
- 70.468 af

**Reach 31R: Reach H2**

- Avg. Flow Depth = 0.75’
- Max Vel = 23.54 fps
- Inflow = 216.44 cfs
- 70.316 af

**Reach 32R: Reach A2**

- Avg. Flow Depth = 0.57’
- Max Vel = 15.59 fps
- Inflow = 26.50 cfs
- 3.192 af

**Reach 33R: Reach K**

- Avg. Flow Depth = 3.31’
- Max Vel = 19.33 fps
- Inflow = 1,059.27 cfs
- 338.217 af

**Reach 34R: Reach G2**

- Avg. Flow Depth = 0.75’
- Max Vel = 15.59 fps
- Inflow = 26.51 cfs
- 3.192 af

**Reach 35R: Reach A1**

- Avg. Flow Depth = 4.50’
- Max Vel = 16.76 fps
- Inflow = 545.01 cfs
- 70.468 af

**Reach 36R: Reach J**

- Avg. Flow Depth = 3.11’
- Max Vel = 19.33 fps
- Inflow = 1,059.27 cfs
- 338.217 af

**Reach 37R: Reach E**

- Avg. Flow Depth = 2.23’
- Max Vel = 12.29 fps
- Inflow = 380.42 cfs
- 51.961 af

**Reach 38R: Reach K**

- Avg. Flow Depth = 4.07’
- Max Vel = 4.16 fps
- Inflow = 375.85 cfs
- 152.794 af

**Reach 39R: Reach N**

- Avg. Flow Depth = 1.33’
- Max Vel = 15.14 fps
- Inflow = 131.80 cfs
- 14.098 af

**Reach 40R: Reach D**

- Avg. Flow Depth = 4.37’
- Max Vel = 13.83 fps
- Inflow = 1,071.58 cfs
- 339.659 af

**Reach 41R: Reach I**

- Avg. Flow Depth = 3.68’
- Max Vel = 16.08 fps
- Inflow = 210.22 cfs
- 27.000 af

**Reach 42R: Reach H1**

- Avg. Flow Depth = 1.40’
- Max Vel = 14.19 fps
- Inflow = 124.02 cfs
- 15.351 af

**Reach 43R: Reach G1**

- Avg. Flow Depth = 0.48’
- Max Vel = 12.78 fps
- Inflow = 26.53 cfs
- 3.192 af

**Reach 44R: Reach F**

- Avg. Flow Depth = 0.74’
- Max Vel = 16.17 fps
- Inflow = 76.05 cfs
- 7.829 af

**Reach 45R: Reach M**

- Avg. Flow Depth = 5.85’
- Max Vel = 4.89 fps
- Inflow = 577.82 cfs
- 165.036 af

**Reach 46R: Reach C**

- Avg. Flow Depth = 4.50’
- Max Vel = 16.76 fps
- Inflow = 545.01 cfs
- 70.468 af

**Reach 47R: Reach H2**

- Avg. Flow Depth = 0.75’
- Max Vel = 23.54 fps
- Inflow = 216.44 cfs
- 70.316 af

**Reach 48R: Reach A2**

- Avg. Flow Depth = 3.31’
- Max Vel = 19.33 fps
- Inflow = 1,059.27 cfs
- 338.217 af

**Reach 49R: Reach G2**

- Avg. Flow Depth = 0.75’
- Max Vel = 15.59 fps
- Inflow = 26.51 cfs
- 3.192 af

**Reach 50R: Reach A1**

- Avg. Flow Depth = 4.50’
- Max Vel = 16.76 fps
- Inflow = 545.01 cfs
- 70.468 af

**Reach 51R: Reach J**

- Avg. Flow Depth = 3.11’
- Max Vel = 19.33 fps
- Inflow = 1,059.27 cfs
- 338.217 af

**Reach 52R: Reach E**

- Avg. Flow Depth = 2.23’
- Max Vel = 12.29 fps
- Inflow = 380.42 cfs
- 51.961 af

**Reach 53R: Reach K**

- Avg. Flow Depth = 4.07’
- Max Vel = 4.16 fps
- Inflow = 375.85 cfs
- 152.794 af

**Reach 54R: Reach N**

- Avg. Flow Depth = 1.33’
- Max Vel = 15.14 fps
- Inflow = 131.80 cfs
- 14.098 af

**Reach 55R: Reach D**

- Avg. Flow Depth = 4.37’
- Max Vel = 13.83 fps
- Inflow = 1,071.58 cfs
- 339.659 af
### Future 2014 Conditions 10&100 Year-Revised Pond Type III 24-hr 100-Year Rainfall=7.50"

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<table>
<thead>
<tr>
<th>Reach 78R: Reach A3</th>
<th>Avg. Flow Depth=4.41’  Max Vel=7.42 fps  Inflow=385.34 cfs  78.067 af</th>
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<td>n=0.050     L=1,670.0’   S=0.0030 '/' Capacity=346.73 cfs Outflow=373.05 cfs 78.067 af</td>
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<th>Reach 79R: Reach A4</th>
<th>Avg. Flow Depth=0.81’  Max Vel=25.68 fps  Inflow=373.05 cfs 78.067 af</th>
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<td>216.0” x 54.0” Box Pipe   n=0.011 L=340.0’ S=0.0051 '/' Capacity=1,161.64 cfs Outflow=373.05 cfs 78.067 af</td>
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<th>Reach 86R: Reach E1</th>
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<td>30.0” Round Pipe   n=0.013 L=175.0’ S=0.0018 '/' Capacity=17.26 cfs Outflow=25.96 cfs 12.107 af</td>
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<th>Reach 87R: Reach E2</th>
<th>Avg. Flow Depth=1.44’  Max Vel=7.51 fps  Inflow=25.96 cfs 12.107 af</th>
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<th>Reach 88R: Reach E3</th>
<th>Avg. Flow Depth=0.76’  Max Vel=11.79 fps  Inflow=30.54 cfs 12.107 af</th>
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<td>72.0” Round Pipe   n=0.013 L=500.0’ S=0.0028 '/' Capacity=224.10 cfs Outflow=24.44 cfs 12.107 af</td>
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<td>72.0” Round Pipe   n=0.013 L=230.0’ S=0.0026 '/' Capacity=216.31 cfs Outflow=24.19 cfs 12.107 af</td>
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<th>Avg. Flow Depth=0.71’  Max Vel=12.86 fps  Inflow=25.96 cfs 12.107 af</th>
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<th>Pond 48P: Pond C</th>
<th>Peak Elev=336.07’ Storage=0.480 af  Inflow=125.48 cfs 14.098 af</th>
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<tbody>
<tr>
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<td>Outflow=131.80 cfs 14.098 af</td>
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<table>
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<tr>
<th>Pond 51P: B1 Basin</th>
<th>Peak Elev=429.65’ Storage=1.359 af  Inflow=25.29 cfs 2.577 af</th>
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<tbody>
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<td></td>
<td>Outflow=4.04 cfs 2.568 af</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pond 53P: D Basin</th>
<th>Peak Elev=466.02’ Storage=0.823 af  Inflow=24.44 cfs 2.226 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outflow=18.25 cfs 2.211 af</td>
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</table>

<table>
<thead>
<tr>
<th>Pond 54P: D Pond</th>
<th>Peak Elev=385.07’ Storage=2.769 af  Inflow=182.37 cfs 18.719 af</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Outflow=141.92 cfs 18.719 af</td>
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<table>
<thead>
<tr>
<th>Pond 72P: Pond E</th>
<th>Peak Elev=374.98’ Storage=272,019 cf  Inflow=256.76 cfs 12.107 af</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Outflow=30.54 cfs 12.112 af</td>
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<table>
<thead>
<tr>
<th>Pond 78P: Pond D</th>
<th>Peak Elev=349.90’ Storage=9,790 cf  Inflow=1,065.36 cfs 339.659 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outflow=1,071.58 cfs 339.659 af</td>
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</table>

<table>
<thead>
<tr>
<th>Pond DP_A: Proposed Pond A</th>
<th>Peak Elev=372.73’ Storage=1,407,154 cf  Inflow=372.59 cfs 85.994 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outflow=272.82 cfs 84.047 af</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pond DP_B: Proposed Pond B</th>
<th>Peak Elev=365.02’ Storage=1,471,515 cf  Inflow=563.77 cfs 154.049 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Outflow=375.85 cfs 152.794 af</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Link 7L: CON 1 - Rye Lake</th>
<th>Inflow=763.89 cfs 86.622 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary=763.89 cfs 86.622 af</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Link 20L: BB-7FA</th>
<th>Inflow=344.98 cfs 50.695 af</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary=168.00 cfs 43.545 af  Secondary=176.98 cfs 7.150 af</td>
</tr>
</tbody>
</table>
Future 2014 Conditions 10 & 100 Year-Revised Pond Type III 24-hr 100-Year Rainfall = 7.50"

Total Runoff Area = 1,037.970 ac  Runoff Volume = 453.638 af  Average Runoff Depth = 5.24"
73.18% Pervious = 759.560 ac  26.82% Impervious = 278.410 ac
Appendix H

Type III 24-hr 100-Year Rainfall = 7.50"

Future 2014 Conditions 10&100 Year-Revised Pond

Printed 12/9/2014
Prepared by TRC

Page 13

Summary for Pond DP_A: Proposed Pond A

Inflow Area = 201.930 ac, 47.63% Impervious, Inflow Depth = 5.11" for 100-Year event
Inflow = 372.59 cfs @ 12.20 hrs, Volume = 85.994 af
Outflow = 272.82 cfs @ 13.04 hrs, Volume = 84.047 af, Atten = 27%, Lag = 50.3 min

Primary = 272.82 cfs @ 13.04 hrs, Volume = 84.047 af

Routing by Dyn-Stor-Ind method, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs / 3
Peak Elev = 372.73' @ 13.04 hrs Surf.Area = 233,589 sf Storage = 1,407,154 cf

Plug-Flow detention time = 330.6 min calculated for 83.989 af (98% of inflow)
Center-of-Mass det. time = 318.5 min (1,141.8 - 823.2)

Volume Invert Avail.Storage Storage Description
#1 365.00' 1,894,815 cf Custom Stage Data (Irregular) Listed below (Recalc)

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<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
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<td>1,039.0</td>
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<td>0</td>
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<td>2,247.0</td>
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<td>1,162,893</td>
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<td>1,176,783</td>
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<td>2,305.0</td>
<td>232,007</td>
<td>1,470,999</td>
<td>1,184,441</td>
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<td>373.75</td>
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<td>2,319.0</td>
<td>178,306</td>
<td>1,649,305</td>
<td>1,189,876</td>
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<tr>
<td>374.00</td>
<td>242,349</td>
<td>2,318.0</td>
<td>60,293</td>
<td>1,709,598</td>
<td>1,190,563</td>
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<tr>
<td>374.75</td>
<td>251,592</td>
<td>2,328.0</td>
<td>185,217</td>
<td>1,894,815</td>
<td>1,194,650</td>
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<table>
<thead>
<tr>
<th>Device</th>
<th>Routing</th>
<th>Invert</th>
<th>Outlet Devices</th>
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<tbody>
<tr>
<td>#1</td>
<td>Primary</td>
<td>364.10'</td>
<td>54.0&quot; Round 54&quot; Culvert - OS1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L= 11.0' RCP, square edge headwall, Ke= 0.500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inlet / Outlet Invert= 364.10' / 363.88' S= 0.0200 '/' Cc= 0.900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n= 0.013 Concrete pipe, straight &amp; clean, Flow Area= 15.90 sf</td>
</tr>
<tr>
<td>#2</td>
<td>Primary</td>
<td>363.35'</td>
<td>60.0&quot; Round 60&quot; Culvert - OS2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L= 11.0' RCP, square edge headwall, Ke= 0.500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inlet / Outlet Invert= 363.35' / 363.28' S= 0.0064 '/' Cc= 0.900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n= 0.013, Flow Area= 19.63 sf</td>
</tr>
<tr>
<td>#3</td>
<td>Device 1</td>
<td>366.00'</td>
<td>12.0&quot; Round 12&quot; Low Flow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L= 10.0' RCP, square edge headwall, Ke= 0.500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Inlet / Outlet Invert= 366.00' / 365.85' S= 0.0150 '/' Cc= 0.900</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n= 0.013, Flow Area= 0.79 sf</td>
</tr>
<tr>
<td>#4</td>
<td>Device 1</td>
<td>369.66'</td>
<td>3.3' long x 0.5' breadth Broad-Crested Rect. Weir - OS1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Head (feet) 0.20 0.40 0.60 0.80 1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coef. (English) 2.80 2.92 3.08 3.30 3.32</td>
</tr>
<tr>
<td>#5</td>
<td>Device 1</td>
<td>370.64'</td>
<td>6.8' long x 0.5' breadth Broad-Crested Rect. Weir OS1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Head (feet) 0.20 0.40 0.60 0.80 1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Coef. (English) 2.80 2.92 3.08 3.30 3.32</td>
</tr>
<tr>
<td>#6</td>
<td>Device 1</td>
<td>373.25'</td>
<td>72.0&quot; x 84.0&quot; Horiz. Orifice/Grate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C= 0.600</td>
</tr>
</tbody>
</table>
Limited to weir flow at low heads

#7 Primary 373.75' 200.0' long x 10.0' breadth Broad-Crested Rect Weir - OS1
   Head (feet)  0.20  0.40  0.60  0.80  1.00  1.20  1.40  1.60
   Coef. (English)  2.49  2.56  2.70  2.69  2.68  2.69  2.67  2.64

#8 Device 2 366.00' 12.0" Round 12" Low Flow
   L= 10.0' RCP, square edge headwall, Ke= 0.500
   Inlet / Outlet Invert= 366.00' / 365.85'  S= 0.0150 '/'  Cc= 0.900
   n= 0.013, Flow Area= 0.79 sf

#9 Device 2 369.66' 3.3' long x 0.5' breadth Broad-Crested Rect Weir - OS2
   Head (feet)  0.20  0.40  0.60  0.80  1.00
   Coef. (English)  2.80  2.92  3.08  3.30  3.32

#10 Device 2 370.64' 6.8' long x 0.5' breadth Broad-Crested Rect Weir - OS2
   Head (feet)  0.20  0.40  0.60  0.80  1.00
   Coef. (English)  2.80  2.92  3.08  3.30  3.32

#11 Device 2 373.25' 72.0" x 90.0" Horiz. Orifice/Grate  C= 0.600
   Limited to weir flow at low heads

Primary OutFlow Max=272.52 cfs @ 13.04 hrs HW=372.73' TW=0.00' (Dynamic Tailwater)
   1=54" Culvert - OS1 (Passes 136.26 cfs of 193.37 cfs potential flow)
   2=60" Culvert - OS2 (Passes 136.26 cfs of 247.91 cfs potential flow)
   3=12" Low Flow (Inlet Controls 9.44 cfs @ 12.01 fps)
   4=Broad-Crested Rect. Weir - OS1 (Weir Controls 58.81 cfs @ 5.81 fps)
   5=Broad-Crested Rect. Weir OS1 (Weir Controls 68.01 cfs @ 4.79 fps)
   6=Orifice/Grate  ( Controls 0.00 cfs)
   8=12" Low Flow (Inlet Controls 9.44 cfs @ 12.01 fps)
   9=Broad-Crested Rect Weir - OS2 (Weir Controls 58.81 cfs @ 5.81 fps)
   10=Broad-Crested Rect Weir - OS2 (Weir Controls 68.01 cfs @ 4.79 fps)
   11=Orifice/Grate  ( Controls 0.00 cfs)
   7=Broad-Crested Rect Weir - OS1  ( Controls 0.00 cfs)
Pond DP_A: Proposed Pond A

Hydrograph

- Inflow Area = 201.930 ac
- Peak Elev = 372.73'
- Storage = 1,407,154 cf

Stage-Discharge

- 12" Low Flow + 12" Low Flow
- Broad-Crested Rect Weir - OS1 + Broad-Crested Rect Weir - OS2
- Orifice/Grate + Orifice/Grate
- Primary

Discharge (cfs) vs Elevation (feet) graph with marked points:
- 372.59 cfs
- 272.82 cfs
Pond DP_A: Proposed Pond A

Stage-Area-Storage

Surface/Horizontal/Wetted Area (sq-ft)

Storage (cubic-feet)

Elevation (feet)

Custom Stage Data
Summary for Pond DP_B: Proposed Pond B

Inflow Area = 230.930 ac, 43.16% Impervious, Inflow Depth > 8.00" for 100-Year event
Inflow = 563.77 cfs @ 12.31 hrs, Volume= 154,049 af, Incl. 7.40 cfs Base Flow
Outflow = 375.85 cfs @ 12.83 hrs, Volume= 152,794 af, Atten= 33%, Lag= 31.2 min
Primary = 375.85 cfs @ 12.83 hrs, Volume= 152,794 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs / 3
Peak Elev= 365.02' @ 12.84 hrs Surf.Area= 256,930 sf Storage= 1,471,515 cf
Plug-Flow detention time= 153.4 min calculated for 152.673 af (99% of inflow)
Center-of-Mass det. time= 128.0 min (1,341.8 - 1,213.8)

Volume Invert Avail.Storage Storage Description
#1 356.00' 1,942,029 cf Custom Stage Data (Irregular) Listed below (Recalc)

(feet) (sq-ft) (feet) (cubic-feet) (cubic-feet) (sq-ft)
356.00 83 35.0 0 0 83
357.00 1,582 873.0 676 676 60,636
358.00 97,336 1,908.0 37,109 37,785 289,690
359.00 149,689 2,616.0 122,577 160,362 544,586
360.00 181,178 2,186.0 325,545 708,920
361.00 206,877 2,492.0 193,886 519,431 822,857
362.00 227,525 2,547.0 217,119 736,550 845,055
363.00 239,098 2,696.0 233,288 969,838 907,277
364.00 248,428 2,755.0 243,748 1,213,586 933,014
365.00 256,777 2,781.0 165,183 1,466,177 944,798
365.80 262,710 2,801.0 207,790 1,673,967 953,958
366.00 264,194 2,818.0 52,690 1,726,657 961,580
366.80 274,267 2,844.0 231,372 973,512

Device Routing Invert Outlet Devices
#1 Primary 356.20' 60.0" Round 60" Culvert X 2.00
L= 50.0' RCP, square edge headwall, Ke= 0.500
Inlet / Outlet Invert= 356.20' / 355.82' S= 0.0076 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 19.63 sf
#2 Device 1 356.47' 18.0" Round 18" Culvert
L= 15.0' RCP, sq.cut end projecting, Ke= 0.500
Inlet / Outlet Invert= 356.47' / 356.32' S= 0.0100 '/' Cc= 0.900
n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.77 sf
#3 Device 1 360.30' 14.0' long x 6.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00
2.50 3.00 3.50 4.00 4.50 5.00 5.50
Coef. (English) 2.38 2.52 2.70 2.68 2.67 2.66 2.65 2.65 2.65 2.65 2.64
#4 Primary 365.60' 220.0' long x 10.0' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
**Future 2014 Conditions 10&100 Year-Revised Pond** Type III 24-hr 100-Year Rainfall=7.50"

Prepared by TRC
Printed 12/9/2014
HydroCAD® 10.00-13 s/n 06251 © 2014 HydroCAD Software Solutions LLC

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**Primary OutFlow**
Max=375.72 cfs @ 12.83 hrs  HW=365.02’  TW=361.07’ (Dynamic Tailwater)

1=60" Culvert (Inlet Controls 375.72 cfs @ 9.57 fps)
2=18" Culvert (Passes < 16.91 cfs potential flow)
3=Broad-Crested Rectangular Weir (Passes < 381.08 cfs potential flow)
4=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

**Pond DP_B: Proposed Pond B**

![Hydrograph](image)

- **Inflow Area=230.930 ac**
- **Peak Elev=365.02’**
- **Storage=1,471,515 cf**

---

**Inflow Area=230.930 ac**
**Peak Elev=365.02’**
**Storage=1,471,515 cf**
Appendix H

Future 2014 Conditions 10&100 Year-Revised Pond
Type III 24-hr 100-Year Rainfall=7.50"
Summary for Link 43L: CON 3

On Blind Brook at intersection with Basin A discharge

Inflow Area = 389.140 ac, 32.59% Impervious, Inflow Depth > 5.09" for 100-Year event
Inflow = 577.82 cfs @ 12.60 hrs, Volume= 165.036 af
Primary = 577.82 cfs @ 12.60 hrs, Volume= 165.036 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Inflow Area = 389.140 ac
Summary for Link 44L: CON 3A

On Blind Brook at intersection with Basin B discharge

Inflow Area = 673.380 ac, 33.74% Impervious, Inflow Depth > 6.03" for 100-Year event

Inflow = 1,059.27 cfs @ 12.74 hrs, Volume = 338.217 af

Primary = 1,059.27 cfs @ 12.74 hrs, Volume = 338.217 af, Attenuation 0%, Lag = 0.0 min

Primary outflow = Inflow, Time Span = 0.00-72.00 hrs, dt = 0.05 hrs

Link 44L: CON 3A

Hydrograph

Inflow Area = 673.380 ac
Summary for Link 49L: L1

Intersection of West Branch of Blind Brook and Lincoln Avenue

Inflow Area = 677.250 ac, 33.55% Impervious, Inflow Depth > 6.02" for 100-Year event
Inflow = 1,065.36 cfs @ 12.75 hrs, Volume= 339.660 af
Primary = 1,065.36 cfs @ 12.75 hrs, Volume= 339.660 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 49L: L1

Hydrograph
Summary for Link 40L: CON 5

Intersection of East Branch of Blind Brook and Lincoln Ave

Inflow Area = 129.370 ac, 15.30% Impervious, Inflow Depth = 4.82" for 100-Year event
Inflow = 380.42 cfs @ 12.35 hrs, Volume= 51.961 af
Primary = 380.42 cfs @ 12.35 hrs, Volume= 51.961 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 40L: CON 5

Hydrograph

Inflow Area=129.370 ac
Summary for Link 39L: CON 6

Offsite intersection of East and West Branches of Blind Brook

Inflow Area = 844.940 ac, 29.92% Impervious, Inflow Depth > 5.79" for 100-Year event
Inflow = 1,374.68 cfs @ 12.65 hrs, Volume= 407.656 af
Primary = 1,374.68 cfs @ 12.65 hrs, Volume= 407.656 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Inflow Area=844.940 ac

Link 39L: CON 6 Hydrograph
**Water Quality Volume, WQv**

\[ WQv = \frac{(P)(Rv)(A)}{12} \]

Where:
- \( P \) = 1-Year, 24 Hour Rainfall Event (Figure 4.2, NYSDEC Design Manual)
- \( A \) = Site area in acres (onsite)
- \( Ai \) = Site impervious area in acres (onsite)
- \( I \) = Percent of impervious cover, proposed
- \( Rv \) = \( 0.05 + 0.009 \times I \)
- \( WQv \) = Required water quality volume (acre-feet)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>P (in.)</th>
<th>Ai (acres)</th>
<th>A (acres)</th>
<th>I (%)</th>
<th>Rv</th>
<th>Water Quality Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Acre-ft)</td>
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<tr>
<td></td>
<td>3.1</td>
<td>0.12</td>
<td>0.38</td>
<td>31.6</td>
<td>0.33</td>
<td>0.03</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Cu. Ft.)</td>
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<td>1,429</td>
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**Redevelopment Criteria**

<table>
<thead>
<tr>
<th>% Impervious Cover</th>
<th>% Water Quality Volume</th>
<th>WQv (Cu. Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing 31.6%</td>
<td>Proposed 31.6%</td>
<td>Reduction 0.0%</td>
</tr>
<tr>
<td>25.0%</td>
<td>0.0%</td>
<td>357.28</td>
</tr>
</tbody>
</table>

**Required Bioretention Bed Areas**

\[ Af = \frac{(WQv)(df)}{(k)(df+hf)(tf)} \]

Where:
- \( Af \) = Required Filter Bed Area (sq. ft.)
- \( WQv \) = Water Quality Volume (cu. ft.)
- \( df \) = Filter Bed Depth (ft.)
- \( k \) = Permeability = 0.5 ft/day (Bioretention Soils)
- \( hf \) = Average Water Height Over Filter Bed (ft)
- \( tf \) = Design Filter Bed Drain Time (days)

<table>
<thead>
<tr>
<th>WQv</th>
<th>df</th>
<th>k</th>
<th>hf</th>
<th>tf</th>
<th>Required Af (sq. ft.)</th>
<th>Provided Af (sq. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,429</td>
<td>2.5</td>
<td>0.5</td>
<td>0.5</td>
<td>2</td>
<td>1,191</td>
<td>3,452</td>
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</tbody>
</table>
Water Quality Volume, $WQv$

$$WQv = \frac{(P) (Rv) (A)}{12}$$

Where:
- $P$ = 1-Year, 24 Hour Rainfall Event (Figure 4.2, NYSDEC Design Manual)
- $A$ = Site area in acres (onsite)
- $Ai$ = Site impervious area in acres (onsite)
- $I$ = Percent of impervious cover, proposed
- $Rv$ = $0.05 + 0.009 \times I$
- $WQv$ = Required water quality volume (acre-feet)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>$P$ (in.)</th>
<th>$Ai$ (acres)</th>
<th>$A$ (acres)</th>
<th>$I$ (%)</th>
<th>$Rv$</th>
<th>$WQv$ (Acre-ft)</th>
<th>$WQv$ (Cu. Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.1</td>
<td>1.21</td>
<td>1.62</td>
<td>74.7</td>
<td>0.72</td>
<td>0.30</td>
<td>13,166</td>
</tr>
</tbody>
</table>

Redevelopment Criteria

<table>
<thead>
<tr>
<th>% Impervious Cover</th>
<th>% Water Quality Volume</th>
<th>$WQv$ (Cu. Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing 74.7%</td>
<td>Proposed 74.7%</td>
<td>9,875</td>
</tr>
<tr>
<td>Reduction 0.0%</td>
<td>Standard 0.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>Alternative 75.0%</td>
<td></td>
<td>3,292</td>
</tr>
</tbody>
</table>

Required Bioretention Bed Areas

$$Af = \frac{(WQv) (df)}{(k)(df+hf)(tf)}$$

Where:
- $Af$ = Required Filter Bed Area (sq. ft.)
- $WQv$ = Water Quality Volume (cu. ft.)
- $df$ = Filter Bed Depth (ft.)
- $k$ = Permeability = 0.5 ft/day (Bioretention Soils)
- $hf$ = Average Water Height Over Filter Bed (ft)
- $tf$ = Design Filter Bed Drain Time (days)

<table>
<thead>
<tr>
<th>$WQv$</th>
<th>$df$</th>
<th>$k$</th>
<th>$hf$</th>
<th>$tf$</th>
<th>Required $Af$ (sq. ft.)</th>
<th>Provided $Af$ (sq. ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,292</td>
<td>2.5</td>
<td>0.5</td>
<td>0.5</td>
<td>2</td>
<td>2,743</td>
<td>4,465</td>
</tr>
</tbody>
</table>
### 1. Runoff curve number (CN)

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>Hydro Group</th>
<th>Cover Description (cover type, treatment &amp; conditions)</th>
<th>CN</th>
<th>Area (acres)</th>
<th>Product CN x Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ub, Uf</td>
<td>C/D</td>
<td>Impervious</td>
<td>98</td>
<td>0.12</td>
<td>12</td>
</tr>
<tr>
<td>Ub, Uf</td>
<td>C/D</td>
<td>Grass</td>
<td>77</td>
<td>0.26</td>
<td>20</td>
</tr>
</tbody>
</table>

Total = 0.38 32

\[
\text{CN (weighted)} = \frac{\text{total product}}{\text{total area}} = \frac{32}{0.38} = 83.6
\]

Use CN = 84
### Project Information

**Project:** Westchester County Airport  
**Project No.:** 186266  
**Date:** 3/6/2013  
**Subject:** CN Worksheet - NRCS TR-55  
**Comp. By:** CSH  
**Chckd. By:**

### 1. Runoff Curve Number (CN)

<table>
<thead>
<tr>
<th>Soil Name</th>
<th>Hydro Group</th>
<th>Cover Description (cover type, treatment &amp; conditions)</th>
<th>CN</th>
<th>Area (acres)</th>
<th>Product CN x Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ub, Uf</td>
<td>C/D</td>
<td>Impervious</td>
<td>98</td>
<td>1.21</td>
<td>119</td>
</tr>
<tr>
<td>Ub, Uf</td>
<td>C/D</td>
<td>Grass</td>
<td>77</td>
<td>0.41</td>
<td>32</td>
</tr>
</tbody>
</table>

Total = 1.62  

CN (weighted) = \( \frac{\text{total product}}{\text{total area}} \) = \( \frac{150}{1.62} \)

CN (weighted) = 92.7  

Use CN = 93
Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment BMP C: Bioretention Basin C**
Runoff Area=0.380 ac  31.58% Impervious  Runoff Depth>1.60”
  Tc=6.0 min  CN=84  Runoff=0.70 cfs  0.051 af

**Subcatchment BMP D: Bioretention Basin D**
Runoff Area=1.620 ac  74.69% Impervious  Runoff Depth>2.35”
  Tc=6.0 min  CN=93  Runoff=4.23 cfs  0.317 af

**Total Runoff Area = 2.000 ac**  **Runoff Volume = 0.368 af**  **Average Runoff Depth = 2.21”**
  33.50% Pervious = 0.670 ac  66.50% Impervious = 1.330 ac
Summary for Subcatchment BMP C: Bioretention Basin C

Runoff = 0.70 cfs @ 12.09 hrs, Volume= 0.051 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Rainfall=3.10"

<table>
<thead>
<tr>
<th>Area (ac)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 0.120</td>
<td>98</td>
<td>Impervious</td>
</tr>
<tr>
<td>* 0.260</td>
<td>77</td>
<td>Grass</td>
</tr>
<tr>
<td>0.380</td>
<td>84</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>0.260</td>
<td>68.42%</td>
<td>Pervious Area</td>
</tr>
<tr>
<td>0.120</td>
<td>31.58%</td>
<td>Impervious Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry,</td>
</tr>
</tbody>
</table>

Subcatchment BMP C: Bioretention Basin C

Hydrograph

Type III 24-hr Rainfall=3.10"
Runoff Area=0.380 ac
Runoff Volume=0.051 af
Runoff Depth>1.60"
Tc=6.0 min
CN=84
Summary for Subcatchment BMP D: Bioretention Basin D

Runoff = $4.23 \text{ cfs} @ 12.09 \text{ hrs}, \ Volume= 0.317 \text{ af}, \ Depth> 2.35"$

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr Rainfall=3.10"

<table>
<thead>
<tr>
<th>Area (ac)</th>
<th>CN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>* 1.210</td>
<td>98</td>
<td>Impervious</td>
</tr>
<tr>
<td>* 0.410</td>
<td>77</td>
<td>Grass</td>
</tr>
<tr>
<td>1.620</td>
<td>93</td>
<td>Weighted Average</td>
</tr>
<tr>
<td>0.410</td>
<td>25.31% Pervious Area</td>
<td></td>
</tr>
<tr>
<td>1.210</td>
<td>74.69% Impervious Area</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tc (min)</th>
<th>Length (feet)</th>
<th>Slope (ft/ft)</th>
<th>Velocity (ft/sec)</th>
<th>Capacity (cfs)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Direct Entry,</td>
</tr>
</tbody>
</table>

Subcatchment BMP D: Bioretention Basin D

Hydrograph

4.23 cfs

Type III 24-hr Rainfall=3.10"
Runoff Area=1.620 ac
Runoff Volume=0.317 af
Runoff Depth>2.35"
Tc=6.0 min
CN=93
APPENDIX I

REUSE OF THE FORMER AIR NATIONAL GUARD SITE

DRAFT REVISED MAY 2010
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Appendix A – Visual Survey of the ANG Site
Appendix B – Fay, Spofford & Thorndike Memorandum
Appendix C – Build Out Analysis Graphics
I. INTRODUCTION

The former Air National Guard (ANG) Site (Site) encompasses approximately 18.2 acres in the northeast section of Westchester County Airport (Airport). The ANG Site is wholly located within the Town of North Castle. The Site was already developed at the time of the December 1986 Westchester County Airport Master Plan Update (Master Plan Update) and was, therefore, not addressed in the master planning process and environmental analysis of the Airport. The Site currently contains several vacant buildings and undeveloped land and is underutilized. However, as will be described below, the Site accommodates necessary Airport and Airport-related facilities and uses.

As a result of the above, and due to the fact that portions of the Site drain to the Rye Lake/Kensico Reservoir, Westchester County (County) has undertaken an evaluation of the Site and its potential for reuse. The purpose of this memorandum is to summarize the efforts that have been undertaken to date, including the establishment of a development envelope and parameters for appropriate long-term reuse of the former ANG Site. The analysis and recommendations presented in this memorandum will help to guide the County and the FAA in making appropriate decisions regarding future uses at the ANG Site.

Figure 1, Aerial of Former ANG Site presents an aerial of the ANG Site.

II. HISTORY OF THE AIR NATIONAL GUARD AT WESTCHESTER COUNTY AIRPORT

A review of historical accounts and aerial photographs, as well as the 105th Airlift Wing website (the units discussed below were further redesignated as the 105th Airlift Wing in October 1995) provides a history of the Air National Guard at Westchester County Airport.

In 1946, the Air National Guard, a separate reserve component of the United States Air Force, was established. On June 24, 1948, the 137th Fighter Squadron of the New York Air National Guard received federal recognition and began operations to establish a $3 million, 27-acre facility in the northeast corner of the Airport. The unit was initially equipped with F-47 “Thunderbolt” aircraft. In September of 1952, the unit was redesignated the 137th Fighter Interceptor Squadron and received the F-51H “Mustang” aircraft, as well as a new air defense mission. By 1952, the Air National Guard Site included the current Buildings 1, 2, and 3.
In 1953, the unit entered the “Jet Age” when it received the F-94A “Starfire” all weather interceptor. The unit retained its air defense mission until 1958 when it converted to the famed F-86H “Saber Jet” and was reorganized as the 105th Tactical Fighter Group. In February of 1961, the unit was redesignated as the 105th Aeromedical Transport Group and was assigned large transport aircraft such as the C-119C “Flying Boxcar.” In 1962 the unit converted to the C-97G “Stratofreighters,” a four-engine strategic transport. By 1966, the 105th was participating in a variety of worldwide missions, including support of operations in Vietnam and Southeast Asia. At this time, the 105th was one of six ANG units operating in New York State. In 1970, the 105th was once again redesignated, this time as the 105th Tactical Air Support Group, and was assigned to Forward Air Control and communications mission, flying the O-2A “Skymaster” for the Tactical Air Command.

By the 1980s, the ANG forces, as part of the “Total Force” concept of the military, were equipped with more modern aircraft, similar to its active-duty counterparts. These shifts had a direct impact on the 105th unit based at the Airport. During this period, the Air Force sought to increase its strategic airlift capacity to assist nations in need around the world. In anticipation of the unit becoming the first (and it remains the only) ANG unit to receive the C-5A “Galaxy” (in July 1985) the military’s largest transport aircraft, in May 1983 the units relocated to Stewart Air Force Base (now known as Stewart International Airport) in Newburgh, New York, to take advantage of more space and a 12,000-foot runway. Following the relocation of the 105th ANG unit in 1983, the 27-acre former ANG Site was transferred from New York State to Westchester County.

III. EXISTING CONDITIONS

A visual survey of the Site was performed and is located in Appendix A. The current layout of the Site is shown in Figure 2, Existing Layout of the Former ANG Site. The Site contains several buildings that are used as follows:

- **Building 1** – A two-story, “W”-shaped building that is mostly empty, and whose tenants include the Westchester County Department of Public Safety (WCDPS) 39th Precinct, the Civil Air Patrol (CAP) New York Wing/Southeastern Group Headquarters, the Corporate Angel Network (CAN), and Galley Foods. Building 1 contains approximately 24,158 square feet of interior space, as presented in Table 1, Building 1 Square Footage By Floor.
Figure 2
EXISTING LAYOUT
OF THE FORMER
AIR NATIONAL GUARD SITE

WESTCHESTER COUNTY AIRPORT
Town of Harrison/Town of North Castle/Village of Rye Brook

Saccardi & Schiff, Inc. - Planning and Development Consultants
Table 1
Building 1 Square Footage By Floor

<table>
<thead>
<tr>
<th>Floor</th>
<th>Square Footage</th>
<th>Tenants</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Floor</td>
<td>13,560</td>
<td>WCDPS, Galley Foods</td>
</tr>
<tr>
<td>First Floor Annex</td>
<td>3,000</td>
<td>CAP, CAN</td>
</tr>
<tr>
<td>Second Floor</td>
<td>7,598</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL</td>
<td>24,158</td>
<td>-</td>
</tr>
</tbody>
</table>

- **Building 2** – A large, one-story rectangular administrative and storage warehouse. Tenants include Cosgrove Aircraft Services and Enterprise Car rental, as well as the County. North of Building 2 is a parking area that is utilized by Enterprise Car rental. Building 2 contains approximately 16,000 square feet of interior space, as presented in Table 2, *Building 2 Square Footage By Tenant*.

Table 2
Building 2 Square Footage By Tenant

<table>
<thead>
<tr>
<th>Tenant</th>
<th>Square Footage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cosgrove</td>
<td>8,800</td>
</tr>
<tr>
<td>Enterprise</td>
<td>1,500</td>
</tr>
<tr>
<td>County</td>
<td>5,700</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>16,000</strong></td>
</tr>
</tbody>
</table>

- **Building 3** – A large, one-story rectangular warehouse. The building is currently occupied by Furniture Sharehouse. Building 3 contains approximately 16,000 square feet of floor space;

- **Building 4** – A one-story vehicle and general maintenance structure, occupied by Seasafe Corp. There are five bays for routine vehicle maintenance. At the southeast side of the building is a vehicle wash rack for periodically washing down facility vehicles. A small office is also located within the building. Building 4 is approximately 2,700 square feet;

- **Buildings 7 and 9** – These buildings were once part of a pump house for the fuel farm on the ANG Site that no longer exists. Building 7, an approximately 425-square foot utility building, is unoccupied. Building 9 is also a small, approximately 300-square foot utility building. Although not occupied by a tenant, it is a storage site for airport maintenance equipment. Building 8, once located between these two buildings, was removed in 1991;

- **Building 10** – A 20,806-square foot vehicle and general maintenance structure. It houses the maintenance and snow removal equipment for the Airport. On the west side of the building is a gas and diesel-fueling island located next to an emergency generator. Just to the northeast of the building are two silos – one for storage of airfield sand and the other for the storage of roadway sand and salt – used to aid in the snow removal efforts of the Airport;

- **Building 11** – Building 11 is approximately 7,000 square feet and is broken into two segments. An office area is currently occupied by the Airport’s ground handling staff and consists of approximately 4,800 square feet. On the north side of the building is a 2,200-square foot, two-bay garage that is occupied by the County for storage of a
reserve fire truck and related equipment. East of Building 11 is a 11,000-square foot, 85 foot by 140 foot aircraft parking area and perimeter roadway;

- **Building 15** – A metal-clad, one-story Butler building that was once the guard shack at the entrance of the ANG Site. It is currently occupied by Rudy’s Inflight Catering and contains approximately 2,100 square feet;

- **Cellphone Waiting Area** – South of Buildings 1 and 15 is a paved area for people temporarily waiting to pick up passengers arriving at the Airport. The waiting area includes a food ordering kiosk from Sal’s Good Eats;

- **Wishing Well Area** – West of Building 1 is a small open space area. The open space area is utilized during the summer months as an informal gathering area for Airport workers and includes a covered structure that is used for cooking and eating.

- **Overflow Parking Area** – West of the Wishing Well area and along the access roadway to the ANG Site is an area that serves as overflow parking. Shuttle service is provided by the Airport from the overflow parking area to the terminal.

IV. REGULATORY RESTRICTIONS

The historical development (i.e., the location and height of objects) of the ANG Site has been guided and restricted by a number of Federal Aviation Administration (FAA) regulations and design/operational criteria. In order to establish the extent of future development allowable at the Site, these regulatory restrictions were reviewed, primarily from the perspective of examining the Site with regard to FAA siting and obstruction criteria. Fay, Spofford & Thorndike (FST) provided such an evaluation in a detailed memorandum dated July 5, 2006 (see Appendix B). Key restrictions and how they affect the reuse of the Site are summarized below.

A. **Building Restriction Line**

A building restriction line (BRL) is established on each side of an airport’s runway(s) to identify suitable building locations. The BRL is located so as to encompass various areas associated with the safe operation of an airport, such as: the runway protection zones, the runway object free areas, navigational aid critical areas, airport air traffic control tower sight lines, etc. The location of the BRL is also influenced by the location of taxiways that serve the runway(s), as well as the types of aircraft that utilize the airport. Unlike some FAA criteria, there is no specific standard for the location of the BRL in terms of distance from the runway centerline. Rather, the location of the BRL is determined by the aforementioned factors.

Examination of the Airport Layout Plan (ALP) for the Airport indicated that Runway 16-34, the Airport’s primary instrument runway (and the runway located closest to the Site), has its BRL located 750 feet from the centerline of that runway. There are no buildings on the Airport, including the existing buildings located the Site, which penetrate the BRL, although, multiple buildings on the Site (Buildings 3, 5, 10, and 11) directly abut the BRL. However, a portion of the
ANG Site to the west of Building 10 does penetrate the BRL. This area accommodates parking for automobiles, but contains no buildings.

Any reuse of the ANG Site should continue to respect the BRL and be located no closer than 750 feet from the centerline of Runway 16-34. As a result, 16.4 acres of the 18.2 ANG Site is developable; the remaining 2.4 acres of the Site located inside the BRL should remain undeveloped, with the exception of parking and/or stormwater management facilities.

B. FAR Part 77

Part 77 of the Federal Aviation Regulations (Part 77) among other things establishes standards for determining obstructions in navigable airspace, sets forth the requirements for notice to the FAA of certain proposed construction or alteration, and provides for aeronautical studies of obstructions to air navigation so as to determine their effect on the safe and efficient use of airspace. Objects are subsequently classified as being „No Hazard”, a „Presumed Hazard”, or a „Hazard to Air Navigation”. It is generally best to avoid constructing anything that is an obstruction, although such a determination does not absolutely preclude it from happening. A key purpose of this evaluation was to determine at what point development at the ANG Site would become an obstruction. In other words, how high could a building be constructed in the ANG Site? Four types of “surfaces” are of relevance to the discussion of potential reuse at the Site. These four surfaces are:

1) Primary surface;
2) Runway protection zone (RPZ);
3) Approach surface; and,
4) Transitional surfaces.

Taken together, the four surfaces effectively place limits on the locations and heights of reuse at the Site. These surfaces as they apply to Runway 16-34 at the Airport are depicted on Figure 3, ANG Site Development Constraints.

No part of the Site is located within the primary surface for Runway 16-34. However, the RPZ does overlies a very small section of the portion of the Site that is located inside of the BRL. This small area is also theoretically affected by the approach surface that overlies the RPZ. These facts reinforce the recommendation that no development should be allowed to occur in that portion of the Site located inside of the BRL.

The transitional surface, which rises from the eastern edge of the RPZ and the primary surface, overlies the remainder of the Site and affects the allowable heights of development on the Site. Figure 3 shows the approximate elevations of the transitional surface at all points within the Site. The FAA height restrictions would allow the construction of buildings of three stories in height at
Figure 3
Westchester County Airport
ANG Site Development Constraints
the western side of the Site (closest to the airfield), with taller buildings (up to eight stories) being allowed deeper into the property to the east (closest to Airport Access Road).

The FAA, being a federal agency, has no direct power to prohibit or control development at the Airport. That power rests at the local level, in this case the County. Rather, the FAA’s key power over development at the Airport lies in its ability to control funding for the Airport. To that end, Part 77 also requires that the FAA be noticed beforehand of any construction or alteration involved in any reuse of the ANG Site. Such a notice is for their official review as to its potential impacts on air navigation and safety of aeronautical operations. The formal review is initiated via the completing and filing of Standard Form 7460-1 with the FAA.

C. Navigational Aids

1. Instrument Landing System

   The ANG Site is located outside of the critical areas associated with the Instrument Landing System (ILS) localizer and glide slope antennas. Accordingly, construction of any new structures within the ANG Site should not likely affect the functions of these antennas, although the FAA should be consulted regarding specific proposals and will make the final determination with regard to any possible interference.

2. Rotating Beacon

   It is unlikely that development of the ANG Site would interfere with the operation of the Airport rotating beacon. Nevertheless, any proposed construction should be examined at that time for potential interference with the function of the rotating beacon – that is, the ability of the rotating beacon to be seen by pilots approaching the Airport under visual flight conditions.

3. ASR Radar

   It is not expected that any new activities in the ANG Site would interfere with the function of this Airport surveillance radars (ASR) radar antenna. Nevertheless, the FAA should be consulted and will review any proposed construction in the ANG Site for the possibility of any potential interference or even the possibility that building construction could create a “blind spot” in the radar’s presentation.
D. Summary of Regulatory Restrictions

In summary, two regulatory restrictions apply to the ANG Site:

- 16.4 acres of the 18.2-acres Site is available for reuse, as the remaining 2.4 acres falls within the BRL.
- FAA height restrictions resulting from consideration of FAR Part 77 requirements will allow the construction of buildings of three stories in height at the western side of the Site, with taller buildings being allowed deeper into the property to the east.

The other FAA criteria with regard to navigational aids, radar systems, etc. will not likely restrict development on the ANG Site. In any case, as development proposals are considered over time, it is suggested that the FAA be kept apprised through informal contact of any such proposals as they arise. The FAA will also have to be officially notified as any development proposal progresses, through the filing of Standard Form 7460-1.

V. STORMWATER MANAGEMENT (TRC to revise based on SWMP)

A. Existing Conditions

Existing hydrologic conditions for the Westchester County Airport Site, which includes the ANG Site, are based on the “Full Development” condition as documented in the “Westchester County Airport 1999 Stormwater Management Plan” prepared by Dvirka and Bartilucci (D&B Plan). The D&B Plan was formulated to divert runoff from the Rye Lake/Kensico Reservoir watershed to the Blind Brook watershed, as well as provide water quality treatment and attenuate peak rates of runoff associated with modernization and improvement projects prior to exiting the Airport property. Various improvements documented in the D&B Plan were designed and have been constructed so that peak rates of stormwater runoff under “full development” conditions during a 2-year, 10-year, and 100-year, 24-hour storm will be no greater than the peak rates from similar storms prior to 1987 (predevelopment) conditions. The improvements include the following:

- Installation of storm drain collection (catch basins/manholes and piping) systems described in Section 3.2 of the D&B Plan. Some of these systems abandon or redirect several outfalls that previously discharged to the Rye Lake/Kensico Reservoir watershed;
- Improvements to Detention Basin B;
- Expansion of Detention Basin A; and,
- Use of natural areas such as water ponds, natural streams, and manmade open channels and grassed swales within the Airport property.
Using the best available data, TRC Raymond Keyes (TRC) performed a detailed compilation of overall and impervious areas that currently drain from each drainage sub area in both the Rye Lake/Kensico and the Blind Brook watersheds in April 2006. The compiled data was compared to the “Full Development” sub areas identified in the D&B Plan. With respect to the Blind Brook watershed, the analysis specifically targeted those sub areas that discharge to stormwater Basins A and B.

The ANG Site is located on a drainage divide that separates stormwater runoff discharging to Rye Lake/Kensico Reservoir from runoff discharging to Blind Brook. Runoff from the ANG Site is collected via roof runoff and overland flow into a series of subsurface drainage systems ranging from 8 inches to 12 inches in diameter.

The northern portion of the Site lies within drainage sub area RL-1F, which discharges through State Pollutant Discharge Elimination System (SPDES) permitted Outfall No. 007 into tributaries to Rye Lake/Kensico Reservoir. The total Site area within sub area RL-1F is approximately 11.5 acres, of which approximately 5.2 acres is impervious.

The southern portion of the Site lies within drainage sub area BB-1BF, which discharges through State Pollutant Discharge Elimination System (SPDES) permitted Outfall No. 008 located on the east side of Airport Road. Outfall No. 008 directly discharges to Blind Brook, which is conveyed under the Airport property through an existing pipe system. The system starts as a 54-inch diameter circular pipe, increases to a 96-inch diameter circular pipe, and then ultimately changes to a 7-foot, 3-inch square box culvert. The total site area within sub area BB-1BF is approximately 7.4 acres, of which approximately 5 acres is impervious.

B. Proposed Conditions

1. Stormwater Quantity

   RL-1F
   With respect to drainage sub area RL-1F, the TRC April 2006 analysis determined that approximately 1.1 acres of additional impervious surfaces could be constructed within the sub area without impacting peak discharge rates at Outfall No. 007. Since the construction of the proposed Airport Access Road Vehicle Security Checkpoint would account for approximately 0.2 acre of new impervious surfaces within RL-1F, future redevelopment scenarios for the ANG Site could include up to approximately 0.9 acre of new impervious surfaces within the sub area.
BB-1BF

Since the TRC April 2006 analysis specifically targeted those Blind Brook sub areas that discharge to stormwater Basins A and B, a determination of impervious cover for drainage sub area BB-1BF was not included. Using best available data, TRC did additional area calculations as part of this study to determine the extent of “current” impervious cover within sub area BB-1BF, compared to the “Full Development” impervious cover for the sub area identified in the D&B Plan. The result of the comparison indicates that approximately 2.9 acres of additional impervious surfaces could be constructed without impacting peak discharge rates at Outfall No. 008. Based on discussions with CDM, the design consultant for the deicing facility improvement project, the design and construction of the deicing truck upload facility was intended to be accomplished with no net increase in impervious cover within sub area BB-1BF. Therefore, future redevelopment scenarios for the ANG Site could include up to approximately 2.9 acres of new impervious surfaces within the sub area. It should be stated that various Airport documents, including the D&B Plan, planned for additional impervious areas at the north end of the Airport for highway or vehicle parking purposes as part of the Master Plan Update. However, it is not known whether the amounts of greater “Full Development” impervious cover within sub areas RL-1F and BB-1BF identified in the D&B Plan account for some of those planned additional impervious areas. Further investigation would be required to verify this issue.

The allowance of additional impervious surfaces within each drainage sub area without the need for stormwater quantity controls (i.e., detention storage) assumes that the design and construction of any of the redevelopment scenarios in this study would not substantially modify the current drainage divide that separates stormwater runoff discharging to Rye Lake/Kensico Reservoir from runoff discharging to Blind Brook. Any redevelopment scenario for the ANG Site that proposes a substantial change in the drainage divide, particularly one that would propose to redirect more runoff from one sub area to the other, would require the design of full stormwater quantity controls to handle the increased discharge rates up to the 100-year storm. Under such a scenario, a more detailed hydrologic analysis would need to be done to determine the extent of required quantity controls.

2. Stormwater Quality

The redevelopment of the ANG Site will require the design of post-construction stormwater quality controls as part of a Stormwater Pollution Prevention Plan (SPPP) for the project to comply with the federal Phase II stormwater regulations, which are enforced by the New York State Department of Environmental Conservation (NYSDEC). Compliance
typically requires conformance with the technical standards for the sizing and design of stormwater quality controls presented in the *New York State Stormwater Management Design Manual* (NYSDEC Design Manual).

Because a portion of redevelopment will occur in the Rye Lake/Kensico Reservoir watershed, the design of post-construction water quality controls as part of a SPPP must also be in accordance with the New York City Department of Environmental Protection (NYCDEP) regulations.

For each redevelopment scenario, the type(s) and location(s) (at grade or underground) of the post-construction water quality controls and their proper sizing will be governed by such factors the adequacy or lack of pervious area, the permeability of the soil strata, and the presence of groundwater and/or rock.

**VI. BUILD OUT ANALYSIS**

In order to determine the type and amount of development that could occur at the ANG Site, building envelopes were developed for the Site, under four development scenarios:

- Full Build Out of Site
- “Givens”
- “Probables”
- Preservation of Wishing Well Area

The development scenarios reflect not only the elements considered as part of the SDEA/SDEIS, but also opportunities and potential proposals of the Site that the County has considered or is considering. The building envelopes for each of the scenarios were based upon:

1) **Regulatory restrictions** – As described in *IV. Regulatory Restrictions*, no development may occur outside of the BRL. Therefore, of the 18.2-acre Site, only 16.4 acres is available for development. A second regulatory restriction relates to building heights. Depending on the elevation and location within the Site, building heights could range from three (closest to airfield) to eight (closest to Airport Access Road) stories;

2) **Stormwater** – As described in the previous section, based on the analysis performed by TRC, it was determined that additional impervious areas (in addition to the Vehicle Access Security Checkpoints and Truck Upload Facility projects currently being considered as part of the SDEA/SDEIS) could be accommodated at the ANG Site without negatively impacting the stormwater management system (*TRC to revise*);

3) **Parking** – For the purposes of this analysis, a typical parking calculation for office buildings in Westchester County of four spaces per 1,000 square feet of building space was utilized; and,
4) **Type and size of development in the surrounding area** – The immediate vicinity of the ANG Site is the Airport itself, with a range of building types and sizes. Most buildings on the Airport are between 25 feet and 50 feet in height (the equivalent of three to five stories). The areas adjacent to the Airport include light industrial and office space, institutional uses, and residential uses. Such uses tend to be lower in height, typically between 16 feet and 30 feet (the equivalent of two to three stories).

Each of the development scenarios is described below in greater detail. In addition, as part of the discussion, the maximum possible building envelopes for each of the scenarios are provided. Illustrative graphics prepared for each of the build-out analysis scenarios are located in *Appendix C*. These graphics portray the full build out at lower (one-story), medium (five-stories), and taller (eight-stories) heights for each of the scenarios (*S&S to revise, after input from TRC*).

**A. Scenario 1 – Full Build Out of Site (see Figure 4, Scenario 1 in Appendix C)**

Under Scenario 1, all buildings and structures on the ANG Site were assumed to be removed. *Table 3, Possible Building Envelopes – Full Build Out of Site Scenario* presents the possible building envelopes for Scenario 1, depending on building height (the further from the BRL, the greater the possible height).

<table>
<thead>
<tr>
<th>Stories</th>
<th>Footprint Dimensions</th>
<th>Footprint Square Footage</th>
<th>Total Square Footage</th>
<th>FAR</th>
<th>Parking Spaces*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>540 ft. x 690 ft.</td>
<td>372,600</td>
<td>372,600</td>
<td>0.50</td>
<td>1,489</td>
</tr>
<tr>
<td>2</td>
<td>480 x 518</td>
<td>248,640</td>
<td>497,280</td>
<td>0.67</td>
<td>1,985</td>
</tr>
<tr>
<td>3</td>
<td>540 x 345</td>
<td>186,300</td>
<td>558,900</td>
<td>0.75</td>
<td>2,234</td>
</tr>
<tr>
<td>4</td>
<td>432 x 345</td>
<td>149,040</td>
<td>596,160</td>
<td>0.80</td>
<td>2,383</td>
</tr>
<tr>
<td>5</td>
<td>360 x 345</td>
<td>124,200</td>
<td>621,000</td>
<td>0.83</td>
<td>2,483</td>
</tr>
<tr>
<td>6</td>
<td>320 x 330</td>
<td>105,600</td>
<td>633,600</td>
<td>0.85</td>
<td>2,557</td>
</tr>
<tr>
<td>7</td>
<td>301 x 309</td>
<td>93,009</td>
<td>651,063</td>
<td>0.87</td>
<td>2,607</td>
</tr>
<tr>
<td>8</td>
<td>200 x 414</td>
<td>82,800</td>
<td>662,400</td>
<td>0.89</td>
<td>2,648</td>
</tr>
</tbody>
</table>

*NOTE: *Parking calculated at 4 spaces per 1,000 square feet of total square footage (approximate).

**B. Scenario 2 – “Givens” (see Figure 5, Scenario 2 in Appendix C)**

Based on a June 28, 2006 internal County meeting, as well as coordination with the County, a number of the buildings on the ANG Site were identified as potentially filling the needs of various County agencies and departments. Some of the building reuses were deemed most likely to occur and are presented in Scenario 2 as “givens”.

Scenario 3 would therefore involve:
- The retention (and possible renovation) of Buildings 10 and 2. Building 10 would continue to function as the Airport maintenance facility. Building 2
would continue to house the Cosgrove Corporation and Enterprise Car rental offices; and,
- The construction of a new maintenance shed adjacent to Building 10.

All other buildings and structures would be removed. **Table 4, Possible Building Envelopes – “Givens” Scenario** presents the possible building envelopes for Scenario 2.

### Table 4
**Possible Building Envelopes – “Givens” Scenario**

<table>
<thead>
<tr>
<th>Stories</th>
<th>Footprint Dimensions</th>
<th>Footprint Square Footage</th>
<th>Total Square Footage</th>
<th>FAR</th>
<th>Parking Spaces*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>525 ft. x 535 ft.</td>
<td>280,875</td>
<td>280,875</td>
<td>0.38</td>
<td>1,128</td>
</tr>
<tr>
<td>2</td>
<td>450 x 415</td>
<td>186,750</td>
<td>373,500</td>
<td>0.50</td>
<td>1,505</td>
</tr>
<tr>
<td>3</td>
<td>400 x 350</td>
<td>140,000</td>
<td>420,000</td>
<td>0.56</td>
<td>1,692</td>
</tr>
<tr>
<td>4</td>
<td>375 x 300</td>
<td>112,500</td>
<td>450,000</td>
<td>0.60</td>
<td>1,802</td>
</tr>
<tr>
<td>5</td>
<td>325 x 285</td>
<td>92,625</td>
<td>463,125</td>
<td>0.62</td>
<td>1,881</td>
</tr>
<tr>
<td>6</td>
<td>300 x 265</td>
<td>79,500</td>
<td>477,000</td>
<td>0.64</td>
<td>1,934</td>
</tr>
<tr>
<td>7</td>
<td>250 x 280</td>
<td>70,000</td>
<td>490,000</td>
<td>0.66</td>
<td>1,972</td>
</tr>
<tr>
<td>8</td>
<td>200 x 310</td>
<td>62,000</td>
<td>496,000</td>
<td>0.67</td>
<td>2,004</td>
</tr>
</tbody>
</table>

*Parking calculated at 4 spaces per 1,000 square feet of total square footage (approximate).

### C. Scenario 3 – “Probables” (see Figure 6, Scenario 3 in Appendix C)

As mentioned in Scenario 2, a number of the buildings on the ANG Site were identified as potentially filling the needs of various County agencies and departments. In addition to the building reuses were deemed most likely to occur, the coordination also identified building reuses would probably occur. These building reuses are presented in Scenario 3 as “probables”.

Scenario 4 would therefore involve:
- The retention (and possible renovation) of Buildings 10 and 2, as depicted in Scenario 2;
- The construction of a new maintenance shed adjacent to Building 10, as depicted in Scenario 2;
- The retention (and possibly renovation) of Buildings 1 and 3. Building 1 would contain Westchester Department of Public Safety’s headquarters and operations offices, with associated parking for 100 employees and service vehicles. Building 3 would contain Westchester County Department of Emergency Services’ back-up Emergency Operations Center and warehouse space for emergency response equipment (both spaces would be un-staffed, and would be in stand-by mode awaiting activation. Parking would be required for activation); and,
- The removal of Building 11, with the area then utilized for parking for NetJets (Hangar 6).

The remaining buildings and structures would be removed. Unlike the previous scenarios, in order to accommodate buildings of sufficient sizes, two smaller,
stepped buildings may be necessary. Therefore, **Table 5, Possible Building Envelopes – “Probables” Scenario** presents the overall possible building envelopes for Scenario 3, with a two building configuration.

<table>
<thead>
<tr>
<th>Building Configuration</th>
<th>Stories</th>
<th>Footprint Square Footage</th>
<th>Total Square Footage</th>
<th>FAR</th>
<th>Parking Spaces*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Buildings</td>
<td>1</td>
<td>165,000</td>
<td>165,000</td>
<td>0.22</td>
<td>660</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>2</td>
<td>154,000</td>
<td>308,000</td>
<td>0.41</td>
<td>1,232</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>3</td>
<td>115,000</td>
<td>345,000</td>
<td>0.46</td>
<td>1,380</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>4</td>
<td>92,000</td>
<td>368,000</td>
<td>0.49</td>
<td>1,472</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>5</td>
<td>86,000</td>
<td>372,800</td>
<td>0.50</td>
<td>1,491</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>6</td>
<td>80,000</td>
<td>377,600</td>
<td>0.51</td>
<td>1,510</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>7</td>
<td>76,000</td>
<td>384,000</td>
<td>0.52</td>
<td>1,536</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>8</td>
<td>76,000</td>
<td>385,600</td>
<td>0.52</td>
<td>1,542</td>
</tr>
</tbody>
</table>

*NOTE: *Parking calculated at 4 spaces per 1,000 square feet of total square footage (approximate).*

D. **Scenario 4 – Preservation of Wishing Well Area** (see **Figure 7, Scenario 4 in Appendix C**)

As Scenario 3 was developed, it became apparent that there was limited space for development when all of the given and probable uses were considered. Since one of the concerns in the reuse of the Site is an increase in impervious surfaces, an additional scenario was developed, Scenario 4, which considered not only the “givens” and “probables”, but the preservation of the undeveloped wishing well area as well.

Scenario 4 would therefore involve:
- The retention (and possible renovation) of Buildings 10 and 2, as depicted in Scenario 2;
- The construction of a new maintenance shed adjacent to Building 10, as depicted in Scenario 2;
- The retention (and possibly renovation) of Buildings 1 and 3, as depicted in Scenario 3;
- The removal of Building 11, with the area then utilized for parking for NetJets, as depicted in Scenario 3; and,
- The preservation of the area surrounding the wishing well.

The remaining buildings and structures would be removed. Similar to **Table 6** in Scenario 3, **Table 7, Possible Building Envelopes – Wishing Well Preservation Scenario** presents the overall possible building envelopes for Scenario 4, with a two building configuration.
Table 7

Possible Building Envelopes – Wishing Well Preservation Scenario

<table>
<thead>
<tr>
<th>Building Configuration</th>
<th>Stories</th>
<th>Footprint Square Footage</th>
<th>Total Square Footage</th>
<th>FAR</th>
<th>Parking Spaces*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Buildings</td>
<td>1</td>
<td>90,000</td>
<td>90,000</td>
<td>0.12</td>
<td>360</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>2</td>
<td>90,000</td>
<td>180,000</td>
<td>0.24</td>
<td>720</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>3</td>
<td>70,000</td>
<td>210,000</td>
<td>0.28</td>
<td>840</td>
</tr>
<tr>
<td>Two Buildings</td>
<td>4</td>
<td>70,000</td>
<td>280,000</td>
<td>0.38</td>
<td>1,120</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>5</td>
<td>70,000</td>
<td>308,800</td>
<td>0.41</td>
<td>1,235</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>6</td>
<td>70,000</td>
<td>337,600</td>
<td>0.45</td>
<td>1,350</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>7</td>
<td>65,000</td>
<td>340,000</td>
<td>0.46</td>
<td>1,360</td>
</tr>
<tr>
<td>Two Buildings (1-four story)</td>
<td>8</td>
<td>65,000</td>
<td>341,600</td>
<td>0.46</td>
<td>1,366</td>
</tr>
</tbody>
</table>

NOTE: *Parking calculated at 4 spaces per 1,000 square feet of total square footage (approximate).

E. Summary of Scenarios

The evaluation of the building envelopes that would result from different scenarios did not present any surprising results. As expected, the following general trends were identified:

- The fewer the number and extent of buildings and/or uses that are preserved, the greater the amount of potentially developable square footage;
- The greater the building height, the greater the amount of potentially developable square footage and the greater the FAR; and,
- As potentially developable area increases, the greater the amount of parking that is necessary.

An eight-story building under Scenario 1 would produce the largest amount of developable floor area (662,400 square feet). One-story buildings under Scenario 4 would produce the smallest amount of developable floor area (90,000 square feet). Despite the fact that much of the ANG Site would remain unchanged under such a scenario, the developable floor area would still amount to more than four times the floor area that exists in Building 1.

VII. REUSE CRITERIA

The relative scarcity of available land on the Airport suggests that careful consideration be given to what uses are developed at the ANG Site. In order to accomplish this, two steps were taken, as follows:

A. General Reuse Factors

Prior to establishing reuse criteria for the Site, a number of general factors were taken into consideration. These include:
- **Building envelopes** – As presented above, the amount of developable area and the size of potential building(s) were established in order to indicate not only the overall amount of development that could occur, but also the types and sizes of buildings that could accomplish such development. The type and size of a building, in turn, has an effect on the type of use that it could house;

- **Relationship to the Airport or Airport-related functions** – The FAA generally requires that use of property pledged to airport use be used to support airport activities or operations, or related aviation industry activities;

- **Compatibility with Statement of Airport Policy and Master Plan Update** – As with any comprehensive plan, the Statement of Airport Policy and the Master Plan Update act as the official guides to planning and development at the Airport, and contain goals and recommendations for the Airport’s development. Any use or reuse at the Airport, therefore, should be consistent and compatible with the goals and objectives of these plans;

- **Relationship to zoning, public policy, and comprehensive planning goals of the County, State, and surrounding areas** – The County is currently embarking on a process of developing an updated comprehensive vision for the County and its municipalities for the year 2025. Westchester 2025: Plan Together will update the County’s comprehensive plan – Patterns for Westchester: the Land and the People, Policies and Strategies to Guide Land Use. As a County facility, any use or reuse of the Airport should be consistent with the goals and recommendations of Patterns/Westchester 2025. The Airport physically lies within three municipalities (the Towns of Harrison and North Castle and the Village of Rye Brook). Any use or reuse of the Airport should consider how it relates to the general policies and goals of the surrounding areas. Note that the northern portion of the Airport, including the entire ANG Site, is located in the Town of North Castle and is designated as an Industrial (IND-AA) District. The IND-AA District permits a wide variety of nonresidential principal uses, including businesses, professional offices, motels, and business and light industrial uses subject to performance standards. Specifically for the Airport, such uses include the storage and repair of aircraft, the storage and distribution of aviation gasoline, and warehouses (excluding truck storage or truck terminal facilities). The minimum lot area in the IND-AA District is two acres, with a maximum building coverage of 30 percent, a maximum building height of two stories (30 feet), and a maximum FAR of 0.30. These lot and bulk requirements were considered, but, ultimately, not included in the evaluation of the ANG Site since County planning supersedes and preempts local zoning provisions;

- **Compatibility with existing land uses** – The relationship of any use or reuse should be compatible with the overall land use patterns at the Airport, reinforce existing land use patterns in the surrounding area, and counteract any negative land use trends;

- **Changes in visual appearance and impact on community character** – Despite the Site’s location on an Airport and adjacent to non-residential uses, any such use at the Site should not change the general appearance of the
Airport or surrounding area and should not impact upon the character of the community;

- **Impact on environmental resources** – Due to the Site’s location adjacent to the Rye Lake/Kensico Reservoir, the use or reuse should not create adverse impacts on environmental resources, such as water, air, and noise quality. In particular, the County has indicated that it is desirable to avoid any increase in impervious surfaces;

- **Impact on traffic** – The use or reuse should not generate large volumes of traffic (including truck traffic), so as to overburden the existing transportation network;

- **Economic impacts** – The Site, as an available piece of land, has the ability to provide additional tax revenues to the County. In addition, the Site may create additional jobs, spin-offs, and support for other economic activity, services, and businesses.

## B. Reuse Criteria

As a result of examining the aforementioned factors, a number of reuse criteria were developed specifically for the ANG Site. The purpose of establishing reuse criteria was to provide specific guidelines for reuse, focusing on restricting negative impacts and promoting positive impacts. Eight reuse criteria were developed.

The use should:

- Be Airport-related or support Airport functions;
- Meet all FAA regulatory criteria;
- Be compatible with Airport, County, State and local land use policies and goals;
- Help achieve sustainable reuse of the property and the Airport overall;
- Maintain (or improve) water quality on the Airport;
- Minimize noise, air quality, and traffic impacts at the Airport;
- Restrict activities that produce hazardous materials; and,
- Not alter the general visual character of the area.

## VIII. POTENTIAL USES FOR REUSE OF THE ANG SITE

Based on the reuse criteria established above, previous experience in the area, and typical industry guidelines, it was determined that the following uses could be appropriate at the ANG Site:

- **Overflow Airport automobile parking** – The *Master Plan Update* calls for the area at the north end of the Airport to be reserved for parking purposes. Peak period congestion at the Terminal Parking Garage has created a need for overflow public parking. The combination of this goal of the *Master Plan Update* with current needs suggests that utilizing the ANG Site for parking is an appropriate use;
- **General office building(s)** – Most of the surrounding area, including King Street and New King Street, has been developed for campus office uses. The reuse of the Site for an (Airport-related) office or multiple office buildings would conform with the general character and land use pattern of the surrounding area, while generating jobs and increasing the tax base;

- **Warehouses** – Warehouses for storage of Airport, County, or other purposes would be compatible with the general character and land use pattern of the surrounding area;

- **Flight school** – A flight school, including dormitories as an accessory use, would be an Airport-related use and could generate jobs and tax revenues;

- **Aircraft showroom and sales office** – A showroom and sales office for aircraft at the ANG Site would be an Airport-related office use that would allow testing and transport of aircraft. Such a use could generate jobs and tax revenues. Due to the limited amount of activity that would be expected from such use, impacts to the environment would most likely be minimal;

- **Aviation museum** – An aviation museum, containing materials related to aviation in general, or perhaps aviation in Westchester County and the region, would be an Airport-related use and could generate jobs and tax revenues; and,

- **Additional corporate aircraft hangars** – The Master Plan Update calls for new corporate hangars and offices to be developed at the Airport. Although two corporate hangars (Hangars V and W) were built north of Hangar D, they were built at a smaller square footage than was recommended in the Master Plan Update. The ANG Site would be an appropriate location for hangars since it has aircraft ramp and taxiway system access; is near existing infrastructure; has landside access for vehicular access; and, hangars at such a location would not impede the ILS and would not impede winter snow removal operations.

The Master Plan Update identified Airport Access Road at New King Street as a location for an automobile service station. Although this area is technically outside of the ANG Site, this memorandum recommends that gasoline and equivalent stations be prohibited at the ANG Site due to potential environmental consequences.

**IX. FORMER ANG SITE RE-USE POLICY** *(County to re-confirm this policy)*

1) This policy governs redevelopment of the site of the former Air National Guard Base at Westchester County Airport. The subject area (the Area) is the parcel bounded on the southerly side by the NetJets leasehold, on the westerly side by the Airport Operations Area, on the northerly side by the proposed Water Quality Buffer Area and on the easterly side by the Airport Access Road.

2) The Area is depicted on the FAA-approved Airport Layout Plan (ALP) as aviation related use property. Any redevelopment of the Area must be consistent with the ALP.

3) The Area will be available for lease, rather than purchase and any use of the Area must be revenue-producing.
4) The County will make the Area available for redevelopment only as a single parcel. Any proposal for redevelopment must set forth a land use plan that includes at least:
   a) Provision for appropriate collection and management (diversion and/or treatment) of stormwater from all impervious surfaces; and,
   b) Provision for the continued operation or in-kind replacement of the current airport maintenance base that is located in the Area.

5) Any redevelopment on the Area shall be consistent with:
   a) Its setting within the Critical Environmental Area (CEA) designation of the Airport;
   b) The requirements of New York State Water Resource Regulations, Chapter X of the Regulations of the New York State Department of Environmental Conservation; and,

X. SUMMARY AND CONCLUSIONS

The ANG Site is an important piece of real estate, not only for the Airport itself, but also for the County as a whole. It was therefore imperative that a close examination of the Site and any potential uses occur. This memorandum summarizes the efforts that have occurred towards that examination, providing evaluations of the Site under four scenarios that the County identified. What was clear from the evaluation, regardless of scenario, is that despite regulatory and environmental limitations, there are opportunities for reuse, most likely in the form of office buildings. The County should determine the practicality of rehabilitating all or any of the identified buildings to remain prior to selecting a scenario. It may be cost-prohibitive to rehabilitate some or all of the buildings due to deteriorating structures, the presence of asbestos, and mold, among other issues. Only then would the County be able to determine which scenario is most appropriate and what uses, gleaned from the list in VIII. Potential Uses for Reuse of the ANG Site, would make sense. This memorandum has laid the groundwork for that decision-making process, including presenting the policy for redevelopment of the ANG Site. The reuse of the ANG Site will go through an additional round of review as part of the DSEA/DSEIS. Depending on input from the County, this review could be expanded to examine more specific uses and/or proposals.
Appendix A – Visual Survey of the ANG Site
Parking Area North of Building 2 (Need new?)
Building 3

South of Building 3, Looking East to Building 4
Building 15 (Need New)

Cellphone Waiting Area
Runway Sand Silo

Roadway Sand and Salt Silo
Looking South Towards Undeveloped Portion of ANG Site

Undeveloped Portion of ANG Site
APPENDIX J

PUBLIC AND LEGAL NOTICES

PUBLIC COMMENT PERIOD FOR THE DRAFT EA
NOTICE OF AVAILABILITY AND REQUEST FOR COMMENT
ENVIRONMENTAL ASSESSMENT
AIRPORT DRAINAGE IMPROVEMENTS - STORM WATER MANAGEMENT UPGRADES
WESTCHESTER COUNTY AIRPORT

In accordance with the National Environmental Policy Act (NEPA), notice is hereby given that copies of an Environmental Assessment (EA) for Westchester County Airport Drainage Improvements – Storm Water Management Upgrades are available for public review and comment at the following location during normal business hours:

Westchester County
Department of Public Works & Transportation
100 East First Street, 9th Floor
Mount Vernon, NY 10550
Attn: Patricia Chemka, Deputy Commissioner
Hours: 9:00 AM to 5:00 PM Weekdays

The document may also be viewed online at http://airport.westchestergov.com/general-information/news-and-public-notices.

The public and interested parties are invited to comment on the proposed actions. The comment period for this EA is from March 11, 2015 to April 10, 2015.

The proposed actions of this project include:

- Expanding the storm water runoff storage capacity of existing Detention Basin “A” through excavation, reconstruction of the earthen spillway, raising the elevation of the spillway crest, reconstruction of the two basin outlet structures, and reconstruction of the embankment slopes;
- Expanding the storm water runoff storage capacity of existing Detention Basin “B” through excavation, reconstruction of the earthen spillway, raising the elevation of the spillway crest, and reconstruction of the embankment slopes, and;
- Construction of multiple bioretention basins for treatment of storm water runoff from a portion of the Airport Operations Area tributary to State Pollutant Discharge Elimination System Outfall 007, located at the north end of the Airport.

The potential environmental impacts associated with the proposed actions are described within this EA, which has been prepared in compliance with both the President’s Council of Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Part 1500-1508), FAA Order 1050.1E, Change 1, FAA Order 5050.4B, and the FAA Environmental Desk Reference for Airport Actions. The Federal Aviation Administration (FAA) is the lead federal agency responsible for the review and approval of the EA.

Westchester County will accept comments until the official comment period closes on April 10, 2015. Comments on this EA should be sent to the Westchester County Department of Public Works & Transportation, 100 East First St., Mount Vernon, NY 10550 Attn: Patricia Chemka, or e-mailed to psc1@westchestergov.com. Any questions regarding this public notice shall also be directed to Patricia Chemka at the address above.
## Classified Ad Receipt
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