



# M E M O R A N D U M

P L A N N I N G   D E P A R T M E N T  
T O W N   O F   C U M B E R L A N D ,   M A I N E

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Date: August 16, 2018  
To: Cumberland Planning Board  
From: Carla Nixon, Town Planner  
Subject: Village Green Major Subdivision Amendment to add four lots

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As with Oceanview, the applicants were hopeful that the MDEP permits would be issued by the meeting date, however that is not looking likely. There are waiver requests to be addressed and a public hearing will be helpful to ensure that all abutter concerns are being addressed.

Date August 16, 2018  
To Town of Cumberland Planning Board  
From Carla Nixon, Planning Director  
Subject **Village Green Major Subdivision Amendment to Add 4 Lots**

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## **I. REQUEST:**

The applicants are Village Green Cumberland, LLC and George and Constance Russell. The applicants are requesting an amendment to the previously approved 58 lot Village Green subdivision to add four additional lots. The proposed lots are currently part of a single 5.72 acre parcel located at the end of Amanda's Way, owned by the Russell's. Village Green Cumberland, LLC has purchased 3.15 acres of the 5.72 acre parcel that was owned by the Russells. The Russell's have retained 2.57 acres of the original lot. The Russell lot, containing their existing home and the four new lots will be accessed from a new, 640 linear foot, private drive (to be called Brackett Lane) from Bradbury Way. The parcels are shown on Tax Assessor Map U-10, Lot 1B. The applicant is represented by Stephen Bushey, P.E., of Stantec Consulting Services; Jeffrey Read, P.E., of Sevee and Maher Engineering has reviewed the plan for conformance with the Town of Cumberland's ordinances.

## **II. DESCRIPTION:**

|                                |   |
|--------------------------------|---|
| Parcel size:                   | 5.72 acres.   |
| Zoning District:               | Village Mixed Use Zone (VMUZ) with a contract zoning overlay.   |
| Minimum Lot Size:              | Contract Zone Agreement (CZA) allows a minimum lot size of 5,000 sf.  |
| Net Residential Density:       | The contract zoning agreement for the original 40.09 acres allowed for a maximum of 58 lots, however the NRA calculation showed that 181 residential units would be permitted using the 5,000 sf min lot size. The contract zone agreement was amended to allow the four additional lots. |
| Number of Lots/Dwelling Units: | 4   |
| Lot frontage:                  | 75'.  |
| Water and Sewer:               | Portland Water District. Capacity to serve letter dated 4/25/2018 on file. Sewer user units need to be reserved then purchased from the Town prior to the preconstruction conference.   |
| Buffer:                        | 75' buffer between project boundary line abutting the Cumberland Commons residential lots and lots 60 and 61. A 40' wide setback along project line and Town Civic Lot. 75' buffer along streams.   |
| Roads:                         | The private drive (that serves Lots 59-62) will be 18' wide with no esplanade or sidewalk.  |
| Homeowner's Association:       | The new lots will be part of the existing Village Green HOA which maintains and owns all private roads, private utility infrastructure improvements, open space and trails.   |
| Sidewalks:                     | No sidewalks are proposed.  |

Fire Protection:

Public water. Existing hydrant in front of Lot 57 along Bradbury Drive. As per the Fire Protection Ordinance, sprinklers are not required.

### III. WAIVER REQUESTS

Note: Section 15.1 of the Subdivision Ordinance allows for waivers when “an unnecessary hardship may result from strict compliance with these standards, or where there are special circumstances of a particular plan which the Board finds makes a particular standard inapplicable”.

Requested Waivers:

Appendix D:

1. High Intensity Soil Survey
2. Soil boundaries and names superimposed on plan.

### IV. OUTSIDE AGENCY REVIEWS:

Outside Agency Approvals Required:

| Agency                                  | Type of Permit  | Status                |
|---|---|-----------------------|
|   |   |                       |
| MDEP                                    | Site Location of Dev. Permit (SLODA) and NRPA amendment | OUTSTANDING           |
| Maine Natural Areas Program             | Rare Botanical Data                                     | Letter dated 10/25/05 |
| Maine Historic Preservation Commission  | Historic Properties                                     | Letter dated 4/28/11  |
| Maine Dept. Inland Fisheries & Wildlife | Habitat Data  | Letter dated 10/12/05 |

### VI. PLANNING DIRECTOR’S COMMENTS/DISCUSSION ITEMS:

VII. DEPARTMENT HEAD REVIEWS: No comments were submitted.

### VIII. TOWN ENGINEER’S REVIEW:

### VIII. MAJOR SUBDIVISION REVIEW:

#### PROPOSED FINDINGS OF FACT - Subdivision Ordinance, Section 1.1

The purpose of these standards shall be to assure the comfort, convenience, safety, health and welfare of the people, to protect the environment and to promote the development of an economically sound and stable community. To this end, in approving subdivisions within the Town of Cumberland, Maine, the Board shall consider the following criteria and before granting approval shall determine that the proposed subdivision:

1. Pollution. The proposed subdivision will not result in undue water or air pollution. In making this determination, it shall at least consider:
  - A. The elevation of the land above sea level and its relation to the flood plains;
  - B. The nature of soils and subsoil and their ability to adequately support waste disposal;
  - C. The slope of the land and its effect on effluents;
  - D. The availability of streams for disposal of effluents; and
  - E. The applicable state and local health and water resource rules and regulations;

The project will be on public sewer therefore the soils do not need to support waste disposal. The applicant has provided a soils report prepared by Albert Frick Associates, Inc. describing the soils as they relate to the design for the proposed drainage system. The MDEP has **not yet** issued a Site Location of Development permit which includes a review of the erosion control plans.

Based on the information provided the standards of this section have **not yet** been met.

2. Sufficient Water. The proposed subdivision has sufficient water available for the reasonable foreseeable needs of the subdivision;

**The proposed subdivision will utilize public water. There is a letter on file from the Portland Water District dated 4/25/2018 that states that there is an adequate supply of clean and healthful water to serve the needs of the proposed subdivision.**

Based on the information provided the standards of this section have been met.

3. Municipal Water Supply. The proposed subdivision will not cause an unreasonable burden on an existing water supply, if one is to be used;

**The proposed subdivision will utilize public water. There is a letter on file from the Portland Water District dated 4/25/2018 that states that there is an adequate supply of water to serve the needs of the proposed 12 lot mixed use subdivision without creating a burden on the existing water supply.**

Based on the information provided the standards of this section have been met.

4. Erosion. The proposed subdivision will not cause unreasonable soil erosion or a reduction in the land's capacity to hold water so that a dangerous or unhealthy condition results;

**The erosion control plan has been reviewed by the Town Engineer who has made a recommendation that will be incorporated into the final plan. MDEP approval is still outstanding.**

Based on the information provided, the standards of this section have **not yet been met.**

5. Traffic. The proposed subdivision will not cause unreasonable highway or public road congestion or unsafe conditions with respect to the use of the highways or public roads existing or proposed;

**There is a traffic study on file dated April, 2011 which has been reviewed and approved by the MDOT and Tom Gorrill, the Town's peer review traffic engineer.**

Based on the information provided, the standards of this section have been met.

6. Sewage disposal. The proposed subdivision will provide for adequate sewage waste disposal and will not cause an unreasonable burden on municipal services, if they are utilized;

**The project will utilize public sewer. Jeff Read, P.E., has reviewed and approved the proposed sewer plans.**

**There is a letter on file dated 7/27/11 from the Town Manager, Bill Shane, stating that the town has agreed to accept the flow of at least 16,000 gallons per day to its municipal sewer system from this project.**

**Sewer user permits have not yet been purchased by the owner. This is a proposed condition of approval.**

Based on the information provided, the standards of this section have been met.

7. Municipal solid waste disposal. The proposed subdivision will not cause an unreasonable burden on the municipality's ability to dispose of solid waste, if municipal services are to be utilized;

**The Town provides curbside pickup of household trash. The Town is currently under contract with Pine Tree Waste for the collection and hauling of residential solid waste with disposal at Eco-Maine. The four additional single family homes will not impact the municipality's ability to dispose of solid waste.**

Based on the information provided, the standards of this section have been met.

8. Aesthetic, cultural and natural values. The proposed subdivision will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites, significant wildlife habitat identified by the



Department of inland Fisheries and Wildlife or the municipality, or rare and irreplaceable natural areas or any public rights for physical or visual access to the shoreline;

**Letters on file dated 10/25/05 and 4/14/11 from Department of Conservation states that there are no rare or botanical features documented specifically within the project area.**

**Letters on file dated 10/12/05 and 6/8/11 from the Department of Inland Fisheries and Wildlife states that there are no known significant wildlife habitat or threatened or endangered species in the vicinity of the project.**

**A letter on file dated 4/28/11 from the Maine Historic Preservation Commission states that this project will have no effect on historic resources.**

**Based on the information provided, the standards of this section have been met.**

9. Conformity with local ordinances and plans. The proposed subdivision conforms to a duly adopted subdivision regulation or ordinance, comprehensive plan, development plan or land use plan, if any. In making this determination, the municipal reviewing authority may interpret these ordinances and plans;

**The plans have been reviewed by the Town's peer review engineers and town staff. There are outstanding engineering issues that need to be addressed prior to approval or as conditions of approval.**

**Based on the information provided, the standards of this section have not yet been met.**

10. Financial and technical capacity. The subdivider has adequate financial and technical capacity to meet the standards of this section;

**Technical capacity is evidenced by expert engineering, surveyors, soils evaluators, traffic engineers.**

**A letter dated 4/25/18 from Norway Savings Bank states that "the developers have the financial capacity, management skills, and marketing finesse to successfully develop this site and complete the project on time and on budget."**

**Based on the information provided, the standards of this section have been met.**

11. Surface waters; outstanding river segments. Whenever situated entirely or partially within the watershed of any pond or lake or within 250 feet of any wetland, great pond or river as defined in Title 38 chapter 3, subchapter I, article 2-B, the proposed subdivision will not adversely affect the quality of that body of water or unreasonably affect the shoreline of the body of water;

**The man-made pond on the site is not by State definition a great pond or lake regulated by the State. The pond is not part of the parcel now being subdivided.**

**Based on the information provided, the standards of this section have been met.**

12. Ground water. The proposed subdivision will not, alone or in conjunction with existing activities, adversely affect the quality or quantity of ground water;

**The project will be served by public sewer. There are no proposed activities that would adversely affect the quality or quantity of ground water.**

**Based on the information provided, the standards of this section have been met.**

13. Flood areas. Based on the Federal Emergency Management Agency's Flood Boundary and Floodway Maps and Flood Insurance Rate Maps, and information presented by the applicant whether the subdivision is in a flood-prone area. If the subdivision, or any part of it, is in such an area, the subdivider shall determine the 100-year flood elevation and flood hazard boundaries within the subdivision. The proposed subdivision plan must include a condition of plan approval requiring that principal structures in the subdivision will be constructed with their lowest floor, including the basement, at least one foot above the 100-year flood elevation;

**The parcel is located in Zone C- Areas of Minimal Flooding.**

**Based on the information provided, the standards of this section have been met.**

14. Storm water. The proposed subdivision will provide for adequate storm water management;

A stormwater management plan was revised in March, 2018 and submitted for review by the Town Engineer. **There are outstanding issues to be resolved.**

Based on the information provided, the standards of this section **have not yet been met.**

15. Freshwater wetlands. All potential freshwater wetlands, as defined in 30-A M.R.S.A. §4401 (2-A), within the proposed subdivision have been identified on any maps submitted as part of the application, regardless of the size of these wetlands. Any mapping of freshwater wetlands may be done with the help of the local soil and water conservation district.

**Wetland areas have been delineated and shown on the plan. The impact is 2,104 sf. The applicant intends to pay the in-Lieu fee to the DEP for this additional impact. The project requires a NRPA and SLODA amendments which are outstanding.**

Based on the information provided, the standards of this section have **not yet been met.**

16. River, stream or brook: Any river, stream, or brook within or abutting the proposed subdivision has been identified on any map submitted as a part of the application. For purposes of this section, "river, stream or brook" has the same meaning as in Title 38, Section 480-B, Subsection 9. [Amended; Effective. 11/27/89]

One perennial and three intermittent MDEP jurisdictional streams are located within the westerly portion of the site. The 5,976 square feet of impacts associated with the stream crossings are permitted through the NRPA Permit-by-Rule process which has been undertaken.

Based on the information provided, the standards of this section have been met.

**SECTION 300 – AQUIFER PROTECTION (if applicable)**

The parcel is partially located in the Aquifer Protection District. A residential development on public sewer will not adversely affect the aquifer.

## **IX. STANDARD CONDITIONS OF APPROVAL:**

This approval is dependent upon and limited to the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. Any variation from the plans, proposals and supporting documents, except minor changes as so determined by the Town Planner which do not affect approval standards, is subject to review and approval of the Planning Board prior to implementation.

## **X. RECOMMENDED CONDITIONS OF APPROVAL:**

1. Legal documents to be reviewed and approved by Town Attorney prior to release of the plat for recording.
2. Sewer user permits to be obtained from the Town prior to the preconstruction meeting.
3. Statement of values for required improvements for all lots to be submitted prior to releasing the plat for recording.
4. A performance guarantee in a form acceptable to the Town Manager shall be provided prior to the pre-construction conference.
5. A pre-construction conference is required prior to the start of work.



**Stantec Consulting Services Inc.**

482 Payne Road Scarborough Court, Scarborough ME 04074-8929

May 17, 2018

**Ms. Carla Nixon, Planner**

Town of Cumberland  
290 Tuttle Road  
Cumberland, ME 04021

**Subject: Village Green  
4th Amended Subdivision Submission  
Phase 4 Russell Property addition**

Dear Ms. Nixon:

As you may recall, we previously submitted application materials back in October 2017 on behalf of Village Green Cumberland LLC and George and Constance Russell. That submission was intended to cover the proposal to add four new single-family house lots plus the existing Russell residence (Phase 4) to be accessed off a new private drive from Bradbury Way. Subsequent to that submission on December 19, 2017, the Planning Board considered a request to amend the Village Green Subdivision Plan to address issues related to stream setbacks and buffers associated with two of the subdivision lots (Lots 47 and 53).<sup>1</sup>

We subsequently provided additional information addressing peer review comments from Sevee & Maher on April 25, 2018 regarding the road and the four new lots. We also filed on April 5, 2018 an amendment application with the Maine Department of Environmental Protection to amend the Site Law and Natural Resources Protection Act permits<sup>2</sup> for the Village Green development. We are awaiting the DEP review and approval of that amendment application. We understand from various emails from Bill Shane in late April that there may have been some confusion on the submission materials, mostly likely related to our internal delay between submissions, etc. and for that I apologize. On that basis, the following information and accompanying package of materials is being resubmitted in order to bring current the project proposal status in our effort to be placed on the Planning Board's June 19, 2018 meeting agenda.

The proposed lots are currently part of a single 5.72-acre parcel located at the end of Amanda's Way, owned by George L. and Constance Bischof Russell (CCRD Book 29481, Page 273). Village Green Cumberland LLC will be executing a Purchase and Sale Agreement to acquire approximately 3.2 acres of the 5.72 acre parcel. The Russell's will retain 2.52 acres of the original lot. If approved, the four new lots will be available for sale and development of single family residences similar to those now constructed within the Village Green Subdivision. See the attached Plan of Boundary Survey, prepared by Titcomb Associates for the existing Russell property. The objective is to modify the Russell property whereby four new lots are created with access from a new private drive to be extended off the Village Green Bradbury Way. The existing Russell residence will also become accessed from a new driveway

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<sup>1</sup> See Notice of Decision dated December 20, 2017 and 3<sup>rd</sup> Amended Plan CCRD Plan Book 218, Page 26

<sup>2</sup> See Original Orders #L-25376-L3-A-N/L-25376-TE-B-N/L-25376-L6-C-N



Ms. Carla Nixon  
May 17, 2018  
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from the private drive and their access from Amanda's Way will be discontinued. This land division and amendment to the Village Green development was previously contemplated and considered by the Town Council as part of an approved Amended Contract Zoning Agreement earlier this year (see attached and recorded document at CCRD Book 33894, Page 280).

The Village Green development originally consisted of a 40.09-acre parcel that was developed into a 58-lot residential subdivision. The build out of the development is approaching near completion with just a few remaining lots to be constructed upon. The developer is now seeking to expand the residential subdivision by including four new additional residential lots to be divided from the Russell Property, plus the existing Russell house on land that they will retain. The accompanying plans depict a new private drive to extend off Bradbury Way between the original Lots 57 and 58 into the Russell Property. The approximately 650 LF private drive will provide access to the four new Lots (59-62) as well as providing access to the existing Russell residence. In accordance with the Amended Contract Zoning Agreement, the developers will install landscaping at the end of Amanda's Way which will prohibit any further access to the Russell land or the Village Green site from that private drive.

The proposed work will include private drive construction along with utilities extensions for water, sewer, and power/communications. These systems will tie into the existing systems within Bradbury Way. The proposed lot layout includes the following buffers:

- A 75-foot wide buffer between the project boundary line that abuts the Cumberland Common residential lots and the proposed Lots 60 and 61. Of the 75-foot buffer, 50 feet shall remain natural and undisturbed and 25 feet shall be vegetated.
- A 40-foot wide setback along the boundary line of the Phase 4 property that abuts the Town Civic Lot (east side of Lots 59 and 60).
- A 75-foot natural resource setback from adjacent streams on the lots except for the road crossing.

A check in the amount of \$1,050.00 associated with the processing of the Amended Subdivision Plan and a Subdivision Application was previously submitted back in October 2017, to the best of our understanding. On behalf of Village Green Cumberland LLC and George and Constance Russell, we look forward to discussing the Amended Subdivision Plan with you and the members of the Planning Board during the upcoming meeting on June 19, 2018. You will note that reliance is continued to be placed on the original approved plans as it relates to the Village Green project, background data, details, etc. This current submission includes the following plan materials:

- The 4<sup>th</sup> Amended Subdivision Plan
- A Plan & Profile Sheet for the proposed private drive
- The original Titcomb Associates survey of the Russell Property
- Sheet 10.1 of the original Village Green Submission drawings



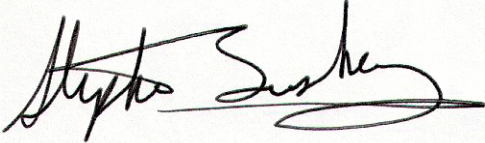
Ms. Carla Nixon  
May 17, 2018  
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We have also attached our April 25, 2018 letter that provides supporting information to address the peer review comments from Sevee & Maher.

If you have any questions with regards to the information submitted, please contact our office.

Regards,

**STANTEC CONSULTING SERVICES INC.**



Stephen R. Bushey, P.E.  
Associate  
Phone: (207) 887-3478  
Fax: (207) 883-3376  
Stephen.bushey@stantec.com

Attachments: Subdivision Application & Checklist  
Amended Contract Zoning Agreement  
April 25, 2018 Letter of Response  
4th Amended Subdivision Plan  
Plan & Profile Sheet  
Titcomb Survey for Russell Property  
Sheet 10.1 of Original Village Green plans

c: Nathan Bateman

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## **SUBDIVISION APPLICATION & CHECKLIST**

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**COMPLETION CHECKLIST**  
**BASED ON APPENDIX C**  
**MINOR SUBDIVISION SUBMISSION REQUIREMENTS**

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|   | <b>YES/NO</b> | <b>NOTES/COMMENTS</b>                        |
|---|---------------|--|
| 15 copies of plans  | YES           |  |
| Scale 1"=40'  | NO            | 1"=100' per Original Plans                   |
| Proposed name of town & subdivision   | YES           |  |
| Date of submission, north point, graphic map scale                          | YES           |  |
| Names & address of record owner and subdivider                              | YES           |  |
| Names of adjoining property owners  | YES           |  |
| Names of existing/proposed streets, easements & bldg. lines                 | YES           |  |
| Boundaries & designations of zoning districts, parks, public spaces         | YES           |  |
| Field survey with bearings and distances certified by LLS. Monuments shown. | YES           |  |
| Dimensions & areas of each proposed lot                                     | YES           |  |
| Location, dimension, bearing of every lot line.                             | YES           |  |
| Survey to an accuracy of 1' to 5,000'.                                      | YES           |  |
| 2' contours   | YES           | See Plan & Profile Sheet 1                   |
| Surface drainage patterns, channels and watershed areas.                    | YES           |  |
| Soils report w/boundaries superimposed on the plan                          | NO            | Previously submitted in Original Application |
| Plan submitted to CCSWCS  | NO            |  |
| On-site public sewer and water shown horiz and vert (Hydro-geol study?)     | NO            | N/A  |
| Surface drainage plan or stormwater mgmt plan                               | YES           | Part of Village Green Systems                |
| Electrical facilities   | YES           | Underground                                  |
| Covenants or deed restrictions  | YES           |  |

**Town of Cumberland**  
**Major Subdivision Submission Checklist**  
BASED ON APPENDIX D  
MAJOR SUBDIVISION SUBMISSION REQUIREMENTS

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Subdivision Name

Village Green

Applicant's Name Village Green Cumberland LLC & George & Constance Russell

Date October 31, 2017

Per Section 4.1 *General Procedures*, please note: *The Code Enforcement Officer will first determine if the project will be classified as a major or minor subdivision. Classification will determine submission requirements.*

***YOU MUST REVIEW THE PROPOSED PLAN WITH THE CODE ENFORCEMENT OFFICER AND TOWN PLANNER PRIOR SUBMITTING APPLICATION TO RECEIVE THE APPROPRIATE CLASSIFICATION.***

Major subdivision Amendment Minor Subdivision \_\_\_\_\_

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The following is intended to provide a summary of the submission requirements for subdivision review and for the provision of evidence for Findings of Fact. For precise requirements, please refer to the Town of Cumberland Subdivision Ordinance.

**THE TOWN PLANNER SHALL DETERMINE IF THE APPLICATION COMPLETE OR INCOMPLETE. ONLY COMPLETE APPLICATIONS SHALL BE REVIEWED BY THE PLANNING BOARD.**

***Waivers:*** Please make a check in the *Waiver Request* column for any requested waivers. Attach a separate sheet citing the Subdivision Ordinance section number, description, and reason for request. (Section 15.1)

**Specify below the location of information,  
i.e., plan #, narrative, binder section...**

|   | Yes or No | Location of Information?      | Waiver Requested? |
|---|-----------|-------------------------------|-------------------|
| <b>General Submissions:</b>                                       |           |                               |                   |
| 15 copies of plans and materials. All sheet sized to be 24" x 36" | YES       |                               |                   |
| 1"=100' scale for general plan                                    | YES       | See Amended Subdivision Plan  |                   |
| 1"=40' scale for construction of required improvements            | YES       | See Plan & Profile Sheet 1    |                   |
| Traffic Info?   | NO        |                               |                   |
| Capacity to Serve letters?  | NO        | Waiting on Confirmation       |                   |
| Financial and Technical Capacity (Sec.14)                         | NO        | See Contract Zoning Agreement |                   |



|   |     |  |  |
|---|-----|--|--|
| Sewer user permits required? Status?  | NO  | Pending                                |  |
| Deed restrictions, if any, describe   | YES | Will be provided on any Transfer Deeds |  |
|   |     |  |  |
|   |     |  |  |
|   |     |  |  |
| <b>Cover Sheet:</b>   |     |  |  |
| Proposed subd. name & name of municipality  | NO  | See Original Plan Set                  |  |
| Name & address of record owner, subdivider, and designer of preliminary plan  | YES | See Amended Subdivision Plan           |  |
|   |     |  |  |
|   |     |  |  |
|   |     |  |  |
| <b>Location Map:</b>  | YES | See Original Plans                     |  |
| ▪ Scale 1"=1000'  |     |  |  |
| ▪ Shows area 1000' from property lines  |     |  |  |
| ▪ All existing subdivisions   |     |  |  |
| Approximate tract lines of adjacent parcels   |     |  |  |
| Approximate tract lines of parcels directly across street   |     |  |  |
| <i>Location of existing &amp; proposed streets, easements, lot lines &amp; bldg. lines of proposed subd. &amp; adjacent properties.</i> |     |  |  |
| <b>Existing Conditions Plan</b>   | YES | See Sheet 1                            |  |
| Existing buildings  |     |  |  |
| Watercourses  |     |  |  |
| Legend  |     |  |  |
| Wetlands  |     |  |  |
| existing physical features (trees 10" diameter or more. Stone walls   |     |  |  |
| Trail System?   |     |  |  |
|   |     |  |  |
|   |     |  |  |
| <b>Subdivision Plan:</b>  | YES | See Amended Plan                       |  |
| Date of plan submission, true north & graphic scale   |     |  |  |

|  |     |                          |  |
|--|-----|--------------------------|--|
| Net residential acreage calculations   | YES | See General Notes C-4.0  |  |
| Legend   | YES |                          |  |
| Trail (connecting?)  | N/A |                          |  |
| <i>Widths</i> of existing/proposed streets, easements & bldg. lines                                    | YES | See Plan & Profile Sheet |  |
| <i>Names</i> of existing/proposed streets, easements & bldg. lines                                     | YES | On Subdivision Plan      |  |
| Boundaries & designations of zoning districts, parks, public spaces                                    | YES | On Subdivision Plan      |  |
| Outline of proposed subd. w/ street system   |     |                          |  |
| Future probable street system of remaining portion of tract.   | N/A |                          |  |
| Opportunities for Connecting Road(s) (13.2D)   | N/A |                          |  |
| Space & setback of district  | YES | See General Notes C-4.0  |  |
| Classification of road   | YES | See Subdivision Plan     |  |
| Width of road(s)   | YES | See Plan & Profile Sheet |  |
| Drainage type (open, closed, mix)  | YES | See Plan & Profile Sheet |  |
| Type of byway provided (8.4D)  | N/A |                          |  |
|  |     |                          |  |
|  |     |                          |  |
|  |     |                          |  |
|  |     |                          |  |
| Names of adj. subdivisions   | N/A |                          |  |
| Names of owners of record of adjacent acreage  | YES |                          |  |
| Any zoning districts boundaries affecting subd.  | YES | See Subdivision Plan     |  |
| Location & size of existing or proposed sewers, water mains, culverts, hydrants and drains on property | YES | See Plan & Profile       |  |
| Connections w/existing sewer or water systems  | YES | See Plan & Profile       |  |
| Private water supply shown   | N/A |                          |  |
| Private septic shown   | N/A |                          |  |
| Hydro-geologic study   | N/A |                          |  |

|   |     |   |                  |
|---|-----|---|------------------|
| (option for Board)  |     |   |                  |
| Test pit locations  | N/A |   |                  |
| Well locations  | N/A |   |                  |
| Signature & lic. # of site evaluator  | N/A |   |                  |
| Existing streets: location, name(s), widths w/in and abutting   | YES | See Subdivision Plan                          |                  |
| Proposed streets: location, name(s), widths w/in and abutting   | YES | See Subdivision Plan                          |                  |
| The above for any highways, easements, bldg. lines, alleys, parks, other open spaces w/in and abutting                | N/A |   |                  |
| Grades & street profiles of all streets, sidewalks or other public ways proposed                                      | YES | See Plan & Profile Sheet                      |                  |
| 2' contour lines  | YES | See Plan & Profile Sheet                      |                  |
| High intensity soil survey by cert. soil scientist  | NO  |   | Waiver Requested |
| Soil boundaries & names superimposed on plot plan   | NO  |   | Waiver Requested |
| Deed reference & map of survey of tract boundary by reg. land surveyor tied to established reference points           | YES | See Titcomb Survey for Russell Property       |                  |
| Surface drainage or stormwater mgmt plan w/profiles & cross sections by a P.E. showing prelim. design and conveyances | NO  |   |                  |
| Proposed lot lines w/ dimensions and suggested bldg. locations.   | YES | See Plan & Profile Sheet                      |                  |
| Location of temp. markers in field  | NO  |   |                  |
| All parcels proposed to be dedicated to public use and conditions of such.  | NO  |   |                  |
| Location of all natural features or site elements to be preserved   | YES | See Subdivision Plan and Plan & Profile Sheet |                  |
| Street lighting details   | N/A |   |                  |
| Landscaping and grading plan including natural features to be preserved   | YES | See Subdivision Plan                          |                  |

|   |                       |                                  |                  |
|---|-----------------------|----------------------------------|------------------|
| Survey stamped by P.E.  | NO                    | To be Provided Prior to Approval |                  |
| Soil surveys w/# of soil scientist  | NO                    |                                  | Waiver Requested |
| Septic plan w/ # of prof. site evaluator  | N/A                   |                                  |                  |
| Geological evals w/ reg. geologists number  | N/A                   |                                  |                  |
| Architect's seal  |                       |                                  |                  |
| For Rt. One: 75' undisturbed buffer applicable to all buildings, structures, parking areas, drainage facilities and uses. | N/A                   |                                  |                  |
| Open Space?   | N/A                   |                                  |                  |
| Any part of parcel in a shoreland zone?   | N/A                   |                                  |                  |
| Flood Map Number and rating?  | N/A                   |                                  |                  |
| Stormwater Report?  | NO                    |                                  |                  |
| Rivers, ponds, wetlands?  | YES                   | See Plan & Profile Sheet         |                  |
| Historic, archeological features?   | NO                    | See Original Submission          |                  |
| Solid waste disposal?   | NO                    |                                  |                  |
|   |                       |                                  |                  |
| <b>Required Notes on Plan:</b>  |                       |                                  |                  |
| Fire Department notes   |                       |                                  |                  |
| Clearing limits note  | YES                   |                                  |                  |
| <i>Re: approval limit of 90 days before recording or null p. 10</i>   |                       |                                  |                  |
|   |                       |                                  |                  |
|   |                       |                                  |                  |
| <b>Final Plan Submissions:</b>  | <i>See Appendix D</i> |                                  |                  |
| Actual field survey of boundary lines w/ monumentation shown  | YES                   |                                  |                  |
| Assessor's approval of street names and assignment of lot numbers.  | NO                    | Pending                          |                  |
| Designation of all open spaces w/ notes on ownership  | N/A                   |                                  |                  |
| Copies of declarations, agreements or other documents showing the manner in which open space or easements are to          | N/A                   |                                  |                  |

|  |     |           |  |
|--|-----|-----------|--|
| be held and maintained.  |     |           |  |
| Written offer for any conveyance to the Town of open space or easements along with written evidence that the Council is willing to accept such offer |     |           |  |
|  |     |           |  |
| Evidence of Outside Agency Approvals   | YES | See Below |  |
|  |     |           |  |
|  |     |           |  |
|  |     |           |  |

*As per Section 7.2 - REVIEW AND APPROVAL BY OTHER AGENCIES:*

- A. Where review and approval of any subdivisions or site plan by any other governmental agency is required, such approval shall be submitted to the Planning Board in writing prior to the submission of the Final Plan.*

Please list below all outside agency approvals that are required for this subdivision.

**Maine Department of Environmental Protection:** *List type of permit(s) required (e.g., SLODA, NRPA (tier type?), Maine Construction General Permit, etc.)*

Amendment of MeDEP SLDA/NRPA Permit Orders L-25376-L3-A-N, L-25376-TE-B-N and L-25376-L6-C-N

**US Army Corps of Engineers:**

General Permit NAE-2011-01168

**Maine Department of Transportation:** *List type of permit(s) required.*

Driveway/Entrance Permit #11592

**Maine Department of Inland Fisheries and Wildlife:**

Part of the MeDEP SLDA Permit

**Other:** (List)

## **AMENDED CONTRACT ZONING AGREEMENT**

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**AMENDED AND RESTATED**  
**CONTRACT ZONING AGREEMENT**  
**BY AND BETWEEN THE TOWN OF CUMBERLAND**  
**AND**  
**VILLAGE GREEN CUMBERLAND, LLC**

**RELATING TO PHASE 1 and PHASE 4 OF THE**  
**VILLAGE GREEN REVITALIZATION MASTER PLAN**

This Amended and Restated Contract Zoning Agreement is entered into this 22<sup>nd</sup> day of March, 2017 by and between the **Town of Cumberland**, a Municipal Corporation (the “**Town**”), and **Village Green Cumberland, LLC**, a Maine Limited Liability Company with a business address of PO Box 3572, Portland, ME 04104-3571, its nominee or assigns (the “**Developer**”), pursuant to the Conditional and Contract rezoning provisions set forth in 30-A M.R.S.A. Section 4352 (the “**Act**”) and Section 315-79 of the Cumberland Code, as amended (the “**Code**”).

WHEREAS, the Town and Developer entered into a Contract Zoning Agreement dated April 11, 2011, which is recorded at the Cumberland County Registry of Deeds in Book 28735, Page 158 (the “**Original Agreement**”); and

WHEREAS, the Town conveyed to the Developer the property subject to the Original Agreement, a 40.7 +/- acre parcel of unimproved real estate located between Drowne Road and Wyman Way, identified on the Town of Cumberland Tax Assessor map as Map U10, Lot 7B (the “**Original Property**”), by virtue of a Deed dated January 18, 2012, recorded in the Cumberland County Registry of Deeds in Book 29285, Page 284; and

WHEREAS, the Developer has begun developing the Original Property into a 59 lot residential subdivision, subject to the terms and conditions set forth in the Original Agreement and a subdivision plan as approved by the Cumberland Planning Board on January 17, 2012, recorded in the Cumberland County Registry of Deeds in Plan Book 212, Page 18; and

WHEREAS, the Developer intends to expand the residential subdivision of the Original Property, subject to the terms and conditions set forth herein, to include additional residential lots on a 5.66 +/- parcel of real estate adjoining the Original Property, identified on the Town of Cumberland Tax Assessor map as Map U10, Lot 1B (the “**Phase 4 Property**”), which property is currently owned by George and Constance Russell by virtue of a Deed dated August 20, 2001, recorded in the Cumberland County Registry of Deeds in Book 16675, Page 235; and

WHEREAS, the Town and the Developer desire to amend and restate the Original Agreement in its entirety;

NOW THEREFORE, the Original Agreement is hereby amended and restated in its entirety, as follows, it being understood that this Amended and Restated Contract Zoning

Agreement supersedes and replaces the Original Agreement, which shall be of no further force and effect:

WHEREAS, the property subject to this Amended and Restated Contract Zoning Agreement consists of two separate parcels, the Original Property, a 40.7 +/- acre parcel of real estate located between Drowne Road and Wyman Way, identified on the Town's Tax Assessor map as MAP U10, Lot 7B, and the Phase 4 Property, a 5.66 +/- acre parcel of real estate located adjacent to the northern boundary of the Original Property, identified on the Town's Tax Assessor map as Map U10, Lot 1B, both properties consisting of 46.36 +/- acres total as more particularly shown on Exhibit A attached hereto (together hereinafter referred to as the "**Property**"); and

WHEREAS, the Original Property is located in the Village Mixed-Use Zone (VMUZ) District (the "**V-MUZ District**") located in Section 315-18 of the Cumberland Code; and

WHEREAS, the Phase 4 Property is located in the Rural Residential 1 (RR1) Zoning District (the "**RR1 Zoning District**") located in Section 315-6 of the Cumberland Code; and

WHEREAS, the Town desires to sell the property to generate tax revenue and stimulate further economic development in the town center as recommended by the 2009 Comprehensive Plan.

WHEREAS, the Developer has submitted an application for subdivision approval to the Cumberland Planning Board, in accordance with the subdivision plan attached hereto as Exhibit E; and

WHEREAS, in order for the Project to be financially feasible for the construction and sale of residential dwelling units while meeting all applicable codes, certain Amendments with respect to dimensional, design and certain other performance standards of the Cumberland Zoning Ordinance are required; and

WHEREAS, on May 23, 2016, the Cumberland Town Council approved the execution of this Amended and Restated Contract Zoning Agreement, subject to later compliance with the Subdivision and Site Plan Standards as set forth in Chapter 250 and Chapter 229, respectively, of the Cumberland Code, provided such provisions are not in conflict with the Act;

NOW THEREFORE, pursuant to the provisions of 30-A.M.R.S.A. § 4352(8) and Section 315-79 of the Code, as amended, the Cumberland Town Council hereby finds that this Amended and Restated Contract Zoning Agreement:

- A) is consistent with the Comprehensive Plan duly adopted by the Town of Cumberland on November 9, 2009; and
- B) establishes a contract zone area consistent with the existing and permitted uses in the original zone of the area involved; and



- C) only includes conditions and restrictions which relate to the physical development and future operation of the proposed development; and
- D) imposes those conditions and restrictions which are necessary and appropriate for the protection of the public health, safety and general welfare of the Town.

In furtherance of these common goals, the parties agree as follows:

I. **Establishment of the Contract Zone:**

The Town hereby agrees that the Property as described herein shall be a contract zone (the “**Contract Zone**”) pursuant to the provisions of 30-A.M.R.S.A. § 4352(8) and Section 315-79 of the Cumberland Code. This Agreement shall create an overlay zone. Except as expressly modified or otherwise stated herein, the Property shall be subject to the requirements of the V-MUZ District, as the same may be amended from time to time, together with all applicable lot requirements and general requirements, not modified herein.

II. **Permitted Uses Within the Contract Zone:**

The development permitted within the Contract Zone established herein shall be as follows:

A. All uses currently authorized either as permitted uses or special exceptions in the V-MUZ District, or as specifically authorized herein.

B. Up to four additional residential dwelling units may be constructed on the Phase 4 Property, not including the existing residential dwelling unit that currently exists on the Phase 4 Property and is currently occupied by the property owners George and Constance Russell.

III. **Restrictions and Certain Design Standards Within the Contract Zone:**

All restrictions as currently set forth in Section 315-79 of the Cumberland Code, except as modified herein and as appears on Exhibit C, attached hereto and made a part hereof.

IV. **Performance Standards Within the Contract Zone:**

The following performance standards shall apply to the Contract Zone (Phase 1 and Phase 4 of the VGRMP) as follows:

- A. The Recreation Facilities and Open Space Impact Fee Ordinance of the Town of Cumberland shall be waived in accordance with Article Section 137-10, Waiver of Impact Fee subject to the following provisions:
  - 137-6 Payment of Fees shall be modified as follows: the Developer shall submit to the Town a list of specific public

improvements with corresponding values for said improvements to be provided by each Phase of the approved Village Green Revitalization Master Plan (VGRMP). The public improvements shall include construction of a roadway from the existing terminus of Wyman Way, crossing the Property and connecting with Drowne Road. All public improvements provided in lieu of the impact fee for each Phase of the approved VGRMP shall be completed prior to the final release of bonds or letter of credit(s) required to secure all public improvements for each Development Phase. Performance guarantees, including Letters of Credit and bonds, shall include the value of the in lieu payments attributed to Public Improvements, even where the Public Improvements are to be located upon future Phases which may or may not be constructed.

- The public improvements provided for each Phase of the approved VGRMP will, at a minimum, equal the value of the impact fee(s) otherwise due as provided in 137-11 Calculation of Fee.
- All public improvements to be located within the adjacent “Civic Lot” (Map U10-A, Lot 13) provided by the Developer as part of this Agreement shall be in accordance with a Site Plan approved in advance by the Town.
- Certain areas within the parcel purchased from the Town (Map U10, Lot 7B) by the Developer shall be subject to an easement which allows for public use and recreation (see Exhibit D Plan of Open Space/Recreational Easements). The value of these easements for the purposes of 137-11 Calculation of Fees (Land for Public Use) shall be based on the total purchase price paid for said parcel, divided by the total acreage of the parcel multiplied by the acreage finally included within the easement area(s). Provided, however, that the Developer shall not be credited for any easements or improvements that are required by law or ordinance of residential subdivisions approved by the Town. The financial guarantees, including Letters of Credit, posted by the Developer to assure the construction of qualifying public improvements in phases future to Phase 1, may be required to be maintained in applicable portion by the Town until the Town and Developer have mutually determined an agreed plan for the future phases.

- B. The Town of Cumberland’s Growth Management Ordinance is hereby amended to include the following additional exemption within Section 118-6 of this ordinance:

**118-6(E)** Lots included within the Phase 1 and Phase 4 subdivision of the approved Village Green Revitalization Plan.

- C. The improvements to be constructed within Phase 1 and Phase 4 of the development shall be constructed in a manner to take advantage of emerging energy conservation techniques and technologies, consistent with the standards set forth in Exhibit F hereto.

Subject to the terms herein, the Cumberland Planning Board shall have review authority under the applicable provisions of the Cumberland Subdivision, Site Plan and Zoning Ordinances to impose conditions of approval pursuant to said Ordinances relating to the development and construction.

V. **Miscellaneous Provisions:**

- A. **Survival Clause:** The terms and conditions of this Agreement shall run with the land and be binding upon and shall inure to the benefit of the respective successors, heirs and assigns of the parties hereto except as specifically set forth herein. This Agreement shall not be assignable without the prior approval of the Cumberland Town Council, provided, however, that the Developer may assign this Agreement without such approval to a corporate entity or limited liability company solely owned and organized by the Developer for the purpose of developing the Project. A true copy of this Agreement shall be recorded in the Cumberland County Registry of Deeds.

VI. **Further Assurances:** In order to effectively and properly implement this Agreement, the parties agree to negotiate in good faith the terms and conditions of such further instruments and agreements as may be reasonably necessary from time to time to give effect to this Agreement.

VII. **Maine Agreement:** This contract is a Maine Agreement, entered into in the State of Maine and shall be governed by and enforced in accordance with the laws of the State of Maine.

VIII. **Binding Covenants:** The above stated restrictions, provisions, and conditions are an essential part of this contract and shall run with the subject premises, shall bind the interest therein, and any party in possession or occupancy of said property or any part thereof, and shall inure to the benefit of and be enforceable by the Town, by and through its duly authorized representatives. This Agreement may not be amended except by mutual written agreement by the parties.

IX. **Severability:** In the event any one or more clauses of this Agreement shall be held to be void or unenforceable for any reason by any court of competent jurisdiction, such clause or clauses shall be deemed to be severable and of no force or effect in such jurisdiction, and the remainder of this Agreement shall be deemed to be valid and in full force and effect, and

the terms of this Agreement shall be equitably adjusted if possible so as to compensate the appropriate party for any consideration lost because of the elimination of such clause or clauses.

X. **Enforcement:** The Town shall also have the ability to enforce any breach of this Agreement or any other violation of the Zoning Ordinance through the provisions of 30-A M.R.S.A § 4452.

IN WITNESS WHEREOF, the parties have hereunto caused this Agreement to be executed as of the day and year first above written.

WITNESS:

Town of Cumberland

Eliza A. Pouth

By:

William R. Shane  
William R. Shane  
Its Town Manager

WITNESS:

Village Green Cumberland, LLC

\_\_\_\_\_

By:

David H. Bateman  
David H. Bateman  
Its Manager

State of Maine

County of Cumberland, ss.

March 22, 2017

Personally appeared the above-named William R. Shane, Town Manager of the Town of Cumberland and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of the Town of Cumberland and subscribed and swore to the same.

SEAL

TAMARA P. O'DONNELL  
Notary Public, Maine  
My Commission Expires  
November 14, 2021

Tamara P. O'Donnell  
Notary Public/Attorney-at-Law  
Print Name: Tamara P. O'Donnell

State of Maine

County of Cumberland, ss.

\_\_\_\_\_, 2017

Personally appeared the above-named David H. Bateman, Manager of Village Green Cumberland, LLC and acknowledged the foregoing to be his free act and deed in his said capacity, and the free act and deed of Village Green Cumberland, LLC.

\_\_\_\_\_  
Notary Public/Attorney-at-Law  
Print Name: \_\_\_\_\_

IN WITNESS WHEREOF, the parties have hereunto caused this Agreement to be executed as of the day and year first above written.

WITNESS:

Town of Cumberland

\_\_\_\_\_

By:

\_\_\_\_\_  
William R. Shane  
Its Town Manager

WITNESS:

Village Green Cumberland, LLC

\_\_\_\_\_

By:

\_\_\_\_\_  
~~David H. Bateman~~ *Nathan H. Bateman*  
Its Manager

State of Maine

County of Cumberland, ss.

\_\_\_\_\_, 2017

Personally appeared the above-named William R. Shane, Town Manager of the Town of Cumberland and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of the Town of Cumberland and subscribed and swore to the same.

\_\_\_\_\_  
*Elura R. Webber*  
Notary Public/Attorney-at-Law  
Print Name: *Elura Webber*

State of Maine

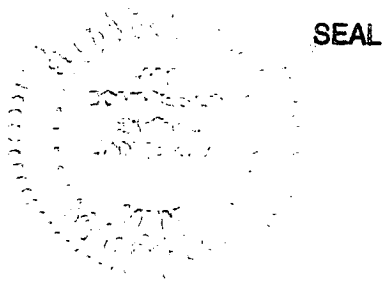
County of Cumberland, ss.

*March 23*, 2017

Personally appeared the above-named <sup>*Nathan*</sup> ~~David H. Bateman~~, Manager of Village Green Cumberland, LLC and acknowledged the foregoing to be his free act and deed in his said capacity, and the free act and deed of Village Green Cumberland, LLC.

**ELURA R. WEBBER**  
NOTARY PUBLIC  
State of Maine  
My Commission Expires  
January 18, 2024

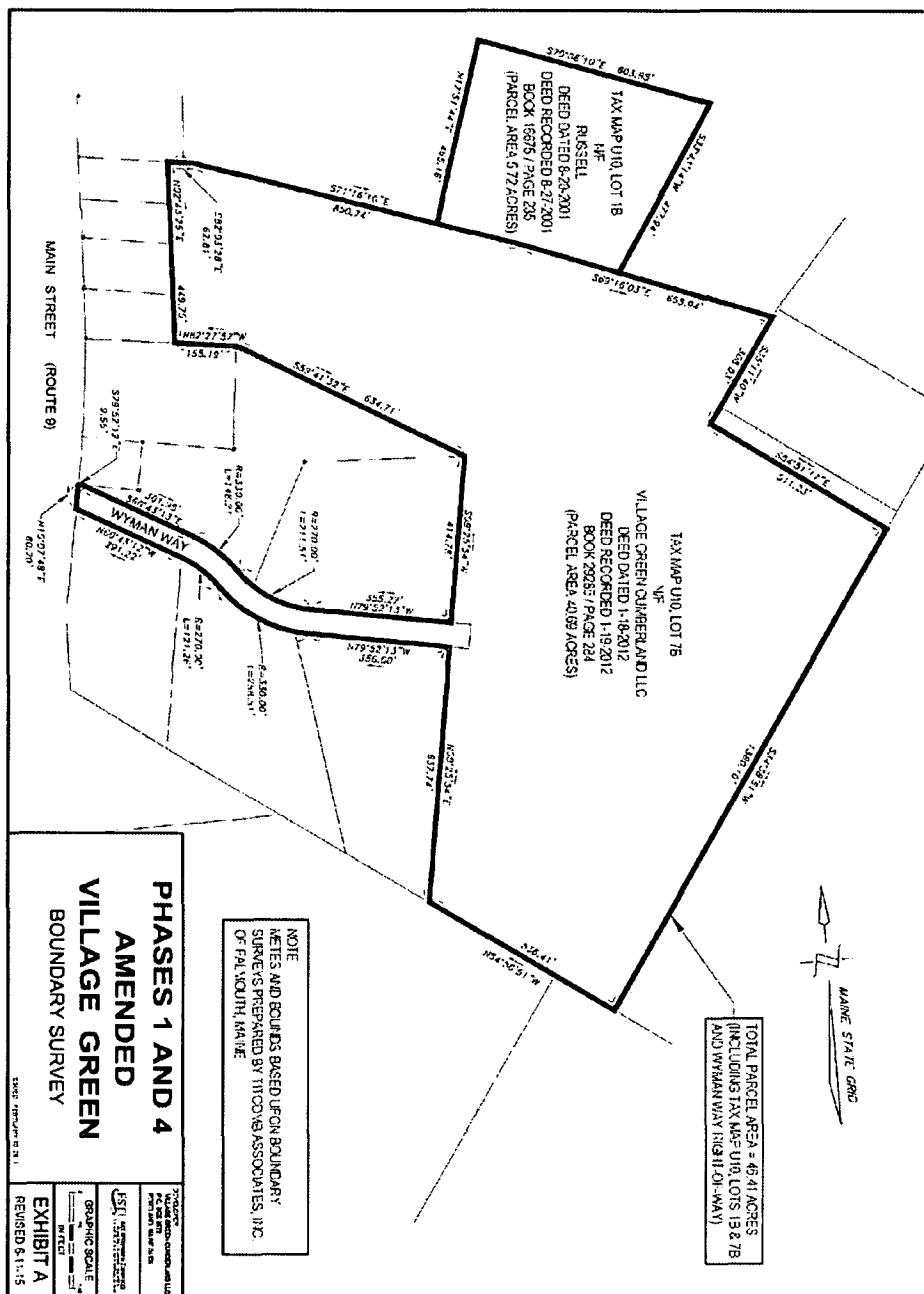
\_\_\_\_\_  
*Elura R. Webber*  
Notary Public/Attorney-at-Law  
Print Name: *Elura Webber*



**EXHIBITS**

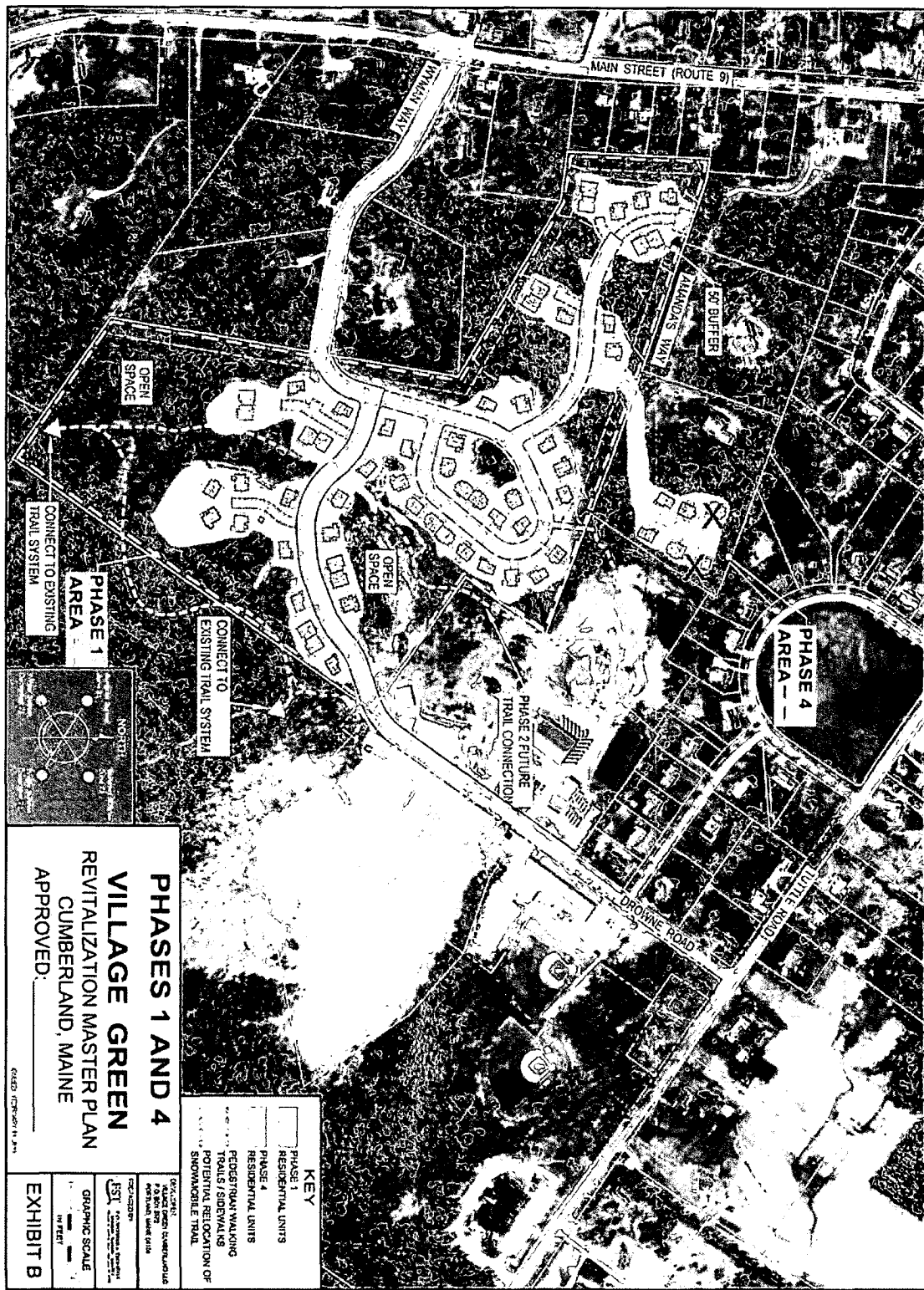
|                           |  |
|---------------------------|--|
| <b><u>Exhibit A</u></b>   | Survey of the Property   |
| <b><u>Exhibit B</u></b>   | Approved Village Green Revitalization Master Plan (VGRMP)<br>Phase 1 and Phase 4 |
| <b><u>Exhibit C</u></b>   | Summary of Zoning Amendments   |
| <b><u>Exhibit D</u></b>   | Plan of Open Space/Recreational Easement(s)                                      |
| <b><u>Exhibit E</u></b>   | Proposed Subdivision Plan  |
| <b><u>Exhibit F</u></b>   | Energy Conservation Standards  |
| <b><u>Exhibit F-1</u></b> | Street Lighting  |

**EXHIBIT A**





# EXHIBIT B



**EXHIBIT C**  
Summary of Zoning Amendments

A) The following minimum lot frontages shall be required on a Private Drive within the Contract Zone (Phase I and Phase 4 of the Village Green Revitalization Master Plan, VGRMP) as follows:

| Use  | Min. Lot Frontage |
|--|-------------------|
| Detached Single Family Residential Structure | 15'               |
| Attached Single Family Residential Structure | 15'               |
| Duplex Residential Structure                 | 50'               |

Maximum Number of Residential Units Accessed from Private Drive = 6

B) The following minimum setbacks within the V-MUZ District shall be modified for all structures within the Contract Zone (Phase I and Phase 4 of the VGRMP) as follows:

| Structure Type  | Front | Side   |
|---|-------|--------|
| Detached Single Family Residential Structure and Garage                 | 15' * |        |
| Attached Single Family Residential Structure and Garage                 | 15' * | 10' ** |
| Duplex Residential Structure and Garage                                 | 15' * |        |
| Driveways   | 0'    | 8' **  |
| Note: See additional buffer and setback requirements in Section F below |       |        |

\* Setback between face of garage and sidewalk shall be minimum distance of 20'

\*\* Side setback reduced to 0' along common sideline between attached residential structures and garages

C) All public roads within the Contract Zone (Phase I and Phase 4 of the VGRMP), including the full extent of Wyman Way connecting to Main Street, shall be designed in accordance with the residential sub-collector roadway standards as contained in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code, as modified by Section 315-18, the V-MUZ District, of the Cumberland Code, and as further modified below:

| Standard  | Public Road        |
|---|--------------------|
| Grass Esplanade   | 6' *<br>(one side) |
| Paved Sidewalk  | 6'<br>(one side)   |
| Min. Tangent Length Between Curves of Reverse Alignment | 0'                 |
| Min. Distance Between Street Intersections on Same Side | 100'               |
| Min. Distance Between Street Intersections on           | 200'               |

|   |                           |
|---|---------------------------|
| Opposite Side                             |                           |
| Min. Pavement Radii at Intersections      | 25'                       |
| Min. K Factor, Crest Vertical Curve       | 15                        |
| Min. K Factor, Sag Vertical Curve         | 20                        |
| MPH Design Speed                          | 25                        |
| Min. Property Line Radius at Intersection | 15'                       |
| Dead End Turn Around                      | Cul-de-Sac<br>Per 8.2.D.3 |
| Right-of-Way Width                        | 50'                       |
| Minimum Centerline Radius                 | 100'                      |
| Minimum Angle of Street Intersection      | 71 degrees                |
| Minimum Pavement Radii at Intersection    | 25'                       |
| Aggregate Subbase Course: Sand            | 0"                        |

\* Reduce esplanade width to 0' along portion of Wyman Way extending between Parcel 1 (Tax Map U10, Lot 7B) – Former Doane Parcel and Main Street (Route 9).

D) All private roads within the Contract Zone (Phase 1 and Phase 4 of the VGRMP) shall be designed in accordance with the private roadway standards as contained in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code, as modified by Section 315-18, the V-MUZ District, of the Cumberland Code, and as further modified below:

| Standard  | Private Road                  |
|---|-------------------------------|
| Grass Esplanade   | 4'<br>(one side)              |
| Paved Sidewalk  | 5'<br>(one side)              |
| Min. Tangent Length Between Curves of Reverse Alignment | 0'                            |
| Min. Distance Between Street Intersections on Same Side | 100'                          |
| Dead End Turn Around                                    | Tee Turn Around<br>25' Length |

E) The following roadway standards shall apply to private drives within the Contract Zone (Phase 1 and Phase 4 of the VGRMP):

| Standard  | Private Drive |
|---|---------------|
| Right-of-Way Width                                | 30'           |
| Roadway Pavement Width                            | 18'           |
| Grass Esplanade                                   | N/A           |
| Paved Sidewalk                                    | N/A           |
| Max. Dead End Road Length                         | 675'          |
| Min. Roadway Centerline Grade<br>(1.0% preferred) | 1.0%          |
| Max. Roadway Centerline Grade                     | 10%           |
| Min. Centerline Radius<br>(100' Preferred)        | 100'          |

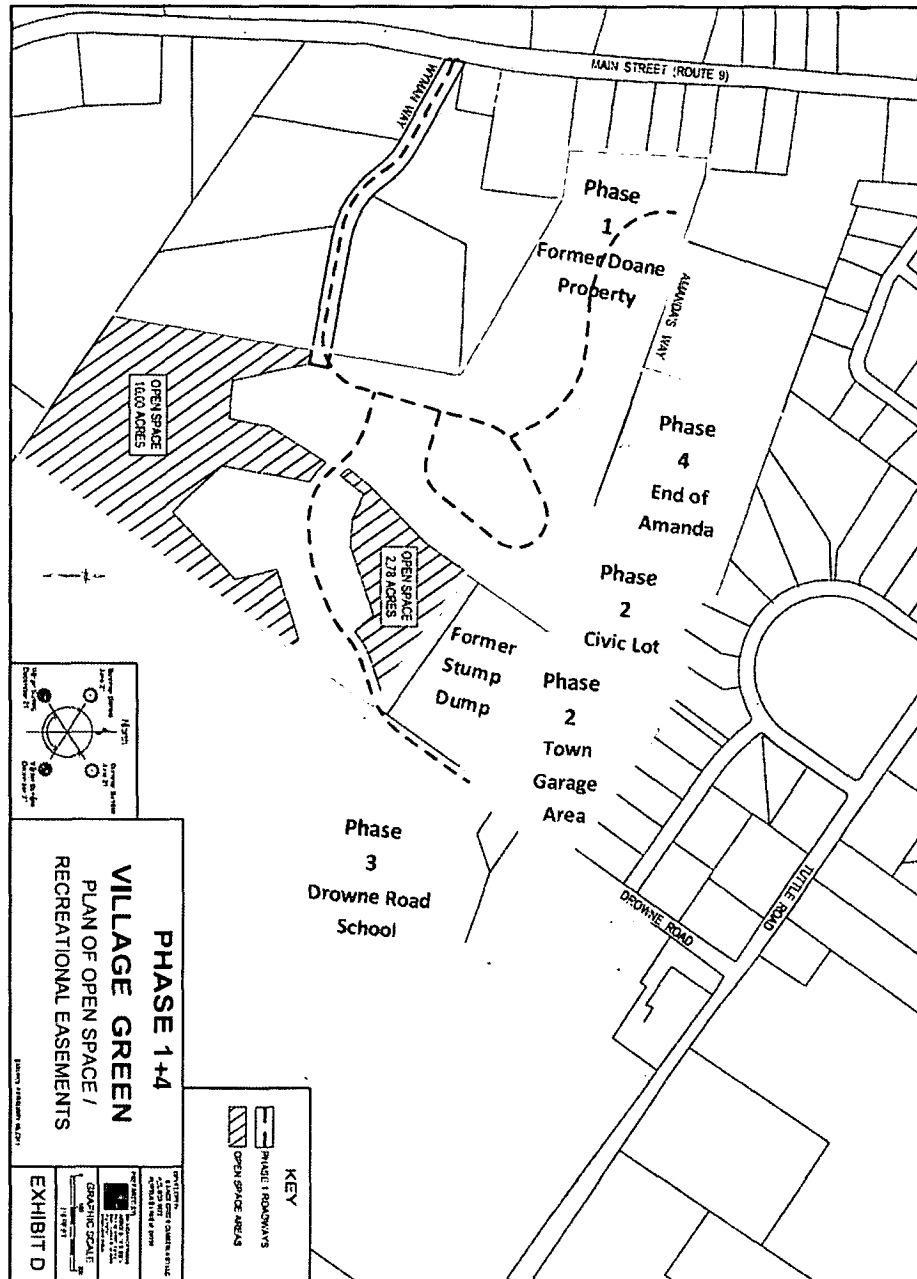
|   |             |
|---|-------------|
| Min. Tangent Length Between Curves of Reverse Alignment     | 0'          |
| Min. Angle of Street Intersections (90° Preferred)          | 75°         |
| Min. Distance Between Street Intersections on Same Side     | 100'        |
| Min. Distance Between Street Intersections on Opposite Side | 100'        |
| Min. Pavement Radii at Intersections                        | 10'         |
| Min. Pavement Crown   | ¼" per foot |
| Min. Slope of Gravel Shoulder                               | ½" per foot |
| Min. K Factor, Crest Vertical Curve                         | 15          |
| Min. K Factor, Sag Vertical Curve                           | 20          |
| MPH Design Speed  | 25          |
| Max. Grade within 75' of Intersection                       | 3%          |
| Min. Property Line Radius at Intersection                   | 0'          |
| Dead End Turn Around  | N/A         |

F) The following design standards shall apply to the Contract Zone (Phase I and Phase 4 of the VGRMP) as follows:

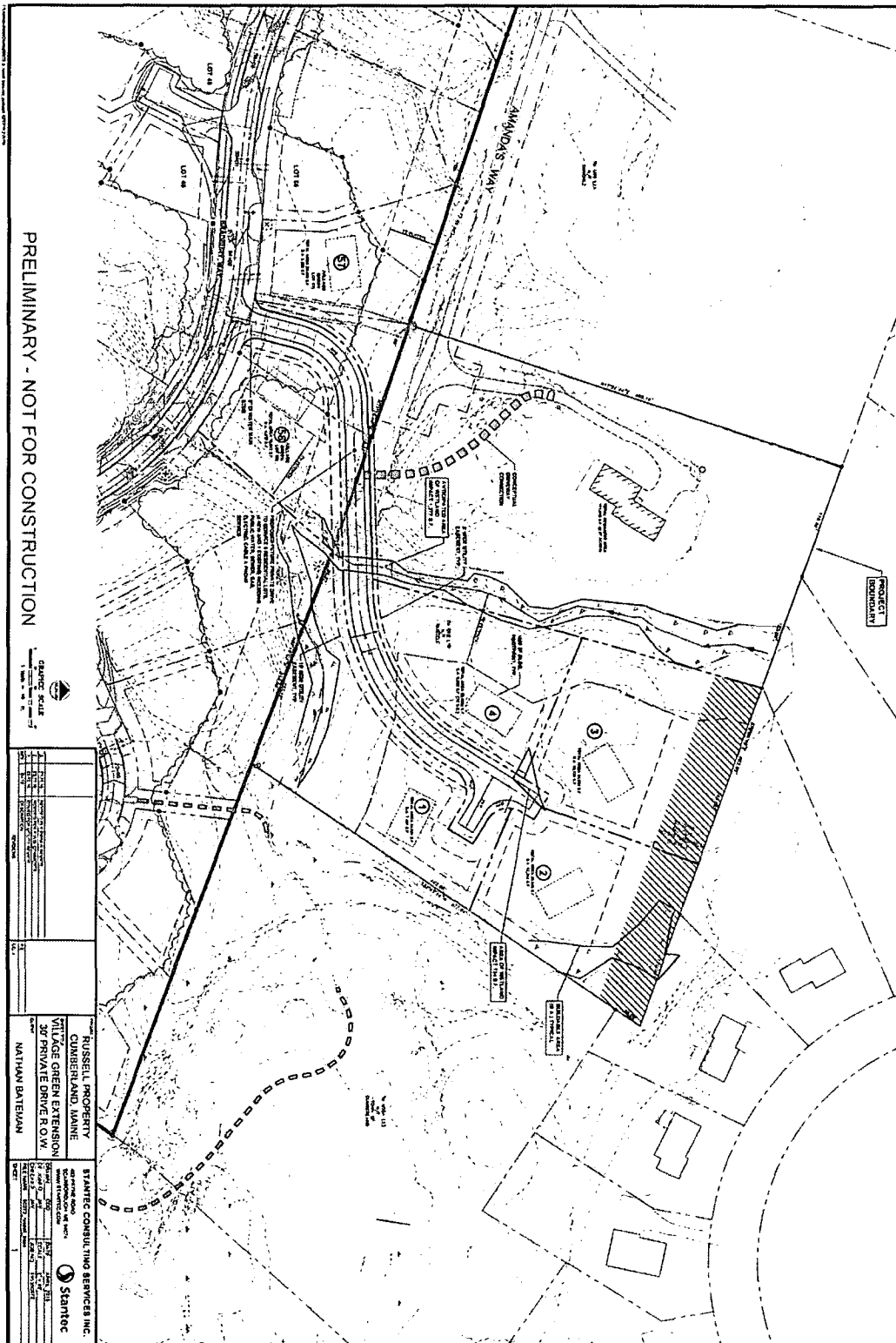
1. The portion of public roadway along the existing Wyman Way right-of-way shall conform to the existing right-of-way dimensions and geometry, which shall include the ability of the roadway not to be centered within the existing right-of-way.
2. The drainage system for public and private roadways shall consist of closed drainage to the extent practicable; however, shallow under-drained swales may be used alongside roadways where no sidewalk is proposed. Where sidewalks are proposed, they shall be constructed with curb and access to the closed drain system through catch basin inlets, for example.
3. Parking and garage doors facing towards the public right-of-way are permissible provided the garages are architecturally designed to not be the principal element of the structure. Parking and garage doors facing towards private roads and private drives are permissible.
4. No minimum wooded buffer strip is required to be maintained along existing public streets as referenced in Section 7.9 of the Subdivision Ordinance.
5. Curbing at roadways to be either bituminous or slip form concrete.
6. A minimum 50' buffer shall be maintained along the exterior of the VGRMP parcel (excluding Wyman Way right-of-way and the Phase 4 Property) and abutting residential development. The 50' buffer shall not be required to adjacent land owned by the Town.

7. For the residential lots proposed to be built on the Phase 4 Property (Lots 2, 3, 4 and 5 as shown on Exhibit E) the following buffers shall be maintained:
  - a. A 75 foot wide buffer between the project boundary line that abuts the Cumberland Common residential lots and the proposed new residential Lots 3 and 4 as shown on Exhibit E. Of the 75 foot wide buffer, 50 feet shall remain natural and undisturbed, and 25 feet shall be vegetated.
  - b. A 40 foot wide setback along the boundary line of the Phase 4 Property that abuts the Town Civic Lot, behind proposed residential Lots 2 and 3, as shown on Exhibit E.
8. Upon completion of construction providing access to Phase 4 via Bradbury Way as shown on Exhibit E, no access to the VGRMP Property, including, but not limited to, the Phase 1 and Phase 4 Property, shall be permitted from Amanda's Way. Current access from Amanda's Way shall be discontinued and landscaping shall be installed along the Phase 4 property boundary to prevent future access to and from Amanda's Way. The Developer shall add proposed landscaping features to the subdivision plan and submit to the Planning Board for review and approval.

**EXHIBIT D**



**EXHIBIT E**



**EXHIBIT F****CHAPTER 4****RESIDENTIAL ENERGY EFFICIENCY****SECTION 401  
GENERAL**

**401.1 Scope.** This chapter applies to residential buildings.

**401.2 Compliance.** Projects shall comply with Sections 401, 402.4, 402.5, and 403.1, 403.2.2, 403.2.3, and 403.3 through 403.9 (referred to as the mandatory provisions) and either:

1. Sections 402.1 through 402.3, 403.2.1 and 404.1 (prescriptive); or
2. Section 405 (performance).

**401.3 Certificate.** A permanent certificate shall be posted on or in the electrical distribution panel. The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant *R*-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies

of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

**SECTION 402  
BUILDING THERMAL ENVELOPE****402.1 General (Prescriptive).**

**402.1.1 Insulation and fenestration criteria.** The building thermal envelope shall meet the requirements of Table 402.1.1 based on the climate zone specified in Chapter 3.

**402.1.2 *R*-value computation.** Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component *R*-value. The manufacturer's settled *R*-value shall be used for blown insulation. Computed *R*-values shall not include an *R*-value for other building materials or air films.

**TABLE 402.1.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT\***

| CLIMATE ZONE    | FENESTRATION U-FACTOR <sup>b</sup> | SKYLIGHT <sup>b</sup> U-FACTOR | GLAZED FENESTRATION SHGC <sup>a,c</sup> | CEILING R-VALUE | WOOD FRAME WALL R-VALUE | MASS WALL R-VALUE <sup>d</sup> | FLOOR R-VALUE   | BASEMENT <sup>e</sup> WALL R-VALUE | SLAB <sup>f</sup> R-VALUE & DEPTH | CRAWL SPACE <sup>g</sup> WALL R-VALUE |
|-----------------|------------------------------------|--------------------------------|---|-----------------|-------------------------|--------------------------------|-----------------|------------------------------------|-----------------------------------|---------------------------------------|
| 1               | 1.2                                | 0.75                           | 0.30                                    | 30              | 13                      | 3/4                            | 13              | 0                                  | 0                                 | 0                                     |
| 2               | 0.65 <sup>i</sup>                  | 0.75                           | 0.30                                    | 30              | 13                      | 4/6                            | 13              | 0                                  | 0                                 | 0                                     |
| 3               | 0.50 <sup>j</sup>                  | 0.65                           | 0.30                                    | 30              | 13                      | 5/8                            | 19              | 5/13 <sup>k</sup>                  | 0                                 | 5/13                                  |
| 4 except Marine | 0.35                               | 0.60                           | NR                                      | 38              | 13                      | 5/10                           | 19              | 10/13                              | 10, 2 ft                          | 10/13                                 |
| 5 and Marine 4  | 0.35                               | 0.60                           | NR                                      | 38              | 20 or 13+5 <sup>h</sup> | 13/17                          | 30 <sup>l</sup> | 10/13                              | 10, 2 ft                          | 10/13                                 |
| 6               | 0.35                               | 0.60                           | NR                                      | 49              | 20 or 13+5 <sup>h</sup> | 15/19                          | 30 <sup>l</sup> | 15/19                              | 10, 4 ft                          | 10/13                                 |
| 7 and 8         | 0.35                               | 0.60                           | NR                                      | 49              | 21                      | 19/21                          | 38 <sup>m</sup> | 15/19                              | 10, 4 ft                          | 10/13                                 |

For SI: 1 foot = 304.8 mm.

- R*-values are minimums. *U*-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 × 6 framing cavity such that the *R*-value is reduced by R-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.
- The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- There are no SHGC requirements in the Marine Zone.
- Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- The second *R*-value applies when more than half the insulation is on the interior of the mass wall.
- For impact rated fenestration complying with Section R301.2.1.2 of the *International Residential Code* or Section 1608.1.2 of the *International Building Code*, the maximum *U*-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.



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TABLE 402.1.3  
EQUIVALENT U-FACTORS<sup>a</sup>

| CLIMATE ZONE    | FENESTRATION U-FACTOR | SKYLIGHT U-FACTOR | CEILING U-FACTOR | FRAME WALL U-FACTOR | MASS WALL U-FACTOR <sup>b</sup> | FLOOR U-FACTOR | BASEMENT WALL U-FACTOR | CRAWL SPACE WALL U-FACTOR <sup>c</sup> |
|-----------------|-----------------------|-------------------|------------------|---------------------|---------------------------------|----------------|------------------------|--|
| 1               | 1.20                  | 0.75              | 0.035            | 0.082               | 0.197                           | 0.064          | 0.360                  | 0.477                                  |
| 2               | 0.65                  | 0.75              | 0.035            | 0.082               | 0.165                           | 0.064          | 0.360                  | 0.477                                  |
| 3               | 0.50                  | 0.65              | 0.035            | 0.082               | 0.141                           | 0.047          | 0.091 <sup>c</sup>     | 0.136                                  |
| 4 except Marine | 0.35                  | 0.60              | 0.030            | 0.082               | 0.141                           | 0.047          | 0.059                  | 0.065                                  |
| 5 and Marine 4  | 0.35                  | 0.60              | 0.030            | 0.057               | 0.082                           | 0.033          | 0.059                  | 0.065                                  |
| 6               | 0.35                  | 0.60              | 0.026            | 0.057               | 0.060                           | 0.033          | 0.050                  | 0.065                                  |
| 7 and 8         | 0.35                  | 0.60              | 0.026            | 0.057               | 0.057                           | 0.028          | 0.050                  | 0.065                                  |

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall U-factor in Marine Zone 4 and Zones 5 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.1.

**402.1.3 U-factor alternative.** An assembly with a U-factor equal to or less than that specified in Table 402.1.3 shall be permitted as an alternative to the R-value in Table 402.1.1.

**402.1.4 Total UA alternative.** If the total building thermal envelope UA (sum of U-factor times assembly area) is less than or equal to the total UA resulting from using the U-factors in Table 402.1.3 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table 402.1.1. The UA calculation shall be done using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

#### 402.2 Specific insulation requirements (Prescriptive).

**402.2.1 Ceilings with attic spaces.** When Section 402.1.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly, R-38 shall be deemed to satisfy the requirement for R-49 wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.2.2 Ceilings without attic spaces.** Where Section 402.1.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction of insulation from the requirements of Sec-

tion 402.1.1 shall be limited to 500 square feet (46 m<sup>2</sup>) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.2.3 Access hatches and doors.** Access doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment that prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened, and to provide a permanent means of maintaining the installed R-value of the loose fill insulation.

**402.2.4 Mass walls.** Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs.

**402.2.5 Steel-frame ceilings, walls, and floors.** Steel-frame ceilings, walls and floors shall meet the insulation requirements of Table 402.2.5 or shall meet the U-factor requirements in Table 402.1.3. The calculation of the U-factor for a steel-frame envelope assembly shall use a series-parallel path calculation method.

**Exception:** In Climate Zones 1 and 2, the continuous insulation requirements in Table 402.2.5 shall be permitted to be reduced to R-3 for steel frame wall assemblies with studs spaced at 24 inches (610 mm) on center.

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TABLE 402.2.5  
STEEL-FRAME CEILING, WALL AND FLOOR INSULATION  
(R-VALUE)

| WOOD FRAME<br>R-VALUE<br>REQUIREMENT    | COLD-FORMED STEEL<br>EQUIVALENT R-VALUE <sup>a</sup>   |
|---|--|
| <b>Steel Truss Ceilings<sup>b</sup></b> |  |
| R-30                                    | R-38 or R-30 + 3 or R-26 + 5                           |
| R-38                                    | R-49 or R-38 + 3                                       |
| R-49                                    | R-38 + 5   |
| <b>Steel Joist Ceilings<sup>b</sup></b> |  |
| R-30                                    | R-38 in 2 x 4 or 2 x 6 or 2 x 8<br>R-49 in any framing |
| R-38                                    | R-49 in 2 x 4 or 2 x 6 or 2 x 8 or 2 x 10              |
| <b>Steel-Framed Wall</b>                |  |
| R-13                                    | R-13 + 5 or R-15 + 4 or R-21 + 3 or R-0 + 10           |
| R-19                                    | R-13 + 9 or R-19 + 8 or R-25 + 7                       |
| R-21                                    | R-13 + 10 or R-19 + 9 or R-25 + 8                      |
| <b>Steel Joist Floor</b>                |  |
| R-13                                    | R-19 in 2 x 6<br>R-19 + 6 in 2 x 8 or 2 x 10           |
| R-19                                    | R-19 + 6 in 2 x 6<br>R-19 + 12 in 2 x 8 or 2 x 10      |

a. Cavity insulation R-value is listed first, followed by continuous insulation R-value.

b. Insulation exceeding the height of the framing shall cover the framing.

**402.2.6 Floors.** Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

**402.2.7 Basement walls.** Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections 402.1.1 and 402.2.6.

**402.2.8 Slab-on-grade floors.** Slab-on-grade floors with a floor surface less than 12 inches (305 mm) below grade shall be insulated in accordance with Table 402.1.1. The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table 402.1.1 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the exterior wall. Slab-edge insulation is not required in jurisdictions designated by the code official as having a very heavy termite infestation.

**402.2.9 Crawl space walls.** As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizon-

tally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *International Building Code*. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

**402.2.10 Masonry veneer.** Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

**402.2.11 Thermally isolated sunroom insulation.** The minimum ceiling insulation R-values shall be R-19 in Zones 1 through 4 and R-24 in Zones 5 through 8. The minimum wall R-value shall be R-13 in all zones. New wall(s) separating a sunroom from conditioned space shall meet the building thermal envelope requirements.

#### 402.3 Fenestration. (Prescriptive).

**402.3.1 U-factor.** An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements.

**402.3.2 Glazed fenestration SHGC.** An area-weighted average of fenestration products more than 50 percent glazed shall be permitted to satisfy the SHGC requirements.

**402.3.3 Glazed fenestration exemption.** Up to 15 square feet (1.4 m<sup>2</sup>) of glazed fenestration per dwelling unit shall be permitted to be exempt from U-factor and SHGC requirements in Section 402.1.1. This exemption shall not apply to the U-factor alternative approach in Section 402.1.3 and the Total UA alternative in Section 402.1.4.

**402.3.4 Opaque door exemption.** One side-hinged opaque door assembly up to 24 square feet (2.22 m<sup>2</sup>) in area is exempted from the U-factor requirement in Section 402.1.1. This exemption shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.3.5 Thermally isolated sunroom U-factor.** For Zones 4 through 8, the maximum fenestration U-factor shall be 0.50 and the maximum skylight U-factor shall be 0.75. New windows and doors separating the sunroom from conditioned space shall meet the building thermal envelope requirements.

**402.3.6 Replacement fenestration.** Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and SHGC in Table 402.1.1.

#### 402.4 Air leakage (Mandatory).

**402.4.1 Building thermal envelope.** The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

1. All joints, seams and penetrations.

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2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating a garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Attic access openings.
11. Rim joist junction.
12. Other sources of infiltration.

**402.4.2 Air sealing and insulation.** Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section 402.4.2.1 or 402.4.2.2:

**402.4.2.1 Testing option.** Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than seven air changes per hour (ACH) when tested with a blower door at a pressure of 50 pascals (1 psf). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed, including exhaust, intake, makeup air, backdraft and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

**402.4.2.2 Visual inspection option.** Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* party independent from the installer of the insulation shall inspect the air barrier and insulation.

**402.4.3 Fireplaces.** New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

**402.4.4 Fenestration air leakage.** Windows, skylights and sliding glass doors shall have an air infiltration rate of no

more than 0.3 cfm per square foot (1.5 L/s/m<sup>2</sup>), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m<sup>2</sup>), when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and *listed* and *labeled* by the manufacturer.

**Exceptions:** Site-built windows, skylights and doors.

**402.4.5 Recessed lighting.** Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and *labeled* as meeting ASTM E 283 when tested at 1.57 psf (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the *conditioned space* to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

**402.5 Maximum fenestration U-factor and SHGC (Mandatory).** The area-weighted average maximum fenestration U-factor permitted using trade-offs from Section 402.1.4 or 405 shall be 0.48 in Zones 4 and 5 and 0.40 in Zones 6 through 8 for vertical fenestration, and 0.75 in Zones 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using trade-offs from Section 405 in Zones 1 through 3 shall be 0.50.

## SECTION 403 SYSTEMS

**403.1 Controls (Mandatory).** At least one thermostat shall be provided for each separate heating and cooling system.

**403.1.1 Programmable thermostat.** Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

**403.1.2 Heat pump supplementary heat (Mandatory).** Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

### 403.2 Ducts.

**403.2.1 Insulation (Prescriptive).** Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.

**Exception:** Ducts or portions thereof located completely inside the *building thermal envelope*.

**403.2.2 Sealing (Mandatory).** All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed.

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Joints and seams shall comply with Section M1601.4.1 of the *International Residential Code*.

Duct tightness shall be verified by either of the following:

1. Postconstruction test: Leakage to outdoors shall be less than or equal to 8 cfm (226.5 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* or a total leakage less than or equal to 12 cfm (12 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 6 cfm (169.9 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area*.

**Exceptions:** Duct tightness test is not required if the air handler and all ducts are located within *conditioned space*.

TABLE 402.4.2  
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

| COMPONENT  | CRITERIA  |
|--|---|
| Air barrier and thermal barrier                            | Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier.<br>Breaks or joints in the air barrier are filled or repaired.<br>Air-permeable insulation is not used as a sealing material.<br>Air-permeable insulation is inside of an air barrier. |
| Ceiling/attic  | Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.<br>Attic access (except unvented attic), knee wall door, or drop down stair is sealed.  |
| Walls  | Corners and headers are insulated.<br>Junction of foundation and sill plate is sealed.  |
| Windows and doors  | Space between window/door jambs and framing is sealed.  |
| Rim joists   | Rim joists are insulated and include an air barrier.  |
| Floors<br>(including above-garage and cantilevered floors) | Insulation is installed to maintain permanent contact with underside of subfloor decking.<br>Air barrier is installed at any exposed edge of insulation.  |
| Crawl space walls  | Insulation is permanently attached to walls.<br>Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.  |
| Shafts, penetrations                                       | Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.  |
| Narrow cavities  | Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.   |
| Garage separation  | Air sealing is provided between the garage and conditioned spaces.  |
| Recessed lighting  | Recessed light fixtures are air tight, IC rated, and sealed to drywall.<br>Exception—fixtures in conditioned space.   |
| Plumbing and wiring  | Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.   |
| Shower/tub on exterior wall                                | Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.   |
| Electrical/phone box on exterior walls                     | Air barrier extends behind boxes or air sealed-type boxes are installed.  |
| Common wall  | Air barrier is installed in common wall between dwelling units.   |
| HVAC register boots  | HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.   |
| Fireplace  | Fireplace walls include an air barrier.   |

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**403.2.3 Building cavities (Mandatory).** Building framing cavities shall not be used as supply ducts.

**403.3 Mechanical system piping insulation (Mandatory).** Mechanical system piping capable of carrying fluids above 105°F (41°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

**403.4 Circulating hot water systems (Mandatory).** All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot-water circulating pump when the system is not in use.

**403.5 Mechanical ventilation (Mandatory).** Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

**403.6 Equipment sizing (Mandatory).** Heating and cooling equipment shall be sized in accordance with Section M1401.3 of the *International Residential Code*.

**403.7 Systems serving multiple dwelling units (Mandatory).** Systems serving multiple dwelling units shall comply with Sections 503 and 504 in lieu of Section 403.

**403.8 Snow melt system controls (Mandatory).** Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F, and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F.

**403.9 Pools (Mandatory).** Pools shall be provided with energy-conserving measures in accordance with Sections 403.9.1 through 403.9.3.

**403.9.1 Pool heaters.** All pool heaters shall be equipped with a readily accessible on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

**403.9.2 Time switches.** Time switches that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on swimming pool heaters and pumps.

**Exceptions:**

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

**403.9.3 Pool covers.** Heated pools shall be equipped with a vapor-retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12.

**Exception:** Pools deriving over 60 percent of the energy for heating from site-recovered energy or solar energy source.

## SECTION 404 ELECTRICAL POWER AND LIGHTING SYSTEMS

**404.1 Lighting equipment.** A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

## SECTION 405 SIMULATED PERFORMANCE ALTERNATIVE (Performance)

**405.1 Scope.** This section establishes criteria for compliance using simulated energy performance analysis. Such analysis shall include heating, cooling, and service water heating energy only.

**405.2 Mandatory requirements.** Compliance with this section requires that the mandatory provisions identified in Section 401.2 be met. All supply and return ducts not completely inside the *building thermal envelope* shall be insulated to a minimum of R-6.

**405.3 Performance-based compliance.** Compliance based on simulated energy performance requires that a proposed residence (*proposed design*) be shown to have an annual energy cost that is less than or equal to the annual energy cost of the *standard reference design*. Energy prices shall be taken from a source approved by the *code official*, such as the Department of Energy, Energy Information Administration's *State Energy Price and Expenditure Report*. *Code officials* shall be permitted to require time-of-use pricing in energy cost calculations.

**Exception:** The energy use based on source energy expressed in Btu or Btu per square foot of *conditioned floor area* shall be permitted to be substituted for the energy cost. The source energy multiplier for electricity shall be 3.16. The source energy multiplier for fuels other than electricity shall be 1.1.

### 405.4 Documentation.

**405.4.1 Compliance software tools.** Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *code official*.

**405.4.2 Compliance report.** Compliance software tools shall generate a report that documents that the *proposed design* complies with Section 405.3. The compliance documentation shall include the following information:

1. Address or other identification of the residence;
2. An inspection checklist documenting the building component characteristics of the *proposed design* as listed in Table 405.5.2(1). The inspection checklist shall show results for both the *standard reference design* and the *proposed design*, and shall document all inputs entered by the user necessary to reproduce the results;
3. Name of individual completing the compliance report; and

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## 4. Name and version of the compliance software tool.

**Exception:** Multiple orientations. When an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements in each of the four cardinal (north, east, south and west) orientations.

**405.4.3 Additional documentation.** The *code official* shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the *standard reference design*.
2. A certification signed by the builder providing the building component characteristics of the *proposed design* as given in Table 405.5.2(1).
3. Documentation of the actual values used in the software calculations for the *proposed design*.

**405.5 Calculation procedure.**

**405.5.1 General.** Except as specified by this section, the *standard reference design* and *proposed design* shall be configured and analyzed using identical methods and techniques.

**405.5.2 Residence specifications.** The *standard reference design* and *proposed design* shall be configured and analyzed as specified by Table 405.5.2(1). Table 405.5.2(1) shall include by reference all notes contained in Table 402.1.1.

**405.6 Calculation software tools.**

**405.6.1 Minimum capabilities.** Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the *standard reference design* and the *proposed design* and shall include the following capabilities:

1. Computer generation of the *standard reference design* using only the input for the *proposed design*. The calculation procedure shall not allow the user to directly modify the building component characteristics of the *standard reference design*.
2. Calculation of whole-building (as a single zone) sizing for the heating and cooling equipment in the *standard reference design* residence in accordance with Section M1401.3 of the *International Residential Code*.
3. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.
4. Printed *code official* inspection checklist listing each of the *proposed design* component characteristics from Table 405.5.2(1) determined by the analysis to provide compliance, along with their respective performance ratings (e.g., *R*-value, *U*-factor, SHGC, HSPF, APUE, SEER, EF, etc.).

**405.6.2 Specific approval.** Performance analysis tools meeting the applicable sections of Section 405 shall be permitted to be *approved*. Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The *code official* shall be permitted to approve tools for a specified application or limited scope.

**405.6.3 Input values.** When calculations require input values not specified by Sections 402, 403, 404 and 405, those input values shall be taken from an *approved* source.

## RESIDENTIAL ENERGY EFFICIENCY

**TABLE 405.5.2(1)**  
**SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**

| BUILDING COMPONENT             | STANDARD REFERENCE DESIGN  | PROPOSED DESIGN   |
|--------------------------------|--|---|
| Above-grade walls              | Type: mass wall if proposed wall is mass; otherwise wood frame.<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3<br>Solar absorptance = 0.75<br>Emittance = 0.90  | As proposed<br>As proposed<br>As proposed<br>As proposed<br>As proposed                                   |
| Basement and crawl space walls | Type: same as proposed<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3, with insulation layer on interior side of walls.   | As proposed<br>As proposed<br>As proposed   |
| Above-grade floors             | Type: wood frame<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3   | As proposed<br>As proposed<br>As proposed   |
| Ceilings                       | Type: wood frame<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3   | As proposed<br>As proposed<br>As proposed   |
| Roofs                          | Type: composition shingle on wood sheathing<br>Gross area: same as proposed<br>Solar absorptance = 0.75<br>Emittance = 0.90  | As proposed<br>As proposed<br>As proposed<br>As proposed  |
| Attics                         | Type: vented with aperture = 1 ft <sup>2</sup> per 300 ft <sup>2</sup> ceiling area  | As proposed   |
| Foundations                    | Type: same as proposed foundation wall area above and below grade and soil characteristics: same as proposed.  | As proposed<br>As proposed  |
| Doors                          | Area: 40 ft <sup>2</sup><br>Orientation: North<br>U-factor: same as fenestration from Table 402.1.3.   | As proposed<br>As proposed<br>As proposed   |
| Glazing <sup>a</sup>           | Total area <sup>b</sup> =<br>(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.<br>(b) 15% of the conditioned floor area; where the proposed glazing area is 15% or more of the conditioned floor area.<br>Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).<br>U-factor: from Table 402.1.3<br>SHGC: From Table 402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.<br>Interior shade fraction:<br>Summer (all hours when cooling is required) = 0.70<br>Winter (all hours when heating is required) = 0.85 <sup>c</sup><br>External shading: none | As proposed<br><br><br>As proposed<br>As proposed<br>Same as standard reference design<br><br>As proposed |
| Skylights                      | None   | As proposed   |
| Thermally isolated sunrooms    | None   | As proposed   |

(continued)

## RESIDENTIAL ENERGY EFFICIENCY

TABLE 405.5.2(1)—continued  
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

| BUILDING COMPONENT                                  | STANDARD REFERENCE DESIGN   | PROPOSED DESIGN   |
|---|---|---|
| Air exchange rate                                   | Specific leakage area (SLA)* = 0.00036 assuming no energy recovery  | For residences that are not tested, the same as the standard reference design.<br>For residences without mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate <sup>f</sup> but not less than 0.35 ACH<br>For residences with mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate <sup>f</sup> combined with the mechanical ventilation rate, $f$ which shall not be less than $0.01 \times CFA + 7.5 \times (N_{br}+1)$<br>where:<br>$CFA$ = conditioned floor area<br>$N_{br}$ = number of bedrooms |
| Mechanical ventilation                              | None, except where mechanical ventilation is specified by the proposed design. In which case:<br>Annual vent fan energy use:<br>$kWh/yr = 0.03942 \times CFA + 29.565 \times (N_{br} + 1)$<br>where:<br>$CFA$ = conditioned floor area<br>$N_{br}$ = number of bedrooms   | As proposed   |
| Internal gains                                      | $IGain = 17,900 + 23.8 \times CFA + 4104 \times N_{br}$<br>(Btu/day per dwelling unit)  | Same as standard reference design   |
| Internal mass                                       | An internal mass for furniture and contents of 8 pounds per square foot of floor area.  | Same as standard reference design, plus any additional mass specifically designed as a thermal storage element <sup>g</sup> but not integral to the building envelope or structure  |
| Structural mass                                     | For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air.  | As proposed   |
|   | For masonry basement walls, as proposed, but with insulation required by Table 402.1.3 located on the interior side of the walls  | As proposed   |
|   | For other walls, for ceilings, floors, and interior walls, wood frame construction  | As proposed   |
| Heating systems <sup>h</sup>                        | As proposed<br>Capacity: sized in accordance with Section M1401.3 of the <i>International Residential Code</i>  | As proposed   |
| Cooling systems <sup>h, i</sup>                     | As proposed<br>Capacity: sized in accordance with Section M1401.3 of the <i>International Residential Code</i>  | As proposed   |
| Service H <sub>2</sub> O heating <sup>h, k, l</sup> | As proposed<br>Use: same as proposed design   | As proposed<br>$gal/day = 30 + (10 \times N_{br})$  |
| Thermal distribution systems                        | A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. Duct insulation: From Section 403.2.1. For tested duct systems, the leakage rate shall be the applicable maximum rate from Section 403.2.2. | As tested or as specified in Table 405.5.2(2) if not tested   |
| Thermostat  | Type: Manual, cooling temperature setpoint = 75°F;<br>Heating temperature setpoint = 72°F   | Same as standard reference  |

(continued)



## RESIDENTIAL ENERGY EFFICIENCY

TABLE 405.5.2(1)—continued

For SI: 1 square foot = 0.093 m<sup>2</sup>; 1 British thermal unit = 1055 J; 1 pound per square foot = 4.88 kg/m<sup>2</sup>; 1 gallon (U.S.) = 3.785 L; °C = (°F-32)/1.8; 1 degree = 0.79 rad.

- a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50 percent of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

- b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$$AF = A_s \times FA \times F$$

where:

$AF$  = Total glazing area.

$A_s$  = Standard reference design total glazing area.

$FA$  = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

$F$  = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

- c. For fenestrations facing within 15 degrees (0.26 rad) of true south that are directly coupled to thermal storage mass, the winter interior shade fraction shall be permitted to be increased to 0.95 in the proposed design.

- d. Where leakage area ( $L$ ) is defined in accordance with Section 5.1 of ASHRAE 119 and where:

$$SLA = LCFA$$

where  $L$  and  $CFA$  are in the same units.

- e. Tested envelope leakage shall be determined and documented by an independent party approved by the code official. Hourly calculations as specified in the 2001 ASHRAE *Handbook of Fundamentals*, Chapter 26, page 26.21, Equation 40 (Sherman-Grimsrud model) or the equivalent shall be used to determine the energy loads resulting from infiltration.

- f. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals*, page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.

- g. Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

- h. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

- i. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be used for the standard reference design.

- j. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

- k. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

TABLE 405.5.2(2)  
DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS<sup>a</sup>

| DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION                                  | FORCED AIR SYSTEMS | HYDRONIC SYSTEMS <sup>b</sup> |
|--|--------------------|-------------------------------|
| Distribution system components located in unconditioned space                    | —                  | 0.95                          |
| Untested distribution systems entirely located in conditioned space <sup>c</sup> | 0.88               | 1                             |
| "Ductless" systems <sup>d</sup>  | 1                  | —                             |

For SI: 1 cubic foot per minute = 0.47 L/s; 1 square foot = 0.093 m<sup>2</sup>; 1 pound per square inch = 6895 Pa; 1 inch water gauge = 1250 Pa.

- a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

- b. Hydronic systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.

- c. Entire system in conditioned space shall mean that no component of the distribution system, including the air handler unit, is located outside of the conditioned space.

- d. Ductless systems shall be allowed to have forced airflow across a ceiling but shall not have any ducted airflow external to the manufacturer's air handler enclosure.

**EXHIBIT F-1**

Street lighting in Phase 1 shall utilize current energy-saving lighting equipment and technologies for street lighting, including LED cut-offs on all Town roads, private roads and common parking areas.

Received  
Recorded Register of Deeds  
Mar 22, 2017 11:19:19A  
Cumberland County  
Nancy A. Lane

## **APRIL 25, 2018 LETTER OF RESPONSE**

---



**Stantec Consulting Services Inc.**

482 Payne Road Scarborough Court, Scarborough ME 04074-8929

April 25, 2018

**Resubmitted May 17, 2018**

**Ms. Carla Nixon, Town Planner**

Town of Cumberland

290 Tuttle Road

Cumberland, Maine 04021

**Subject: Village Green**

**4th Amended Subdivision Submission**

**Phase 4 Property**

**Letter of Response #1 to Planning Staff Review Comments**

Dear Ms. Nixon:

On behalf of Village Green Cumberland LLC and George and Constance Russell, our office has received and reviewed Planning Staff review comments from Sevee & Maher (SME) dated November 14, 2017 for the above referenced project. For ease of reference, we have repeated the comments in *italics* followed by our responses in **bold**.

## **CHAPTER 250 – SUBDIVISION OF LAND**

### *Section 250-1.J. – Financial Capacity*

- 1. SME recommends the applicant provide evidence of Financial Capacity.*

### **Response:**

- 1. Please find the accompanying letter from Norway Savings Bank in Attachment A as evidence of financial capacity.**

### *Section 250-19 – Review and approval by other agencies.*

- 2. SME understands that the MEDEP permit has not been amended to account for the new access road and lots. Please provide copies of the permit application prior to submitting for final approval.*
- 3. SME understands that a NRPA permit for the impacts to the wetlands and the road stream crossing has not been received. SME recommends a NRPA permit be received prior to the Town's final approval.*

### **Response:**

- 2.&3. The MaineDEP has accepted the minor amendment applications filed under Orders #L-25376-L3-A-N/L-25376-TE-B-N and has assigned Christine Woodruff as the project**



Ms. Carla Nixon  
April 25, 2018  
**Resubmitted May 17, 2018**  
Page 2

**analyst processing these applications. We will keep the Town Planner apprised of the DEP progress in completing their review. A copy of the MEDEP application materials accompanies this letter in Attachment C.**

*Section 250-27 through 250-29 - Utilities, Water Supply, and Sewage Disposal.*

- 4. Capacity to Serve letters for water supply and sewer are still pending. Please provide these documents with the final plan application.*
- 5. The proposed sewer appears to have less than 4-feet of cover in places. Please clarify the proposed pipe trench construction and if insulation is proposed where cover will be less than frost depths.*
- 6. SME recommends that a 10-foot separation be provided between the sewer and water lines.*
- 7. Please provide transformer locations for underground utilities.*
- 8. Please provide details on proposed fire protection.*

**Response:**

- 4. The Portland Water District has reviewed the proposed plans and offered comments about the water system layout, which we have incorporated into the accompanying plan and profile sheet. We have received a water and sewer capacity availability letter from the District, which accompanies this letter in Attachment B.**
- 5. The sewer alignment has been adjusted to provide at least 5 feet of cover in all locations.**
- 6. The water and sewer lines have been adjusted to provide the recommended 10 feet of separation.**
- 7. The transformer locations have been reviewed with CMP and are now identified on the plan.**
- 8. The proposed private drive has been designed with similar water infrastructure as Reid Lane and Baxter Lane, both of which are private drives off Drowne Road, within the Village Green Subdivision. Reid Lane serves 6 house lots and contains a 4" water supply main for domestic water supply. Bradbury Way contains a Fire Hydrant located approximately 80 feet west of the proposed private drive.**

*Section 250-31 through 250-34 - Street Design and Construction standards*

- 9. The street sign and name was not provided. SME recommends the proposed street names be provided for Town review.*



Ms. Carla Nixon

April 25, 2018

**Resubmitted May 17, 2018**

Page 3

10. The hammer head at the end of the access road has not been graded. SME recommends proposed grading be shown on the Plan and Profile, Sheet 1.
11. Please provide a section view for the road construction detailing proposed construction materials.
12. Please review the k-values proposed for the roadway construction. SME recommends the profile design comply with minimum k-values for a 15 MPH roadway required by AASHTO.
13. SME recommends the Applicant provide a Stop sign and painted stop bar at the intersection with Bradbury Way.

**Response:**

9. **We are working with the applicants to develop suggestions for a street name. The current names under consideration include Brackett, Russell or Aroostook Lane or Drive. We welcome the Town's input on the name selection.**
10. **The grading of the hammerhead has been provided on the accompanying updated plan.**
11. **The proposed road cross section will be consistent with the originally approved design detail for the typical roadway section of a Private drive-without curb as contained on Sheet 10.1 of the original Village Green drawings. A copy of this plan sheet accompanies this submission. The section will consist of a 3.5" thick pavement section (18 feet wide) and 5' wide shoulders. The gravel section consists of 3" of Type A crushed aggregate and 12" of Type D crushed aggregate.**
12. **The road profile has been adjusted to meeting the AASHTO recommended minimum K-values for a 15 mph road. Per Table 3-34 of AASHTO 6<sup>th</sup> Edition the K-Value for a crest vertical curve with 15 mph speed is 3.0. The minimum on the design is 9.37.**
13. **A Stop Sign and Stop Bar are identified on the revised plan.**

*Section 250-40 – Storm Drainage Design Standard*

14. *Minimum of four (4) feet of cover over storm drains is required in Section 250-40.B.7. The cover over storm drains at DMH R1, DMH R2, CB R1 and CB R2 is less than four (4) feet and as little as 1.75 feet at CB R1. Please revise the drawings to provide adequate cover.*
15. *Drainage calculations for the stormwater system have not been provided. SME recommends the calculations be included and reviewed to ensure proper sizing of the road culverts and storm drain system.*



Ms. Carla Nixon  
April 25, 2018  
**Resubmitted May 17, 2018**  
Page 4

**Response:**

14. The current road design includes an open drainage system, as the accompanying drainage calculations support the elimination of a closed drainage system to convey runoff to the Village Green stormwater management basin. The overall flooding and general standards for the Village Green Subdivision will remain compliant with the MEDEP Chapter 500 stormwater management regulations.
15. The accompanying Stormwater Management Report and calculations (provided in Attachment C) have been provided to the MEDEP for review and approval. The basic findings are that the project will remain compliant with the Chapter 500 General and Flooding Standards.

*Section 250-45 – Soil Erosion*

16. *No erosion control berm shown downslope of the roadways. SME recommends the erosion control plan be revised to include adequate sedimentation barriers.*

**Response:**

16. Erosion control measures have been added to the plan. This includes a sediment barrier consisting of silt fence or an erosion control mix berm and a stabilized construction entrance onto Bradbury Way.

**GENERAL COMMENTS**

17. SME recommends adding wetland impacts to the Final Subdivision Plan, C-4.0 to be recorded.
18. Please provide labels for the existing contours on the Plan and Profile, Sheet 1.
19. SME recommends typical sections be included for the proposed access road and other design features.
20. SME recommends showing utilities (water, electrical, communications, etc.) on the Plan Profile drawing.

**Response:**

17. The wetland impacts will be added to the Final Subdivision Plan once an authorization from the DEP/ACOE is received. These impacts are 2,104 SF. The applicant intends to pay the In-Lieu Fee to the DEP for this additional impact. The In-Lieu fee is currently expected to be \$8,660.20.
18. The contours have been labeled for clarity.



Ms. Carla Nixon  
April 25, 2018  
**Resubmitted May 17, 2018**  
Page 5

- 19. The typical sections are the same as the original contained in the Village Green Plan set. It is our intent to simply make the latest plans for the Russell Property expansion part of the overall Village Green drawings.**
- 20. The utilities have been added to the plan and profile drawing.**

We look forward to the opportunity to present this proposed expansion to the Village Green Subdivision at the next available Planning Board meeting.

If you have any questions with regards to the information submitted, please contact our office.

Sincerely,

**STANTEC CONSULTING SERVICES INC.**

Stephen R. Bushey, P.E.  
Associate  
Phone: 207-887-3478  
Fax: 207-887-3376  
stephen.bushey@stantec.com

Attachments: Attachment A – Norway Savings Bank Letter  
Attachment B – Portland Water District Ability to Serve Letter  
Attachment C – DEP application and Stormwater Management Report and Calculations  
Updated Plans

c: Nathan Bateman

V:\1953\active\195350072\Admin\Permitting\local\amended subdivision plan\lor\lor\_1\_nixon\_20180517.docx



## **ATTACHMENT A**

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### **FINANCIAL CAPACITY LETTER FROM NORWAY SAVINGS BANK**



April 25, 2018

Planning Board  
Town of Cumberland, Maine  
290 Tuttle Road  
Cumberland, ME 04021

Department of Environmental Protection  
312 Canco Road  
Portland, ME 04103

Re: Village Green Project – Russell Road Extension – Cumberland, Maine

To Whom It May Concern:

Norway Savings Bank has reviewed the information for the proposed Village Green project (Russell Road Extension), Cumberland, Maine. The developers have provided us with their project summary and anticipated development costs and details.

This lending officer has enjoyed many successful lending relationships with the primary developers and their various entities over the past 17+ years. While this letter is in no way to be construed as a commitment to lend funds, I believe that the developers have the financial capacity, management skills, and marketing finesse to successfully develop this site and complete the project on time and on budget.

I trust this letter complies with Section 3, subsection B3c of the Site Location law, but if you should need further information or clarification, please feel free to contact me at (207) 482-7902.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard R. Flagg", is written over the "Sincerely," and extends across the signature block.

Richard R. Flagg  
Regional Vice President, Commercial Lending

CC Nathan Bateman, Bateman Partners

## **ATTACHMENT B**

---

### **PORTLAND WATER DISTRICT ABILITY TO SERVE LETTER**



## Portland Water District

FROM SEBAGO LAKE TO CASCO BAY

April 25, 2018

Stephen Bushey  
Stantec Consulting Services Inc.  
482 Payne Road Scarborough Court  
Scarborough ME 04074-8929 US

Re: Bradbury Way, CU  
Ability to Serve with PWD Water

Dear Mr. Bushey:

The Portland Water District has received your request for an Ability to Serve Determination for the noted site submitted on April 4, 2018. Based on the information provided per plans dated April 25, 2018, we can confirm that the District will be able to serve the proposed project as further described in this letter. **Please note that this letter constitutes approval of the water system as currently designed. Any changes affecting the approved water system will require further review and approval by PWD.**

### Conditions of Service

The following conditions of service apply:

- The District can confirm that the existing water and sewer systems have the capacity to serve the additional 6 single-family house lots within the Village Green Subdivision in Cumberland.
- A new 4-inch ductile iron water main shall be installed in an easement within a private drive off Bradbury Way, from the existing 8" diameter service stub to the center of the last lot to be served. New 1-inch diameter copper domestic water services shall be installed to each subdivided lot.
- Our records show that the property is currently served with an 8-inch diameter domestic water line, which was installed as part of the previous phase of work. The existing water service line stubbed to this site may be used by the proposed development.

Prior to construction, the owner or contractor will need to complete the Main Extension Initiation form and pay all necessary fees. PWD will guide the applicant through the new development process.

### Existing Site Service

According to District records, the project site does currently have existing water service. An 8-inch diameter ductile iron water service line provides water service to the site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.



### Water System Characteristics

According to District records, there is an 8-inch diameter ductile iron water main in Bradbury Way and a public fire hydrant located approximately 100 feet from the site entrance. Recent flow data is not available in this area. The most recent static pressure reading was 92 psi.

### Public Fire Protection

The installation of new public hydrants to be accepted into the District water system will most likely not be required. It is your responsibility to contact the Town of Cumberland Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

### Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project. Based on the high water pressure in this area, we recommend that you consider the installation of pressure reducing devices that comply with state plumbing codes.

### Private Fire Protection Water Needs

You have indicated that this project will not require water service to provide private fire protection to the site.

Should you disagree with this determination, you may request a review by the District's Internal Review Team. Your request for review must be in writing and state the reason for your disagreement with the determination. The request must be sent to MEANS@PWD.org or mailed to 225 Douglass Street, Portland Maine, 04104 c/o MEANS. The Internal Review Team will undertake review as requested within 2 weeks of receipt of a request for review.

If the District can be of further assistance in this matter, please let us know.

Sincerely,  
Portland Water District

A handwritten signature in black ink, appearing to read 'Robert A. Bartels', written in a cursive style.

Robert A. Bartels, P.E.  
Senior Project Engineer

## **ATTACHMENT C**

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### **STORMWATER MANAGEMENT REPORT AND CALCULATIONS**

## **ATTACHMENT C**

---

## **SECTION 12**

### **STORMWATER MANAGEMENT REPORT** **(FLOODING AND GENERAL STANDARDS)**

**VILLAGE GREEN  
CUMBERLAND, MAINE**

**Prepared for:  
Village Green Cumberland, LLC  
PO Box 3572  
Portland, Maine 04104**

**Prepared by:  
  
Stantec Consulting Ltd.  
482 Payne Road  
Scarborough, Maine 04074  
(207) 883-3355**

**May 2011  
Revised June 2011  
Revised July 2011  
Revised January 2012  
Revised September 2015**

**REVISED MARCH 2018 FOR RUSSELL PROPERTY**



# STORMWATER MANAGEMENT REPORT

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## Attachments

|              |   |
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| Attachment A | Postdevelopment Watershed Map and Phase 1 Existing Conditions Plan  |
| Attachment B | Water Quality Calculations  |
| Attachment C | Wet Pond Design Calculations  |
| Attachment D | Underdrained Soil Filter Design Calculations ( <b>Omitted</b> )   |
| Attachment E | <del>Filterra / Stormtech Isolator Row Treatment Train Design Calculations</del>  |
| Attachment F | TR-20 Computations (HydroCAD) <ul style="list-style-type: none"><li>▪ Predevelopment Model (<b>Omitted</b>)</li><li>▪ Postdevelopment Model</li></ul> |
| Attachment G | Maintenance of Common Facilities or Property ( <b>Omitted</b> )   |

Please note: Deletions within this report are shown with strikethrough type. Additions are shown with the following typefaces:

|                 |  |
|-----------------|--|
| June 2011:      | <b>Bold</b>  |
| July 2011:      | <b><i>Bold Italic</i></b>                              |
| January 2012:   | <b><u>Underlined Bold Italic</u></b>                   |
| September 2015: | <b><i>Bold Italic with Yellow Highlights</i></b>       |
| March 2018:     | <b><i>Bold Italic with Bright Green Highlights</i></b> |

JN2998  
May 2011

~~Revised June 2011, July 2011~~  
**Revised January 2012**  
***Revised September 2015***  
***Revised March 2018***

## SECTION 12

### STORMWATER MANAGEMENT REPORT

#### 12.0 Introduction

**Fay, Spofford & Thorndike (formerly DeLuca-Hoffman Associates, Inc. (DHAI))**  
**Stantec** has prepared the following stormwater management analysis for Village Green, a proposed 59-unit ~~58-unit~~ **63-Unit** residential development in Cumberland, Maine.

This project is the first **last** phase of the Village Green Master Development Plan, which includes three phases of development. Provisions have been made to the stormwater management design to allow future phases to meet applicable state and local requirements, however, at this time the applicant is currently seeking approval only for the first phase of the Master Plan.

DHAI completed this stormwater management analysis in accordance with the MeDEP Chapter 500 regulations for Basic, General and Flooding Standards to confirm that the planned development will not result in any significant impacts downstream of the development site and will not create potential degradation of water quality to locations downstream of the development site.

#### 12.1 Existing Site Conditions

The project is located on the easterly side of Main Street (Route 9). It contains approximately 40.69 **45.81** acres of land consisting of the Wyman Way right-of-way and the former "Doane" parcel that is identified by the Town Tax Assessor as Lot 7B on Tax Map U10. **It will also contain approximately 5.72 acres associated with land owned by George and Constance Russell, for which approval is being sought to allow for the creation of four new residential house lots, and the continuation of the existing Russell residence.**

The project site is bounded to the south by residential properties along Wyman Way and undeveloped forest land, to the west by residential properties fronting along Main Street, to the northwest by residential properties along Amanda Way, to the northeast by the Public Works Garage and open space lot owned by the Town of Cumberland, and to the east by undeveloped forest land associated with the Town Forest.

Currently, Wyman Way is a dead-end gravel road, approximately 12 feet in width that extends approximately 750 linear feet from Main Street providing vehicular access to four residential properties. The 60' wide Wyman Way right-of-way extends from Main Street to the former "Doane" parcel providing legal frontage and vehicular access to the lot.

The project site contains a mixture of softwood and hardwood vegetation. A small pond is located in the northeasterly corner of the site. This pond was created as a result of former gravel extraction at the site that extended below the groundwater table.

Generally, the project site consists of gentle to moderately steep topography that is interspersed with forested knolls and incised drainage ravines. The steeper slopes are located along several perennial streams that traverse the site as well as the perimeter slopes associated with the onsite pond. These areas of the site have slopes ranging from 20% to 35%. The remainder of the site contains gentle to moderate topography with slopes ranging from 3% to 15%.

Surface runoff generally flows in a southerly direction across the site and enters an unnamed perennial stream system that continues in a southerly direction with eventual discharge to the Mill Brook and the East Branch of the Piscataqua River.

Albert Frick Associates, Inc. completed a Class A High Intensity Soil Survey on the site in 2009. The results from this survey were used to complete the stormwater model (see Section 11 of this application for specific soil information). The site consists predominantly of Lamoine soil types with areas of Scantic soils in and around natural drainage ways and streams. Portions of the site have been previously disturbed, including the existing man-made pond.

According to the High Intensity Soil Survey, the development site consists of the following soils and corresponding Hydrologic Soil Groups:

| Soils       | Hydrologic Soils Group |
|-------------|------------------------|
| Lamoine     | D                      |
| Elmwood     | C                      |
| Scantic     | D                      |
| Nicholville | C                      |
| Made Land   | D                      |

## 12.2 **Methodology**

The proposed development activities will result in the net addition of approximately 7.85 ~~7.73~~ **7.93** **8.50** acres of new impervious area associated with the roadways, sidewalks, driveways, and residential buildings. The development project will include measures to meet the Maine Department of Environmental Protection (MeDEP) Basic, General and Flooding Stormwater Management Standards for development projects. The project must also meet applicable standards outlined in Section 9 of the Town of Cumberland Subdivision Ordinance. Portions of the Town of Cumberland are located within a designated MS4 area, and are subject to the town's Stormwater Discharge Ordinance. The proposed project is not located within this designated area.

The project has been designed in accordance with the Site Location of Development Act and revised Stormwater Management Regulations (Chapter 500) effective November 2005, amended December 2006, and the Town of Cumberland Subdivision Ordinance. Key points addressed include:

- Provide measures that will mitigate for the increased frequency and duration of channel erosive flows due to runoff generated during smaller, more frequent rainfall events (< 1-year, 2.5-inch).

- Provide for effective treatment of pollutants in stormwater runoff from developed areas by collecting and treating runoff from at least **90%** of the site's new impervious area and **75%** of the site's new developed area with approved Best Management Practice (BMP) measures.<sup>1</sup>
- Provide Best Management Practices meeting all design requirements described in the Stormwater BMP Manual. BMPs used include a wet pond, underdrained soil filters, and roof dripline filters, ~~and Filterra / StormTech isolator row treatment trains.~~
- Provide mitigation for potential temperature impacts.
- Detain or retain stormwater from 24-hour storms of the 2-year, 10-year and 25-year frequencies such that the peak flow rates from the post-development project site do not exceed those of the pre-development project site.

The overarching design goal is to filter the smaller, more frequent runoff events and provide for the stabilized release of stormwater runoff generated from the larger runoff events.

### 12.3 References

The following reference sources were used in preparation of the stormwater analysis:

1. Technical Release Number 20 – Computer Program for Project Formulation – Hydrology, USDA Soil Conservation Service, May 1983
2. Section 4 – Hydrology, USDA Soil Conservation Service, March 1985
3. Technical Release Number 55 – Urban Hydrology for Small Watersheds, USDA Soil Conservation Service, June 1986
4. Civil Engineering Reference Manual, Lindeburg, 2003
5. HydroCAD Owner's Manual, HydroCAD Software Solutions, LLC, 2004
6. Maine Erosion and Sedimentation Control Handbook for Construction: Best Management Practices, MeDEP, March 1991
7. Stormwater Management, Best Management Practices, MeDEP, January 2006

### 12.4 Methods of Analysis – Stormwater Quantity

The hydrologic analysis for predevelopment and postdevelopment conditions has been conducted based upon the methodology contained in the USDA Soil Conservation Service's Technical Releases Nos. 20 and 55 (SCS TR-20 and TR-55). For Cumberland County, Maine, a 24-hour SCS Type III storm distribution was used for the analysis using the following storm frequencies and rainfall amounts:

<sup>1</sup> **Per Table 1 of Chapter 500 Part 4.C.2.a.iii. The development includes 20.13 acres out of 45.81 acres or 44% development.**

| Storm Event   | 24-Hour Rainfall |
|---------------|------------------|
| 2-Year Storm  | 3.0              |
| 10-Year Storm | 4.6              |
| 25-Year Storm | 5.4              |

The HydroCAD computer program was used in the analysis. This program analyzes the critical points of the project watershed and uses SCS TR-20 methodology for evaluation of the anticipated conditions at these points. Drainage areas are defined with runoff curve numbers, times of concentration, and travel time data based on methods outlined in the USDA TR-55 manual. To assess storage and kinematic effects of runoff, the model uses reservoirs and pipes to imitate actual conditions. Specific hydrologic characteristics including travel times, storage capacity, and the effects of hydraulic head are considered for analysis with this program.

To model any watershed, the drainage system is represented by a system network consisting of three basic components:

- **Subcatchment:** A relatively homogenous area of land that drains into a single reach or pond. Each subcatchment generates a runoff hydrograph.
- **Reach:** A uniform stream, channel, or pipe that conveys water from one point to another reach or pond. The outflow of each reach is determined by a hydrograph routing calculation.
- **Pond:** A pond, swamp, dam, or other impoundment which fills with water from one or more sources and empties in a manner determined by a weir, culvert or other device(s) at its outlet. A pond may empty into a reach or into another pond. The outflow of each pond is also determined by a hydrograph routing calculation.

Land use, cover, delineation of watershed subcatchments, hydraulic flow paths and hydrologic soil types were obtained using the following data:

1. Cumberland Center, Maine USGS 7.5 minute Quadrangle Maps
2. High Intensity Soils Mapping by Albert Frick Associates for onsite areas
3. Medium Intensity Soils Mapping by Cumberland County Soil Report for offsite areas
4. Onsite topography is aerial telemetry based 2' contours performed by Bradstreet Consultants, Inc. of Searsmont, Maine. Supplemental field based topography to refine aerial telemetry based topography performed by Titcomb Associates, Inc. of Falmouth, Maine.
5. Offsite topography is aerial telemetry based 5' contours provided through the Town's GIS data.
6. Field Reconnaissance by DeLuca-Hoffman Associates, Inc.

## 12.5 Predevelopment Conditions

The existing project site contains approximately 0.44 acres of developed area and 0.25 acres of impervious area associated with the existing Wyman Way. Runoff from the project site drains in a southerly or south easterly direction into a series of perennial streams and forested wetlands. Runoff from north of the project boundary enters the site via two culverts under Amanda's Way.

Approximately 9.6 acres drains to the existing pond located in the eastern portion of the site. The pond, which was created as the result of a past gravel extraction operation, has no outlet. The water surface elevation is assumed to fluctuate based on rainfall volume and groundwater elevation. The pond was surveyed in the spring of 2011, and the water surface was found to be approximately 81. Existing wetland vegetation surrounding the pond suggests that a water surface of 81 is typical.

A predevelopment hydrologic model was developed to create a baseline in order to determine the effect that the proposed development will have on downstream properties. Thirteen predevelopment subwatersheds and nine points of interest were identified in order to analyze the predevelopment condition and are shown on the attached Predevelopment Watershed Map. The six points of interest correspond with points where runoff leaves the project site and are described below.

- POI 1 corresponds to a natural channel on the project's southeasterly boundary. Predevelopment Subwatershed 1 is tributary to POI 1.
- POI 2 corresponds to a point on the south side of Wyman Way, within an unnamed stream. Runoff from Predevelopment Subwatersheds 2, 2A, 2B, 2C, 7, OS1, and OS2 are tributary to POI 2.
- POI 2A corresponds to a point within an unnamed stream upstream of the culvert crossing at Wyman Way and POI 2. Predevelopment Subwatersheds OS1 and 2A are tributary to POI 2A.
- POI 2B corresponds to a point within an unnamed stream upstream of the culvert crossing at Wyman Way and POI 2. Predevelopment Subwatersheds OS2 and 2B are tributary to POI 2A.
- POI 2C corresponds to a point within an unnamed stream upstream of the culvert crossing at Wyman Way and POI 2. Predevelopment Subwatershed 2C is tributary to POI 2C.
- POI 3 corresponds to a natural channel on the project's southeasterly boundary. Predevelopment Subwatershed 3 is tributary to POI 3.
- POI 4 corresponds to a natural channel on the project's southeasterly boundary. Predevelopment Subwatershed 4, which includes the existing public works facility and a portion of the existing Drowne Road, is tributary to POI 4.
- POI 5 corresponds to a natural channel adjacent to Wyman Way. Predevelopment Subwatershed 8 is tributary to POI 5.

- POI 6 corresponds to an existing culvert inlet on Main Street. Predevelopment Subwatershed 6, which includes the end of Wyman Way, half of Main Street, and portions of several existing residential lots on Main Street, is tributary to POI 6.

Each predevelopment subwatershed was defined by an area, composite curve number and time of concentration. A summary of the pre-development subwatersheds is presented below.

| Pre-Development Site Conditions |              |    |                                 |
|---------------------------------|--------------|----|---------------------------------|
| Subarea                         | Area (acres) | CN | Time of Concentration (minutes) |
| OS-1                            | 18.60        | 70 | 42.3                            |
| OS-2                            | 15.25        | 72 | 13.4                            |
| 1                               | 18.26        | 75 | 74.9                            |
| 2                               | 8.62         | 72 | 18.9                            |
| 2A                              | 5.47         | 72 | 9.6                             |
| 2B                              | 4.29         | 75 | 26                              |
| 2C                              | 21.76        | 74 | 32.6                            |
| 3                               | 3.43         | 77 | 18.5                            |
| 4                               | 8.93         | 83 | 8.2                             |
| 5                               | 9.64         | 78 | 28.6                            |
| 6                               | 2.25         | 80 | 10.7                            |
| 7                               | 1.72         | 71 | 18.5                            |
| 8                               | 0.26         | 62 | 15                              |

The pre-development peak flow rates were estimated, using HydroCAD Software, for each Point of Interest in order to develop a baseline for comparison with post-development rates. The pre-development HydroCAD model is provided as Attachment F and the pre-development peak flow rates are presented below.

| Pre-Development Peak Runoff Flow Rates |        |         |         |
|--|--------|---------|---------|
| Peak Discharge (cfs)                   |        |         |         |
|  | 2-Year | 10-Year | 25-Year |
| POI #1                                 | 6.59   | 16.04   | 20.93   |
| POI #2                                 | 32.02  | 84.10   | 108.56  |
| POI #2A                                | 7.39   | 20.90   | 27.90   |
| POI #2B                                | 12.29  | 31.99   | 42.04   |
| POI #2C                                | 11.73  | 29.18   | 38.26   |
| POI #3                                 | 2.87   | 6.61    | 8.51    |
| POI #4                                 | 13.79  | 27.75   | 34.52   |
| POI #5                                 | 0.06   | 0.26    | 0.38    |
| POI #6                                 | 2.75   | 5.89    | 7.44    |

## 12.6 Postdevelopment Conditions

The postdevelopment conditions include the improvements associated with the proposed development, including roadways, sidewalks, houses, and landscaped areas. Approximately 7.85 ~~7.73~~ **7.93** **8.5** acres of new impervious area and 11.07 ~~10.34~~ **11.28** **11.64** acres of new landscape area will be created by the proposed development.



Predevelopment runoff patterns are generally maintained in the postdevelopment condition.

A new stormdrain system will be constructed to convey runoff from portions of the developed areas to the existing pond, which will serve to treat pollutants in runoff and reduce peak flow rates at downstream locations. Approximately ~~21.8~~ **24.9** acres of area is tributary to the pond in the postdevelopment condition, an increase of ~~12.2~~ **15.3** acres from the predevelopment condition. The existing water surface elevation of the pond is approximately 81. **An outlet control structure with a low outlet at elevation 81.0 will be installed to maintain the existing pond elevation while meeting the general and flooding standards.** It is expected that the water surface elevation will increase after storm events and will normalize with the groundwater elevation over time.

~~With a starting water surface elevation of 81, the pond, without an outlet, would be expected to retain all runoff from the 25-year storm event while reaching a water surface elevation of 85.21. Proposed houses adjacent to the pond, on Drowne Road, will feature basement elevations as low as 87.5. To protect against flooding in the event of an extremely large storm event or multiple storm events, a 24" diameter pipe outlet will be provided at elevation 84 to provide protection from flooding for the adjacent houses. With this provision, in the event that a 100-year storm event (6.7" rainfall) occurred while the pond surface elevation was as high as 84, the water surface elevation in the pond would only be expected to reach 86.37, and no flooding would occur. More information on the pond related to water quality treatment is provided in Section 12.8.~~

In addition to the existing pond, two underdrained soil filter basins will be constructed to treat runoff from developed areas associated with lots 4-14 **1 and 3-11 and approximately 550 linear feet of Wyman Way.** These basins will also serve to attenuate peak flow rates at downstream locations.

A postdevelopment hydrologic model was created to determine the effect that the proposed development will have on downstream properties and channels. Conceptual lot grading and layout were used to determine subwatershed boundaries within lot areas. Thirty-five subwatersheds, tributary to the nine points of interest described above, were delineated for the postdevelopment condition and defined by area, composite curve number, and time of concentration.

The model was used to estimate the postdevelopment peak flow rates at the nine points of interest during the 2-year, 10-year, and 25-year storm events. The postdevelopment HydroCAD model is provided as Attachment F and the postdevelopment peak flow rates are presented below.

| Post-Development Peak Runoff Flow Rates |                                  |                                     |                                     |
|---|----------------------------------|-------------------------------------|-------------------------------------|
| Peak Discharge (cfs)                    |                                  |                                     |                                     |
|   | 2-Year                           | 10-Year                             | 25-Year                             |
| POI #1                                  | <del>5.74</del> <b>5.92 5.78</b> | <del>15.26</del> <b>15.58 14.41</b> | <del>20.30</del> <b>20.64 19.31</b> |



|         |  |   |   |
|---------|--|---|---|
| POI #2  | 31.47 <del>31.26</del><br><b>27.90<sup>2</sup></b> | 81.51 <del>80.94</del><br><b>74.47</b>    | 104.35 <del>106.05</del><br><b>98.99</b>  |
| POI #2A | 7.40   | 20.88                                     | 27.85                                     |
| POI #2B | 12.78 <u>11.20</u>                                 | 32.08 <u>29.44</u>                        | 40.77 <u>38.10</u>                        |
| POI #2C | 9.05<br><u>8.22</u>                                | 22.09<br><u>20.79</u>                     | 27.99<br><u>27.35</u>                     |
| POI #3  | 1.92 <u>2.32 2.15</u><br><u>2.28 2.30</u>          | 4.21 <u>6.06 5.77</u><br><u>5.41 5.42</u> | 5.35 <u>7.64 7.30</u><br><u>6.78 6.79</u> |
| POI #4  | 4.10   | 8.08                                      | 10.00                                     |
| POI #5  | 0.04   | 0.20                                      | 0.29                                      |
| POI #6  | 2.29   | 5.27                                      | 6.78                                      |

## 12.7 Stormwater Peak Flow Rate Control (Flooding Standard)

A comparison of the predevelopment peak flow rates to the postdevelopment peak flow rates at the identified points of interest is a means to determine the effect that the proposed development will have on downstream properties and channels. The pre and postdevelopment peak rates of runoff for the 2-year, 10-year, and 25-year storm events at the identified points of interest is presented below.

| Comparison of Pre-Development and Post-Development Peak Flow Rates<br>Peak Discharge (cfs) |        |  |         |   |         |   |
|--|--------|--|---------|---|---------|---|
| Point of Interest  | 2-Year |  | 10-Year |   | 25-Year |   |
|  | Pre    | Post                                       | Pre     | Post  | Pre     | Post  |
| POI #1   | 6.59   | <del>5.74</del> <u>5.92</u><br><b>5.78</b> | 16.04   | <del>15.26</del> <u>15.58</u><br><b>14.41</b> | 20.93   | <del>20.30</del> <u>20.64</u><br><b>19.31</b> |
| POI #2   | 32.02  | 31.47 <del>31.26</del><br><b>27.90</b>     | 84.10   | 81.51 <del>80.94</del><br><b>74.47</b>        | 108.56  | 104.35 <del>106.05</del><br><b>98.99</b>      |
| POI #2A  | 7.39   | 7.40                                       | 20.90   | 20.88   | 27.90   | 27.85   |
| POI #2B  | 12.29  | 12.78<br><u>11.20</u>                      | 31.99   | 32.08<br><u>29.44</u>                         | 42.04   | 40.77<br><u>38.10</u>                         |
| POI #2C  | 11.73  | 9.05<br><u>8.22</u>                        | 29.18   | 22.09<br><u>20.79</u>                         | 38.26   | 27.99<br><u>27.35</u>                         |
| POI #3   | 2.87   | 1.92 <u>2.32 2.15</u><br><u>2.28 2.30</u>  | 6.61    | 4.21 <u>6.06 5.77</u><br><u>5.41 5.42</u>     | 8.51    | 5.35 <u>7.64 7.30</u><br><u>6.78 6.79</u>     |
| POI #4   | 13.79  | 4.10                                       | 27.75   | 8.08  | 34.52   | 10.00   |
| POI #5   | 0.06   | 0.04                                       | 0.26    | 0.20  | 0.38    | 0.29  |
| POI #6   | 2.75   | 2.29                                       | 5.89    | 5.27  | 7.44    | 6.78  |

As indicated by the above table, postdevelopment peak rates of runoff for the design storm events are expected to be below the predevelopment peak flow rates at all identified points of interest except POI 2A and POI 2B. At these two this points of

<sup>2</sup> **The HydroCAD calculations have been rerun for the inclusion of the four lots on the Russell property and the development of the Private drive to access those lots. The has increased the impervious area within Subarea 20C by 0.56 acre, increased lawn area by 0.367 acre and decreased woods coverage by 0.927 acres. The findings are that there is no change in peak discharge at the Point of Interest #2, which Subarea 20C is tributary to.**

interest, a small increases in peak rates of runoff are is expected in the 2-year design storm as a result of the proposed development.

The reduction in peak flow rates observed is primarily the result of increasing the area tributary to the existing pond from the predevelopment condition. **The large pond detains runoff and releases it slowly, attenuating the peak flow rates at POI 3.** ~~The 21.8 acres tributary to the pond in the postdevelopment condition contribute no flow to any of the points of interest in the 2-year storm event and add less than 2.25 cfs to POI 3 during the 25-year storm event.~~

At POI 2A, the peak rate of runoff is expected to increase from 7.39 cfs to 7.40 cfs during the 2-year storm event. ~~At POI 2B, the peak rate of runoff is expected to increase from 12.29 cfs to 12.78 in the 2-year storm event and from 31.99 cfs to 32.08 cfs in the 10-year storm event.~~

~~These two~~ This points of interest are is located immediately downstream of an area of proposed lot development, and are is ultimately tributary to point of interest POI 2. Overall, POI 2 is expected to experience a decrease in peak flow rates as a result of the proposed development. Given the conservative nature of the underlying hydrologic model and assumptions made in estimating these flows, the small magnitude of the expected increases in flow, and the fact that a reduction in flow is expected downstream of POI 2A and POI 2B, we believe that the modeled increases in peak flow rates are is insignificant.

## 12.8 Water Quality Measures (General Standard)

The project has been designed in accordance with the Site Location of Development Act and Stormwater Law (Chapter 500), which require water quality treatment for 95% **90%** of new impervious areas and 80% **75%** of new developed areas.<sup>3</sup>

The design employs one wet pond, two underdrained soil filter basins, ~~several Filterra / Stormtech Isolator Row treatment trains,~~ and roofline drip edge filters to achieve stormwater quality treatment standards. All BMPs were designed in accordance with the latest version of the Maine Department of Environmental Protection BMPs Technical Design Manual.

The proposed design provides for treatment of 95.5% **96.0%** **91.4%** of new impervious areas and 80.5% **80.9%** **87.2%** **83.9%** of new developed areas. Water quality computations are provided in Attachment B and information on the individual Best Management Practice (BMP) measures are provided below.

**Wet Pond:** The existing man-made pond will be utilized as a wet pond to meet water quality standards. The wet pond will treat approximately 3.93 **3.85** **5.41** **5.53** acres of new impervious area and 8.55 **8.47** **11.31** **12.37** acres of new developed area consisting of roadway and lot development. The existing pond was found to exceed the criteria for permanent pool volume and mean depth, based on a field survey of the pond bottom. ***A wet pond's mean depth is typically calculated at 1 foot below the permanent pool elevation. Because this wet pond has a significantly larger permanent pool volume than is required by Chapter 500 Standards, we feel that it is appropriate to calculate the mean depth at the permanent pool elevation.***

~~A 24" pipe outlet will be installed to provide flooding protection for adjacent houses. The existing water surface elevation is approximately 81. The pond volume and mean depth below elevation 81 are greater than required by the MDEP BMPs Technical Design Manual. An outlet control structure has been designed to discharge the water quality volume over approximately 33 28 30 hours, as well as limit peak discharge rates downstream to predevelopment levels.~~ The outlet will discharge to a large forested wetland located in the town forest, southeast of the project site. The discharge will travel overland for approximately 2,500' prior to entering Mill Brook. Because temperature reduction is not necessary when discharging to a wetland, the typical underdrained gravel trench outlet has been eliminated from the design in accordance with Section 4.B.3(b) of the Chapter 500 Rules. Design computations for the wet pond are provided in Attachment C.

The existing pond ***was created by a past gravel extraction operation and*** has no ***natural*** outlet. ***The land surrounding the pond is significantly higher in elevation than the pond water surface, which is believed to be the groundwater elevation. In order for water to overtop the pond embankment, the water surface elevation would need to reach approximately 93.0. Storm events as large as the 100-year***

<sup>3</sup> **See reference to Chapter 500 Table 1 of Part 4.C.2.a.iii. The primary treatment for the four new house lots on the Russell property will be roof line drip edges. No other drainage systems are part of the Russell property design.**

**storm are expected to only raise the water surface elevation to approximately 84.5 85.0. As such, constructing an emergency spillway is not necessary or feasible.**

~~**Filterra / Stormtech Isolator Row Treatment Trains:** Eight Filterra treebox filters tributary to three Stormtech Isolator Row treatment trains will be installed to treat runoff from Wyman Way, and the proposed Private Road. The systems were designed in accordance with the Interim Guidance for Filterra/StormTech Isolator Row Treatment Train document, issued by MDEP on February 26, 2009. The treatment trains will treat a total of 1.83 acres of new impervious area and 3.14 acres of new developed area. **Similar to the soil filter basins, the StormTech Isolator Rows have been designed with low permeability clay liners to provide separation between stormwater runoff and groundwater.** Design computations are provided in Attachment E, and construction details are provided in the plan set.~~

**Roofline Dripline Filtration:** All new houses will feature roof dripline filters designed in accordance with MDEP design guidelines, dated May 8, 2007. For the water quality calculations provided in Attachment B, treatment is assumed to occur in dripline filters for houses or portions of houses that are not tributary to other structural BMPs.

## **12.9 Erosion and Sedimentation Control (Basic Standards)**

A comprehensive Erosion and Sediment Control Report has been created that includes Best Management Practices (BMPs) associated with the proposed construction activities (see Section 14 of this application).

The Erosion and Sediment Control Report outlines the required construction measures and techniques that will reduce potential degradation of the water quality to down gradient locations. Temporary and permanent erosion control measures must be incorporated into the construction and long-term surface stabilization practices for the prospective development, thus minimizing erosion and sediment transport. These measures include the constructed BMPs for filtration of runoff flows from smaller storm events, riprap, permanent seeding and other vegetative stabilization measures.

## **12.10 Maintenance of Facilities**

The effectiveness of water quality management provisions and other components of the stormwater management system are dependent on their design, upkeep, and maintenance to assure they meet their intended function over an extended period of years. It is critical that the stormwater management facilities are regularly inspected, and that maintenance is performed on an as-needed basis.

A Stormwater Management Inspection and Maintenance Manual has been prepared specifically for the project, and is included in Attachment G.

## **12.11 Conclusions**

The Stormwater Management system for this project will mitigate impacts of development on stormwater runoff peak discharge rates and provide treatment of non-point pollutants in the runoff in accordance with Maine's Stormwater Management Act and Regulations. Based on the analysis described herein, it is expected that runoff from

the proposed development can be discharged with no adverse impacts to downstream conditions.

#### **12.12 Attachments**

Attachment A – Postdevelopment Watershed Map and Phase 1 Existing Conditions Plan

Attachment B – Water Quality Calculations

Attachment C – Wet Pond Design Calculations **(Omitted)**

Attachment D – Underdrained Soil Filter Basin Design Calculations & TP Logs  
**(Omitted)**

Attachment E – Filterterra / Isolator Row Treatment Train Design Calculations

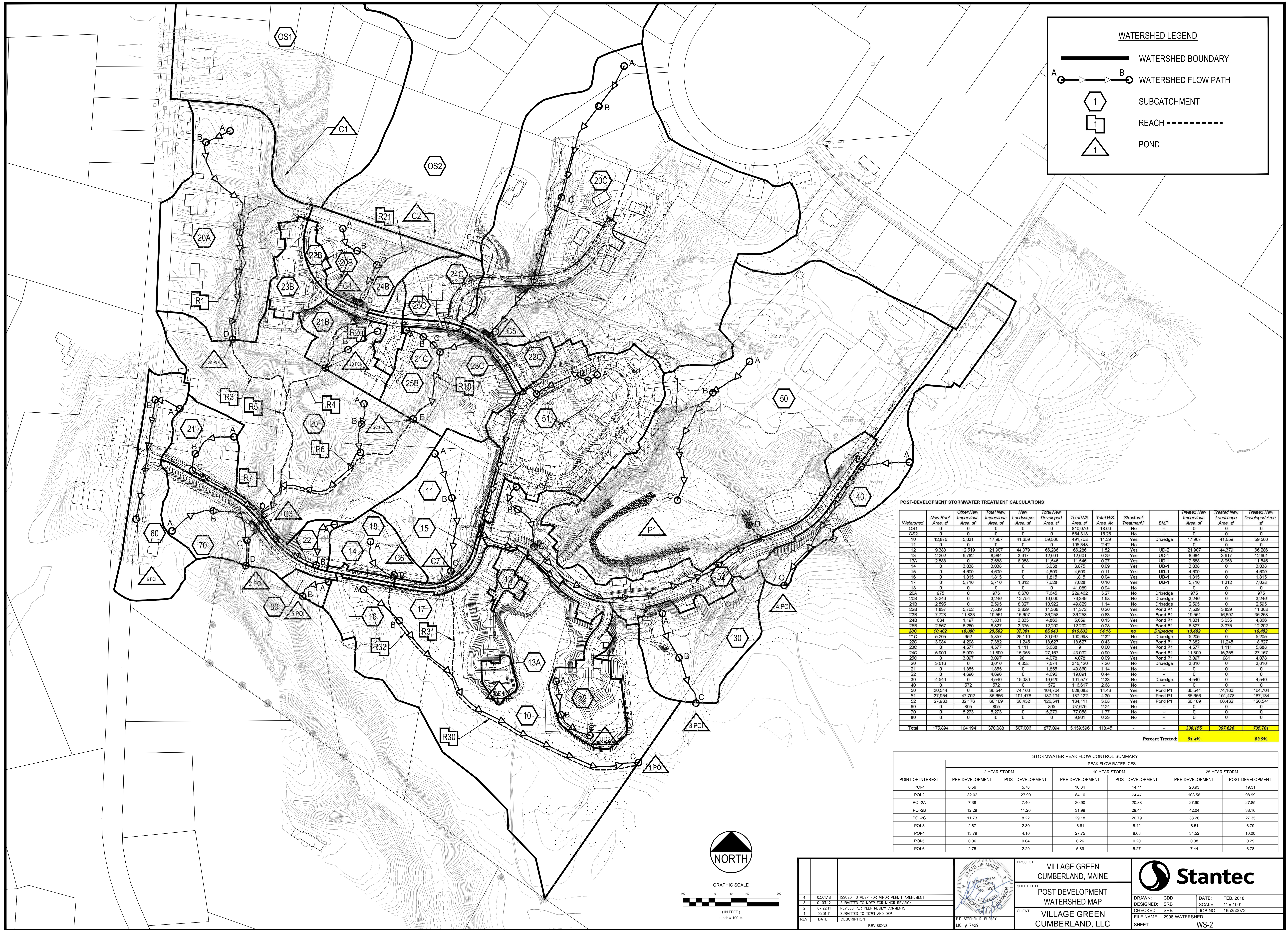
Attachment F – TR-20 Computations (HydroCAD) **(Predevelopment Omitted)**

Attachment G – Maintenance of Common Facilities or Property **(Omitted)**

## **ATTACHMENT A**

### **Predevelopment & Postdevelopment Watershed Maps**







## **ATTACHMENT B**

### **Water Quality Calculations**



**Job No. 195350072 Russell Property**  
**Village Green**

**2/26/2018**

V:\1953\active\195350072\Eng\Calculations

**POST-DEVELOPMENT STORMWATER TREATMENT CALCULATIONS**

| Watershed  | New Roof Area, sf | Other New Impervious Area, sf | Total New Impervious Area, sf | New Landscape Area, sf | Total New Developed Area, sf | Total WS Area, sf | Total WS Area, Ac | Structural Treatment? | BMP             | Treated New Impervious Area, sf | Treated New Landscape Area, sf | Treated New Developed Area, sf |
|------------|-------------------|-------------------------------|-------------------------------|------------------------|------------------------------|-------------------|-------------------|-----------------------|-----------------|---------------------------------|--------------------------------|--------------------------------|
| OS1        | 0                 | 0                             | 0                             | 0                      | 0                            | 810,076           | 18.60             | No                    | -               | 0                               | 0                              | 0                              |
| OS2        | 0                 | 0                             | 0                             | 0                      | 0                            | 664,318           | 15.25             | No                    | -               | 0                               | 0                              | 0                              |
| 10         | 12,876            | 5,031                         | 17,907                        | 41,659                 | 59,566                       | 491,708           | 11.29             | Yes                   | Dripedge        | 17,907                          | 41,659                         | 59,566                         |
| 11         | 0                 | 0                             | 0                             | 0                      | 0                            | 105,348           | 2.42              | No                    | -               | 0                               | 0                              | 0                              |
| 12         | 9,388             | 12,519                        | 21,907                        | 44,379                 | 66,286                       | 66,286            | 1.52              | Yes                   | UD-2            | 21,907                          | 44,379                         | 66,286                         |
| 13         | 2,202             | 6,782                         | 8,984                         | 3,617                  | 12,601                       | 12,601            | 0.29              | Yes                   | UD-1            | 8,984                           | 3,617                          | 12,601                         |
| 13A        | 2,588             | 0                             | 2,588                         | 8,958                  | 11,546                       | 11,546            | 0.27              | Yes                   | UD-1            | 2,588                           | 8,958                          | 11,546                         |
| 14         | 0                 | 3,038                         | 3,038                         | 0                      | 3,038                        | 3,875             | 0.09              | Yes                   | UD-1            | 3,038                           | 0                              | 3,038                          |
| 15         | 0                 | 4,609                         | 4,609                         | 0                      | 4,609                        | 4,609             | 0.11              | Yes                   | UD-1            | 4,609                           | 0                              | 4,609                          |
| 16         | 0                 | 1,815                         | 1,815                         | 0                      | 1,815                        | 1,815             | 0.04              | Yes                   | UD-1            | 1,815                           | 0                              | 1,815                          |
| 17         | 0                 | 5,716                         | 5,716                         | 1,312                  | 7,028                        | 7,028             | 0.16              | Yes                   | UD-1            | 5,716                           | 1,312                          | 7,028                          |
| 18         | 0                 | 0                             | 0                             | 0                      | 0                            | 41,089            | 0.94              | No                    | -               | 0                               | 0                              | 0                              |
| 20A        | 975               | 0                             | 975                           | 6,670                  | 7,645                        | 229,462           | 5.27              | No                    | Dripedge        | 975                             | 0                              | 975                            |
| 20B        | 3,246             | 0                             | 3,246                         | 12,754                 | 16,000                       | 73,349            | 1.68              | No                    | Dripedge        | 3,246                           | 0                              | 3,246                          |
| 21B        | 2,595             | 0                             | 2,595                         | 8,327                  | 10,922                       | 49,829            | 1.14              | No                    | Dripedge        | 2,595                           | 0                              | 2,595                          |
| 22B        | 1,837             | 5,702                         | 7,539                         | 3,829                  | 11,368                       | 11,372            | 0.26              | Yes                   | Pond P1         | 7,539                           | 3,829                          | 11,368                         |
| 23B        | 7,728             | 11,833                        | 19,561                        | 16,697                 | 36,258                       | 36,258            | 0.83              | Yes                   | Pond P1         | 19,561                          | 16,697                         | 36,258                         |
| 24B        | 634               | 1,197                         | 1,831                         | 3,035                  | 4,866                        | 5,659             | 0.13              | Yes                   | Pond P1         | 1,831                           | 3,035                          | 4,866                          |
| 25B        | 2,567             | 6,260                         | 8,827                         | 3,375                  | 12,202                       | 12,202            | 0.28              | Yes                   | Pond P1         | 8,827                           | 3,375                          | 12,202                         |
| <b>20C</b> | <b>10,482</b>     | <b>18,080</b>                 | <b>28,562</b>                 | <b>37,381</b>          | <b>65,943</b>                | <b>616,602</b>    | <b>14.16</b>      | <b>no</b>             | <b>Dripedge</b> | <b>10,482</b>                   | <b>0</b>                       | <b>10,482</b>                  |
| 21C        | 5,205             | 652                           | 5,857                         | 25,110                 | 30,967                       | 100,998           | 2.32              | No                    | Dripedge        | 5,205                           | 0                              | 5,205                          |
| 22C        | 3,084             | 4,298                         | 7,382                         | 11,245                 | 18,627                       | 18,627            | 0.43              | Yes                   | Pond P1         | 7,382                           | 11,245                         | 18,627                         |
| 23C        | 0                 | 4,577                         | 4,577                         | 1,111                  | 5,688                        | 9                 | 0.00              | Yes                   | Pond P1         | 4,577                           | 1,111                          | 5,688                          |
| 24C        | 5,900             | 5,909                         | 11,809                        | 15,358                 | 27,167                       | 43,032            | 0.99              | Yes                   | Pond P1         | 11,809                          | 15,358                         | 27,167                         |
| 25C        | 0                 | 3,097                         | 3,097                         | 981                    | 4,078                        | 4,078             | 0.09              | Yes                   | Pond P1         | 3,097                           | 981                            | 4,078                          |
| 20         | 3,616             | 0                             | 3,616                         | 4,058                  | 7,674                        | 316,120           | 7.26              | No                    | Dripedge        | 3,616                           | 0                              | 3,616                          |
| 21         | 0                 | 1,855                         | 1,855                         | 0                      | 1,855                        | 49,860            | 1.14              | No                    | -               | 0                               | 0                              | 0                              |
| 22         | 0                 | 4,696                         | 4,696                         | 0                      | 4,696                        | 19,091            | 0.44              | No                    | -               | 0                               | 0                              | 0                              |
| 30         | 4,540             | 0                             | 4,540                         | 15,080                 | 19,620                       | 101,577           | 2.33              | No                    | Dripedge        | 4,540                           | 0                              | 4,540                          |
| 40         | 0                 | 572                           | 572                           | 0                      | 572                          | 116,617           | 2.68              | No                    | -               | 0                               | 0                              | 0                              |
| 50         | 30,544            | 0                             | 30,544                        | 74,160                 | 104,704                      | 628,688           | 14.43             | Yes                   | Pond P1         | 30,544                          | 74,160                         | 104,704                        |
| 51         | 37,954            | 47,702                        | 85,656                        | 101,478                | 187,134                      | 187,122           | 4.30              | Yes                   | Pond P1         | 85,656                          | 101,478                        | 187,134                        |
| 52         | 27,933            | 32,176                        | 60,109                        | 66,432                 | 126,541                      | 134,111           | 3.08              | Yes                   | Pond P1         | 60,109                          | 66,432                         | 126,541                        |
| 60         | 0                 | 805                           | 805                           | 0                      | 805                          | 97,675            | 2.24              | No                    | -               | 0                               | 0                              | 0                              |
| 70         | 0                 | 5,273                         | 5,273                         | 0                      | 5,273                        | 77,058            | 1.77              | No                    | -               | 0                               | 0                              | 0                              |
| 80         | 0                 | 0                             | 0                             | 0                      | 0                            | 9,901             | 0.23              | No                    | -               | 0                               | 0                              | 0                              |
| Total      | 175,894           | 194,194                       | 370,088                       | 507,006                | 877,094                      | 5,159,596         | 118.45            | -                     | -               | <b>338,155</b>                  | <b>397,626</b>                 | <b>735,781</b>                 |

Percent Treated:

**91.4%**

**83.9%**

## **ATTACHMENT C**

### **~~Wet Pond Design Calculations~~**

**ATTACHMENT D**

**~~Underdrained Soil Filter Design Calculations  
&  
Soil Test Pit Logs~~**

**(OMITTED)**

**ATTACHMENT E**

**~~Filtterra / Isolator Row Treatment Train Design Calculations~~**

***Removed with January 2012 Revision***

## **ATTACHMENT F**

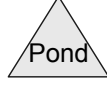
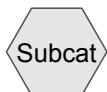
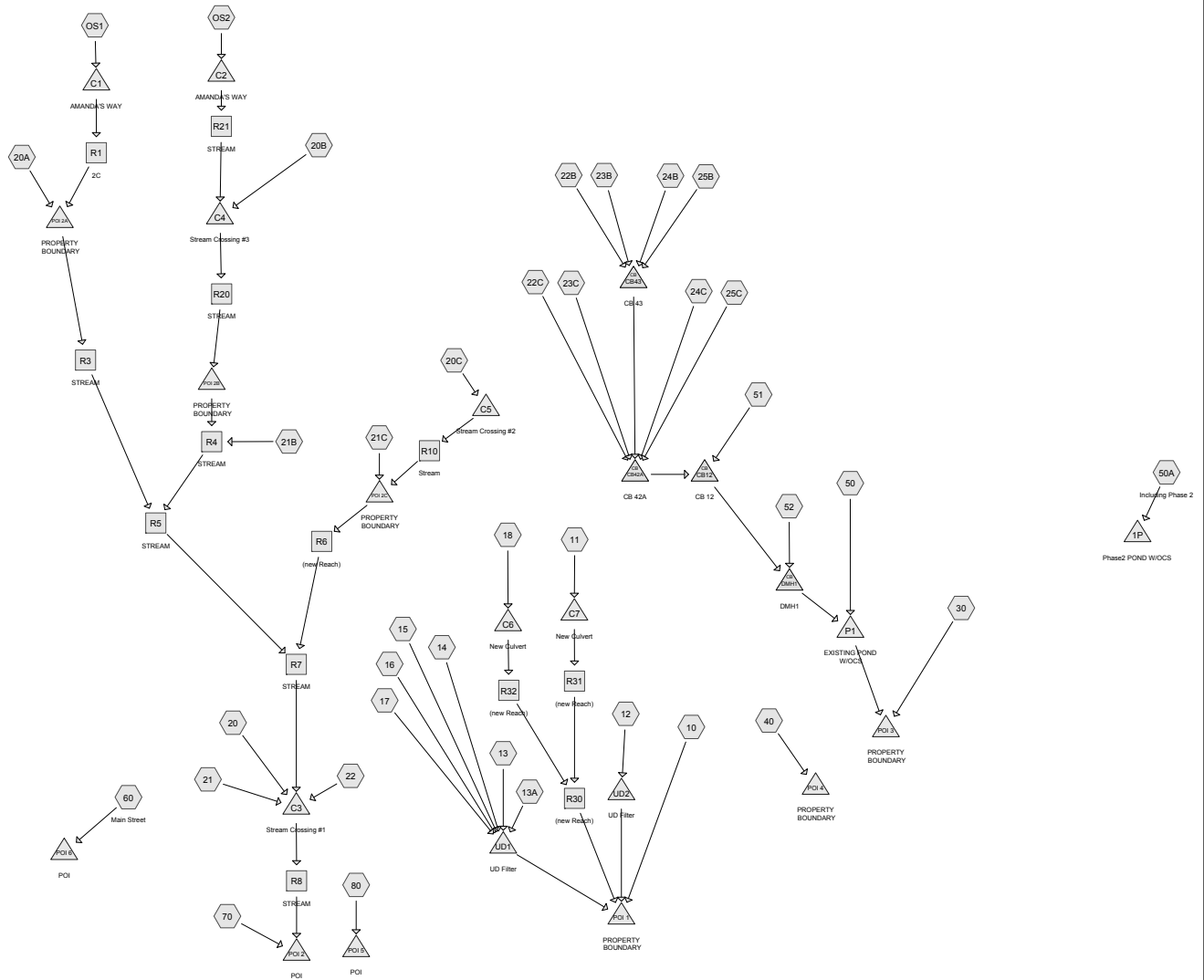
**TR-20 Computations (HydroCAD)**

***(Post development only)***

## Predevelopment Calculations

**(OMITTED)**

## **Postdevelopment Calculations**



**Routing Diagram for 2998 Village Green w Russell-POST-REV02-27-18**  
 Prepared by Stantec Consulting Ltd.  
 HydroCAD® 10.00 s/n 09378 © 2013 HydroCAD Software Solutions LLC



**Summary for Subcatchment 10:**

Runoff = 5.00 cfs @ 12.79 hrs, Volume= 0.805 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.296   | 98 | Paved parking & roofs - New House     |
| * 0.115   | 98 | Paved parking & roofs - New Road+SW   |
| * 0.098   | 98 | Paved parking & roofs - Exist         |
| * 0.586   | 61 | >75% Grass cover, Good, HSG B - Exist |
| * 0.095   | 80 | >75% Grass cover, Good, HSG D - Exist |
| * 0.018   | 61 | >75% Grass cover, Good, HSG B - New   |
| * 1.657   | 80 | >75% Grass cover, Good, HSG D - NEW   |
| 1.334     | 55 | Woods, Good, HSG B                    |
| 7.089     | 77 | Woods, Good, HSG D                    |
| 11.288    | 75 | Weighted Average                      |
| 10.779    |    | 95.49% Pervious Area                  |
| 0.509     |    | 4.51% Impervious Area                 |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 30.7     | 920           | 0.0100        | 0.50              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 53.9     | 1,070         | Total         |                   |                |   |

**Summary for Subcatchment 11:**

Runoff = 1.25 cfs @ 12.61 hrs, Volume= 0.174 af, Depth> 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.164   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.004   | 98 | Paved parking & roofs - Exist       |
| 0.574     | 70 | Woods, Good, HSG C                  |
| 1.677     | 77 | Woods, Good, HSG D                  |
| 2.419     | 75 | Weighted Average                    |
| 2.415     |    | 99.83% Pervious Area                |
| 0.004     |    | 0.17% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 36.4        | 150              | 0.0130           | 0.07                 |                   | <b>Sheet Flow, AB</b>                      |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5         | 232              | 0.0300           | 0.87                 |                   | <b>Shallow Concentrated Flow, BC</b>       |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 40.9        | 382              | Total            |                      |                   |  |

**Summary for Subcatchment 12:**

Runoff = 2.86 cfs @ 12.10 hrs, Volume= 0.197 af, Depth> 1.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.503     | 98 | Paved parking & roofs         |
| 1.019     | 80 | >75% Grass cover, Good, HSG D |
| 1.522     | 86 | Weighted Average              |
| 1.019     |    | 66.95% Pervious Area          |
| 0.503     |    | 33.05% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                           |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------|
| 5.8         | 50               | 0.0200           | 0.14                 |                   | <b>Sheet Flow, A-B</b>                |
|             |                  |                  |                      |                   | Grass: Short n= 0.150 P2= 3.00"       |
| 0.9         | 100              | 0.0160           | 1.90                 |                   | <b>Shallow Concentrated Flow, B-C</b> |
|             |                  |                  |                      |                   | Grassed Waterway Kv= 15.0 fps         |
| 6.7         | 150              | Total            |                      |                   |                                       |

**Summary for Subcatchment 13:**

Runoff = 0.75 cfs @ 12.07 hrs, Volume= 0.051 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.207     | 98 | Paved parking & roofs         |
| 0.083     | 80 | >75% Grass cover, Good, HSG D |
| 0.290     | 93 | Weighted Average              |
| 0.083     |    | 28.62% Pervious Area          |
| 0.207     |    | 71.38% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 13A:**

Runoff = 0.47 cfs @ 12.08 hrs, Volume= 0.031 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.059     | 98 | Paved parking & roofs         |
| 0.206     | 80 | >75% Grass cover, Good, HSG D |
| 0.265     | 84 | Weighted Average              |
| 0.206     |    | 77.74% Pervious Area          |
| 0.059     |    | 22.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 14:**

Runoff = 0.26 cfs @ 12.07 hrs, Volume= 0.019 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.070   | 98 | Paved parking & roofs - New Road + SW |
| * 0.019   | 98 | Paved parking & roofs - Exist         |
| 0.089     | 98 | Weighted Average                      |
| 0.089     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 15:**

Runoff = 0.31 cfs @ 12.07 hrs, Volume= 0.023 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.106   | 98 | Paved parking & roofs - New Road + SW |
| 0.106     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 16:**

Runoff = 0.12 cfs @ 12.07 hrs, Volume= 0.009 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New Road + SW |
| 0.042     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 17:**

Runoff = 0.44 cfs @ 12.07 hrs, Volume= 0.031 af, Depth> 2.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.131   | 98 | Paved parking & roofs - New Road + SW |
| 0.030     | 80 | >75% Grass cover, Good, HSG D         |
| 0.161     | 95 | Weighted Average                      |
| 0.030     |    | 18.63% Pervious Area                  |
| 0.131     |    | 81.37% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 18:**

Runoff = 1.26 cfs @ 12.14 hrs, Volume= 0.095 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.224   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.150   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.208   | 98 | Paved parking & roofs - Exist       |
| 0.003     | 70 | Woods, Good, HSG C                  |
| 0.359     | 77 | Woods, Good, HSG D                  |
| 0.944     | 81 | Weighted Average                    |
| 0.736     |    | 77.97% Pervious Area                |
| 0.208     |    | 22.03% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.5      | 150           | 0.0530        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00" |

### Summary for Subcatchment 20:

Runoff = 3.92 cfs @ 12.30 hrs, Volume= 0.412 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.588   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.027   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.066   | 74 | >75% Grass cover, Good, HSG C-New   |
| * 0.083   | 98 | Paved parking & roofs - New Roof    |
| * 0.069   | 98 | Paved parking & roofs - Exist       |
| 6.225     | 70 | Woods, Good, HSG C                  |
| 0.198     | 77 | Woods, Good, HSG D                  |
| 7.256     | 71 | Weighted Average                    |
| 7.104     |    | 97.91% Pervious Area                |
| 0.152     |    | 2.09% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 17.6     | 65            | 0.0150        | 0.06              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"      |
| 0.6      | 90            | 0.2200        | 2.35              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps             |
| 0.7      | 440           | 0.0200        | 11.23             | 1,122.98       | <b>Channel Flow, CD</b><br>Area= 100.0 sf Perim= 32.0' r= 3.13' n= 0.040 |
| 18.9     | 595           | Total         |                   |                |  |

### Summary for Subcatchment 20A:

Runoff = 4.25 cfs @ 12.15 hrs, Volume= 0.341 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.022   | 98 | Paved parking & roofs - New House   |
| * 0.153   | 74 | >75% Grass cover, Good, HSG C - New |
| 0.038     | 98 | Paved parking & roofs               |
| 0.429     | 98 | Paved parking & roofs               |
| * 0.016   | 98 | Walkways, Impervious                |
| 0.166     | 89 | Gravel roads, HSG C                 |
| 0.339     | 61 | >75% Grass cover, Good, HSG B       |
| 1.777     | 74 | >75% Grass cover, Good, HSG C       |
| 0.618     | 58 | Meadow, non-grazed, HSG B           |
| 0.071     | 71 | Meadow, non-grazed, HSG C           |
| 0.016     | 55 | Woods, Good, HSG B                  |
| 1.583     | 70 | Woods, Good, HSG C                  |
| 0.040     | 77 | Woods, Good, HSG D                  |
| 5.268     | 73 | Weighted Average                    |
| 4.763     |    | 90.41% Pervious Area                |
| 0.505     |    | 9.59% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4      | 85            | 0.0700        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 3.5      | 330           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps   |
| 0.7      | 350           | 0.0100        | 8.97              | 1,345.05       | <b>Channel Flow, CD</b><br>Area= 150.0 sf Perim= 40.0' r= 3.75'<br>n= 0.040 Winding stream, pools & shoals |
| 9.6      | 765           | Total         |                   |                |  |

### Summary for Subcatchment 20B:

Runoff = 1.48 cfs @ 12.24 hrs, Volume= 0.137 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.074   | 98 | Paved parking & roofs - New House |
| * 0.081   | 98 | Paved parking & roofs - Existing  |
| 0.185     | 55 | Woods, Good, HSG B                |
| 0.052     | 70 | Woods, Good, HSG C                |
| 1.000     | 77 | Woods, Good, HSG D                |
| 0.293     | 80 | >75% Grass cover, Good, HSG D     |
| 1.685     | 77 | Weighted Average                  |
| 1.530     |    | 90.80% Pervious Area              |
| 0.155     |    | 9.20% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 15.4        | 90               | 0.0400           | 0.10                 |                   | <b>Sheet Flow, AB</b>                        |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00"   |
| 0.6         | 80               | 0.1700           | 2.06                 |                   | <b>Shallow Concentrated Flow, BC</b>         |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                         |
| 0.2         | 120              | 0.0250           | 10.26                | 615.46            | <b>Channel Flow, DE</b>                      |
|             |                  |                  |                      |                   | Area= 60.0 sf Perim= 26.0' r= 2.31' n= 0.040 |
| 16.2        | 290              | Total            |                      |                   |  |

**Summary for Subcatchment 20C:**

Runoff = 7.18 cfs @ 12.49 hrs, Volume= 0.906 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.179   | 98 | Paved parking & roofs - Exist     |
| * 0.654   | 98 | Paved parking & roofs - New Roof  |
| * 0.491   | 80 | >75% Grass cover, Good, HSG D-NEW |
| 0.222     | 61 | >75% Grass cover, Good, HSG B     |
| 0.465     | 74 | >75% Grass cover, Good, HSG C     |
| 1.265     | 80 | >75% Grass cover, Good, HSG D     |
| 0.578     | 71 | Meadow, non-grazed, HSG C         |
| 1.196     | 78 | Meadow, non-grazed, HSG D         |
| 1.896     | 55 | Woods, Good, HSG B                |
| 3.522     | 70 | Woods, Good, HSG C                |
| 3.687     | 77 | Woods, Good, HSG D                |
| 14.155    | 73 | Weighted Average                  |
| 13.322    |    | 94.12% Pervious Area              |
| 0.833     |    | 5.88% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 25.0        | 150              | 0.0333           | 0.10                 |                   | <b>Sheet Flow, AB</b>                      |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 6.1         | 310              | 0.0290           | 0.85                 |                   | <b>Shallow Concentrated Flow, BC</b>       |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 0.8         | 482              | 0.0380           | 10.18                | 407.20            | <b>Channel Flow, CD</b>                    |
|             |                  |                  |                      |                   | Area= 40.0 sf Perim= 24.0' r= 1.67'        |
|             |                  |                  |                      |                   | n= 0.040 Winding stream, pools & shoals    |
| 31.9        | 942              | Total            |                      |                   |  |

**Summary for Subcatchment 21:**

Runoff = 1.32 cfs @ 12.16 hrs, Volume= 0.104 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.537     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.043   | 98 | Paved parking & roofs - New Road + SW |
| * 0.265   | 98 | Paved parking & roofs - Exist         |
| 0.300     | 70 | Woods, Good, HSG C                    |
| 1.145     | 79 | Weighted Average                      |
| 0.837     |    | 73.10% Pervious Area                  |
| 0.308     |    | 26.90% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.6      | 145           | 0.0480        | 0.25              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.3      | 50            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.9      | 250           | 0.0520        | 4.63              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps            |
| 10.8     | 445           | Total         |                   |                |   |

**Summary for Subcatchment 21B:**

Runoff = 1.06 cfs @ 12.28 hrs, Volume= 0.104 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.060   | 98 | Paved parking & roofs - New House |
| 0.191     | 80 | >75% Grass cover, Good, HSG D     |
| 0.893     | 77 | Woods, Good, HSG D                |
| 1.144     | 79 | Weighted Average                  |
| 1.084     |    | 94.76% Pervious Area              |
| 0.060     |    | 5.24% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 18.9     | 110           | 0.0360        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 0.3      | 50            | 0.2800        | 2.65              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 19.2     | 160           | Total         |                   |                |   |

**Summary for Subcatchment 21C:**

Runoff = 2.48 cfs @ 12.19 hrs, Volume= 0.211 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"



| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.576     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.015   | 98 | Paved parking & roofs - Road + SW  |
| * 0.119   | 98 | Paved parking & roofs - New Houses |
| 1.608     | 77 | Woods, Good, HSG D                 |
| 2.318     | 79 | Weighted Average                   |
| 2.184     |    | 94.22% Pervious Area               |
| 0.134     |    | 5.78% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 60            | 0.0420        | 0.20              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                |
| 7.4      | 40            | 0.0500        | 0.09              |                | <b>Sheet Flow, BC</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"     |
| 0.2      | 30            | 0.3000        | 2.74              |                | <b>Shallow Concentrated Flow, CD</b><br>Woodland Kv= 5.0 fps            |
| 0.5      | 240           | 0.0250        | 8.26              | 330.28         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67' n= 0.040 |
| 13.1     | 370           | Total         |                   |                |   |

**Summary for Subcatchment 22:**

Runoff = 0.49 cfs @ 12.15 hrs, Volume= 0.038 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.092     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.108   | 98 | Paved parking & roofs - New Road + SW |
| 0.044     | 77 | Woods, Good, HSG D                    |
| 0.194     | 70 | Woods, Good, HSG C                    |
| 0.438     | 78 | Weighted Average                      |
| 0.330     |    | 75.34% Pervious Area                  |
| 0.108     |    | 24.66% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.7      | 150           | 0.0660        | 0.29              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 0.9      | 230           | 0.0480        | 4.45              |                | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps |
| 9.6      | 380           | Total         |                   |                |  |

**Summary for Subcatchment 22B:**

Runoff = 0.65 cfs @ 12.07 hrs, Volume= 0.044 af, Depth> 2.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New House  |
| * 0.131   | 98 | Paved parking & roofs - Roads + SW |
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| 0.018     | 74 | >75% Grass cover, Good, HSG C      |
| 0.261     | 92 | Weighted Average                   |
| 0.088     |    | 33.72% Pervious Area               |
| 0.173     |    | 66.28% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 22C:**

Runoff = 0.87 cfs @ 12.08 hrs, Volume= 0.058 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.258     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.071   | 98 | Paved parking & roofs - New Houses |
| * 0.099   | 98 | Paved parking & roofs - Road + SW  |
| 0.428     | 87 | Weighted Average                   |
| 0.258     |    | 60.28% Pervious Area               |
| 0.170     |    | 39.72% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23B:**

Runoff = 1.70 cfs @ 12.08 hrs, Volume= 0.113 af, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.177   | 98 | Paved parking & roofs - New House  |
| * 0.272   | 98 | Paved parking & roofs - Roads + SW |
| 0.051     | 80 | >75% Grass cover, Good, HSG D      |
| 0.332     | 74 | >75% Grass cover, Good, HSG C      |
| 0.832     | 87 | Weighted Average                   |
| 0.383     |    | 46.03% Pervious Area               |
| 0.449     |    | 53.97% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

### Summary for Subcatchment 23C:

Runoff = 0.35 cfs @ 12.07 hrs, Volume= 0.024 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.026     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.105   | 98 | Paved parking & roofs - Road + SW |
| 0.131     | 94 | Weighted Average                  |
| 0.026     |    | 19.85% Pervious Area              |
| 0.105     |    | 80.15% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

### Summary for Subcatchment 24B:

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 0.016 af, Depth> 1.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.027   | 98 | Paved parking & roofs - Road + SW  |
| * 0.014   | 98 | Paved parking & roofs - New Houses |
| 0.018     | 77 | Woods, Good, HSG D                 |
| 0.129     | 85 | Weighted Average                   |
| 0.088     |    | 68.22% Pervious Area               |
| 0.041     |    | 31.78% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 24C:**

Runoff = 1.67 cfs @ 12.08 hrs, Volume= 0.110 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.353     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.136   | 98 | Paved parking & roofs - Road + SW  |
| * 0.135   | 98 | Paved parking & roofs - New Houses |
| 0.046     | 55 | Woods, Good, HSG B                 |
| 0.037     | 70 | Woods, Good, HSG C                 |
| 0.281     | 77 | Woods, Good, HSG D                 |
| 0.988     | 83 | Weighted Average                   |
| 0.717     |    | 72.57% Pervious Area               |
| 0.271     |    | 27.43% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25B:**

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 0.050 af, Depth> 2.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.059   | 98 | Paved parking & roofs - New House     |
| * 0.144   | 98 | Paved parking & roofs - New Road + SW |
| 0.077     | 80 | >75% Grass cover, Good, HSG D         |
| 0.280     | 93 | Weighted Average                      |
| 0.077     |    | 27.50% Pervious Area                  |
| 0.203     |    | 72.50% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25C:**

Runoff = 0.25 cfs @ 12.07 hrs, Volume= 0.017 af, Depth> 2.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.023     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.071   | 98 | Paved parking & roofs - Road + SW |
| 0.094     | 94 | Weighted Average                  |
| 0.023     |    | 24.47% Pervious Area              |
| 0.071     |    | 75.53% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 30:**

Runoff = 1.75 cfs @ 12.41 hrs, Volume= 0.199 af, Depth> 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| 1.881     | 77 | Woods, Good, HSG D                  |
| * 0.104   | 98 | New Houses                          |
| * 0.346   | 80 | >75% Grass cover, Good, HSG D - New |
| 2.331     | 78 | Weighted Average                    |
| 2.227     |    | 95.54% Pervious Area                |
| 0.104     |    | 4.46% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5      | 155           | 0.0130        | 0.57              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 27.7     | 305           | Total         |                   |                |  |

**Summary for Subcatchment 40:**

Runoff = 4.10 cfs @ 12.12 hrs, Volume= 0.296 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 1.280     | 98 | Paved parking & roofs         |
| 0.104     | 39 | >75% Grass cover, Good, HSG A |
| 0.109     | 74 | >75% Grass cover, Good, HSG C |
| 0.818     | 71 | Meadow, non-grazed, HSG C     |
| 0.214     | 78 | Meadow, non-grazed, HSG D     |
| 2.525     | 84 | Weighted Average              |
| 1.245     |    | 49.31% Pervious Area          |
| 1.280     |    | 50.69% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 7.7      | 150           | 0.0660        | 0.32              |                | <b>Sheet Flow, AB</b><br>Range n= 0.130 P2= 3.00"   |
| 0.5      | 440           | 0.0750        | 14.94             | 239.03         | <b>Channel Flow, CD</b><br>Area= 16.0 sf Perim= 12.0' r= 1.33'<br>n= 0.033 Earth, grassed & winding |
| 8.2      | 590           | Total         |                   |                |   |

**Summary for Subcatchment 50:**

Runoff = 12.64 cfs @ 12.41 hrs, Volume= 1.446 af, Depth> 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 3.437   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 0.768   | 98 | Paved parking & roofs - New Houses       |
| * 1.542   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.126   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.015     | 77 | Woods, Good, HSG D                       |
| 0.466     | 70 | Woods, Good, HSG C                       |
| 14.432    | 81 | Weighted Average                         |
| 11.416    |    | 79.10% Pervious Area                     |
| 3.016     |    | 20.90% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 50A: Including Phase 2**

Runoff = 15.47 cfs @ 12.40 hrs, Volume= 1.764 af, Depth> 1.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 0.577   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 2.860   | 98 | Paved parking & roofs - Phase 2          |
| * 0.438   | 98 | Paved parking & roofs - New Houses       |
| * 0.898   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.071   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.975     | 77 | Woods, Good, HSG D                       |
| 0.535     | 70 | Woods, Good, HSG C                       |
| 14.432    | 85 | Weighted Average                         |
| 8.886     |    | 61.57% Pervious Area                     |
| 5.546     |    | 38.43% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 51:**

Runoff = 8.47 cfs @ 12.10 hrs, Volume= 0.582 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.725     | 74 | >75% Grass cover, Good, HSG C      |
| 1.605     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.871   | 98 | Paved parking & roofs - New Houses |
| * 1.095   | 98 | Paved parking & roofs - Road + SW  |
| 4.296     | 87 | Weighted Average                   |
| 2.330     |    | 54.24% Pervious Area               |
| 1.966     |    | 45.76% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 3.0         | 35               | 0.0500           | 0.19                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 0.6         | 180              | 0.0700           | 5.37                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps                           |
| 2.9         | 1,575            | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 6.5         | 1,790            | Total            |                      |                   |  |

**Summary for Subcatchment 52:**

Runoff = 5.70 cfs @ 12.12 hrs, Volume= 0.417 af, Depth> 1.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.174     | 71 | Meadow, non-grazed, HSG C          |
| 0.056     | 74 | >75% Grass cover, Good, HSG C      |
| * 0.641   | 98 | Paved parking & roofs - New Houses |
| * 0.739   | 98 | Paved parking & roofs - Road + SW  |
| 1.469     | 80 | >75% Grass cover, Good, HSG D      |
| 3.079     | 87 | Weighted Average                   |
| 1.699     |    | 55.18% Pervious Area               |
| 1.380     |    | 44.82% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.6         | 90               | 0.0700           | 0.27                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 1.2         | 135              | 0.0150           | 1.84                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                |
| 1.6         | 860              | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 8.4         | 1,085            | Total            |                      |                   |  |

**Summary for Subcatchment 60: Main Street**

Runoff = 2.29 cfs @ 12.16 hrs, Volume= 0.183 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"



| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.418     | 98 | Paved parking & roofs           |
| 0.938     | 70 | Woods, Good, HSG C              |
| 0.196     | 98 | Paved parking & roofs           |
| 0.688     | 69 | 50-75% Grass cover, Fair, HSG B |
| 2.240     | 77 | Weighted Average                |
| 1.626     |    | 72.59% Pervious Area            |
| 0.614     |    | 27.41% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 6.7      | 85            | 0.0400        | 0.21              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 4.0      | 378           | 0.0160        | 1.58              | 0.21           | <b>Trap/Vee/Rect Channel Flow, BC</b><br>Bot.W=1.00' D=0.10' Z= 3.0 ' Top.W=1.60'<br>n= 0.022 Earth, clean & straight |
| 10.7     | 463           | Total         |                   |                |   |

### Summary for Subcatchment 70:

Runoff = 1.04 cfs @ 12.29 hrs, Volume= 0.107 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.121   | 98 | Paved parking & roofs-New Road + SW |
| * 0.052   | 98 | Paved parking & roofs - Exist.      |
| 0.048     | 61 | >75% Grass cover, Good, HSG B       |
| 1.548     | 70 | Woods, Good, HSG C                  |
| 1.769     | 72 | Weighted Average                    |
| 1.596     |    | 90.22% Pervious Area                |
| 0.173     |    | 9.78% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 16.6     | 150           | 0.0930        | 0.15              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                                       |
| 1.7      | 170           | 0.1100        | 1.66              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps  |
| 0.2      | 79            | 0.0130        | 7.40              | 443.81         | <b>Channel Flow, CD</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.040 Winding stream, pools & shoals |
| 18.5     | 399           | Total         |                   |                |   |

**Summary for Subcatchment 80:**

Runoff = 0.04 cfs @ 12.38 hrs, Volume= 0.005 af, Depth> 0.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.020   | 98 | Paved parking & roofs - Exist |
| 0.051     | 61 | >75% Grass cover, Good, HSG B |
| 0.157     | 55 | Woods, Good, HSG B            |
| 0.228     | 60 | Weighted Average              |
| 0.208     |    | 91.23% Pervious Area          |
| 0.020     |    | 8.77% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 15.0     | 106           | 0.0600        | 0.12              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |

**Summary for Subcatchment OS1:**

Runoff = 6.49 cfs @ 12.66 hrs, Volume= 0.977 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.159     | 98 | Paved parking & roofs         |
| 1.167     | 98 | Paved parking & roofs         |
| 1.048     | 98 | Paved parking & roofs         |
| 0.051     | 98 | Water Surface                 |
| 0.057     | 98 | Water Surface                 |
| * 0.002   | 98 | Walkway, Impervious           |
| * 0.041   | 98 | Walkway, Impervious           |
| 0.900     | 39 | >75% Grass cover, Good, HSG A |
| 3.053     | 61 | >75% Grass cover, Good, HSG B |
| 5.742     | 74 | >75% Grass cover, Good, HSG C |
| 0.077     | 58 | Meadow, non-grazed, HSG B     |
| 0.329     | 71 | Meadow, non-grazed, HSG C     |
| 0.694     | 30 | Woods, Good, HSG A            |
| 1.195     | 55 | Woods, Good, HSG B            |
| 4.085     | 70 | Woods, Good, HSG C            |
| 18.600    | 70 | Weighted Average              |
| 16.075    |    | 86.42% Pervious Area          |
| 2.525     |    | 13.58% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 27.4        | 150              | 0.0266           | 0.09                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                               |
| 4.5         | 250              | 0.0345           | 0.93                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps                                      |
| 1.2         | 196              | 0.0306           | 2.62                 |                   | <b>Shallow Concentrated Flow, CD</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.6         | 80               | 0.0125           | 2.27                 |                   | <b>Shallow Concentrated Flow, DE</b><br>Paved Kv= 20.3 fps  |
| 3.6         | 320              | 0.0219           | 1.48                 |                   | <b>Shallow Concentrated Flow, EF</b><br>Nearly Bare & Untilled Kv= 10.0 fps                       |
| 0.2         | 36               | 0.0208           | 2.93                 |                   | <b>Shallow Concentrated Flow, FG</b><br>Paved Kv= 20.3 fps  |
| 0.3         | 60               | 0.0500           | 3.35                 |                   | <b>Shallow Concentrated Flow, GH</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.3         | 70               | 0.0429           | 4.20                 |                   | <b>Shallow Concentrated Flow, HI</b><br>Paved Kv= 20.3 fps  |
| 0.6         | 148              | 0.0777           | 4.18                 |                   | <b>Shallow Concentrated Flow, IJ</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 3.4         | 310              | 0.0935           | 1.53                 |                   | <b>Shallow Concentrated Flow, JK</b><br>Woodland Kv= 5.0 fps                                      |
| 0.2         | 130              | 0.0231           | 13.15                | 788.81            | <b>Channel Flow, KL</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.030 Earth, clean & winding |
| 42.3        | 1,750            | Total            |                      |                   |   |

**Summary for Subcatchment OS2:**

Runoff = 10.18 cfs @ 12.21 hrs, Volume= 0.926 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.00"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.751     | 98 | Paved parking & roofs         |
| 1.187     | 98 | Paved parking & roofs         |
| 0.404     | 98 | Paved parking & roofs         |
| 0.080     | 98 | Water Surface                 |
| 0.039     | 98 | Water Surface                 |
| 0.001     | 98 | Water Surface                 |
| * 0.026   | 98 | Walkways, Impervious          |
| * 0.007   | 98 | Walkways, Impervious          |
| 0.289     | 74 | Farmsteads, HSG B             |
| 0.233     | 82 | Farmsteads, HSG C             |
| 1.691     | 61 | >75% Grass cover, Good, HSG B |
| 4.263     | 74 | >75% Grass cover, Good, HSG C |
| 0.871     | 80 | >75% Grass cover, Good, HSG D |
| 0.437     | 58 | Meadow, non-grazed, HSG B     |
| 0.026     | 71 | Meadow, non-grazed, HSG C     |
| 2.871     | 55 | Woods, Good, HSG B            |
| 2.044     | 70 | Woods, Good, HSG C            |
| 0.030     | 77 | Woods, Good, HSG D            |
| 15.250    | 72 | Weighted Average              |
| 12.755    |    | 83.64% Pervious Area          |
| 2.495     |    | 16.36% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 10.5     | 150           | 0.0407        | 0.24              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 1.1      | 170           | 0.0294        | 2.57              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.1      | 30            | 0.0333        | 3.70              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps  |
| 1.2      | 300           | 0.0767        | 4.15              |                | <b>Shallow Concentrated Flow, DE</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.5      | 400           | 0.0375        | 13.48             | 539.35         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67'<br>n= 0.030 Earth, clean & winding |
| 13.4     | 1,050         | Total         |                   |                |   |

### Summary for Reach R1: 2C

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 0.63" for 2-yr event  
 Inflow = 6.48 cfs @ 12.67 hrs, Volume= 0.976 af  
 Outflow = 6.46 cfs @ 12.71 hrs, Volume= 0.975 af, Atten= 0%, Lag= 2.2 min

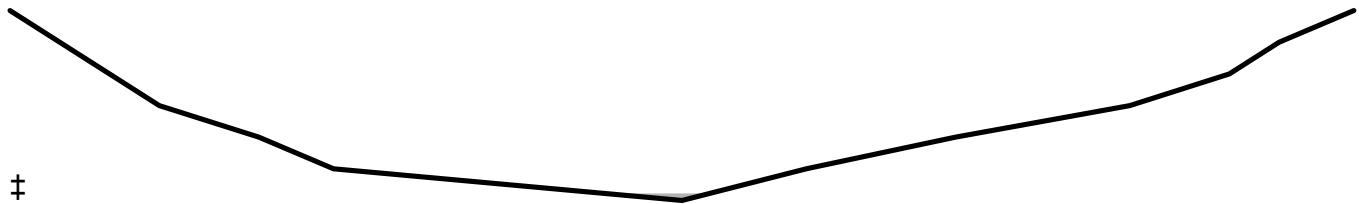
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.44 fps, Min. Travel Time= 1.2 min  
 Avg. Velocity= 2.24 fps, Avg. Travel Time= 1.8 min

Peak Storage= 452 cf @ 12.69 hrs  
 Average Depth at Peak Storage= 0.44'  
 Bank-Full Depth= 12.00' Flow Area= 828.0 sf, Capacity= 29,251.95 cfs

Custom cross-section, Length= 240.0' Slope= 0.0625 '/' (104 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 100.00', Outlet Invert= 85.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -54.00           | 100.00              | 0.00                 |
| -50.00           | 98.00               | 2.00                 |
| -46.00           | 96.00               | 4.00                 |
| -42.00           | 94.00               | 6.00                 |
| -34.00           | 92.00               | 8.00                 |
| -28.00           | 90.00               | 10.00                |
| 0.00             | 88.00               | 12.00                |
| 10.00            | 90.00               | 10.00                |
| 22.00            | 92.00               | 8.00                 |
| 36.00            | 94.00               | 6.00                 |
| 44.00            | 96.00               | 4.00                 |
| 48.00            | 98.00               | 2.00                 |
| 54.00            | 100.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 38.0                | 38.3             | 9,120                   | 351.27             |
| 4.00            | 132.0               | 56.8             | 31,680                  | 2,151.94           |
| 6.00            | 266.0               | 79.1             | 63,840                  | 5,542.97           |
| 8.00            | 434.0               | 91.9             | 104,160                 | 11,348.66          |
| 10.00           | 622.0               | 100.8            | 149,280                 | 19,433.27          |
| 12.00           | 828.0               | 111.6            | 198,720                 | 29,251.95          |

### Summary for Reach R10: Stream

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 0.77" for 2-yr event  
 Inflow = 7.18 cfs @ 12.49 hrs, Volume= 0.906 af  
 Outflow = 7.14 cfs @ 12.56 hrs, Volume= 0.902 af, Atten= 1%, Lag= 3.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.39 fps, Min. Travel Time= 2.3 min  
 Avg. Velocity= 1.27 fps, Avg. Travel Time= 4.3 min

Peak Storage= 972 cf @ 12.52 hrs  
 Average Depth at Peak Storage= 0.47'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,695.16 cfs

Custom cross-section, Length= 325.0' Slope= 0.0215 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 91.00', Outlet Invert= 84.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 325                     | 1.36               |
| 2.25            | 39.0                | 30.4             | 12,676                  | 251.23             |
| 4.25            | 119.0               | 50.8             | 38,675                  | 1,143.69           |
| 6.25            | 233.0               | 65.4             | 75,725                  | 2,962.82           |
| 8.25            | 375.0               | 80.0             | 121,875                 | 5,727.13           |
| 10.25           | 541.0               | 90.8             | 175,825                 | 9,695.16           |

### Summary for Reach R20: STREAM

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 0.75" for 2-yr event  
 Inflow = 11.40 cfs @ 12.25 hrs, Volume= 1.061 af  
 Outflow = 11.20 cfs @ 12.28 hrs, Volume= 1.059 af, Atten= 2%, Lag= 1.6 min

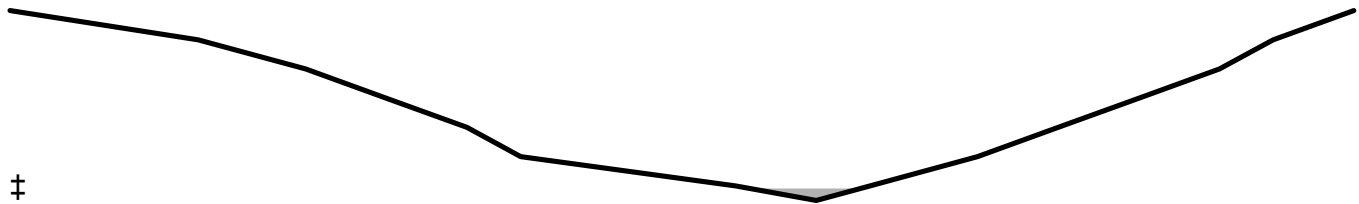
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.39 fps, Min. Travel Time= 0.9 min  
 Avg. Velocity= 1.78 fps, Avg. Travel Time= 1.7 min

Peak Storage= 606 cf @ 12.26 hrs  
 Average Depth at Peak Storage= 0.82'  
 Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 14,699.46 cfs

Custom cross-section, Length= 180.0' Slope= 0.0278 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 88.00', Outlet Invert= 83.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 900                     | 19.24              |
| 3.00            | 49.0                | 34.6             | 8,820                   | 382.78             |
| 5.00            | 127.0               | 45.4             | 22,860                  | 1,561.76           |
| 7.00            | 227.0               | 58.0             | 40,860                  | 3,489.69           |
| 9.00            | 351.0               | 70.7             | 63,180                  | 6,326.40           |
| 11.00           | 499.0               | 83.4             | 89,820                  | 10,183.56          |
| 13.00           | 679.0               | 103.9            | 122,220                 | 14,699.46          |

### Summary for Reach R21: STREAM

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 0.73" for 2-yr event  
 Inflow = 10.12 cfs @ 12.21 hrs, Volume= 0.925 af  
 Outflow = 9.91 cfs @ 12.25 hrs, Volume= 0.924 af, Atten= 2%, Lag= 2.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.76 fps, Min. Travel Time= 1.1 min

Avg. Velocity= 2.08 fps, Avg. Travel Time= 2.0 min

Peak Storage= 669 cf @ 12.22 hrs

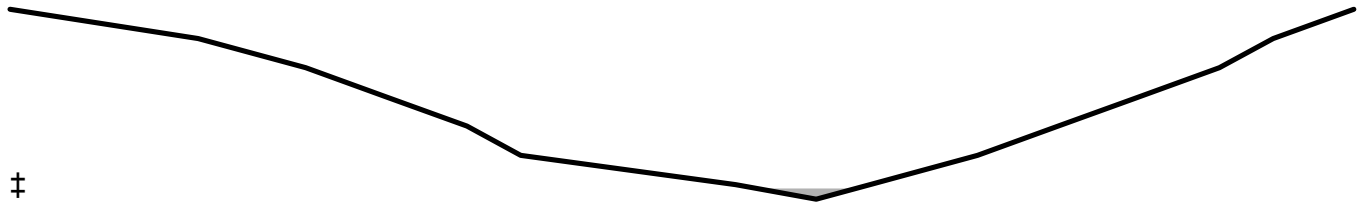
Average Depth at Peak Storage= 0.73'

Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 17,639.35 cfs

Custom cross-section, Length= 250.0' Slope= 0.0400 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 101.00', Outlet Invert= 91.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 1,250                   | 23.09              |
| 3.00            | 49.0                | 34.6             | 12,250                  | 459.33             |
| 5.00            | 127.0               | 45.4             | 31,750                  | 1,874.11           |
| 7.00            | 227.0               | 58.0             | 56,750                  | 4,187.63           |
| 9.00            | 351.0               | 70.7             | 87,750                  | 7,591.68           |
| 11.00           | 499.0               | 83.4             | 124,750                 | 12,220.27          |
| 13.00           | 679.0               | 103.9            | 169,750                 | 17,639.35          |

### Summary for Reach R3: STREAM

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 0.66" for 2-yr event  
 Inflow = 7.40 cfs @ 12.66 hrs, Volume= 1.315 af  
 Outflow = 7.39 cfs @ 12.70 hrs, Volume= 1.312 af, Atten= 0%, Lag= 2.8 min



Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.71 fps, Min. Travel Time= 1.7 min

Avg. Velocity = 1.75 fps, Avg. Travel Time= 2.7 min

Peak Storage= 766 cf @ 12.68 hrs

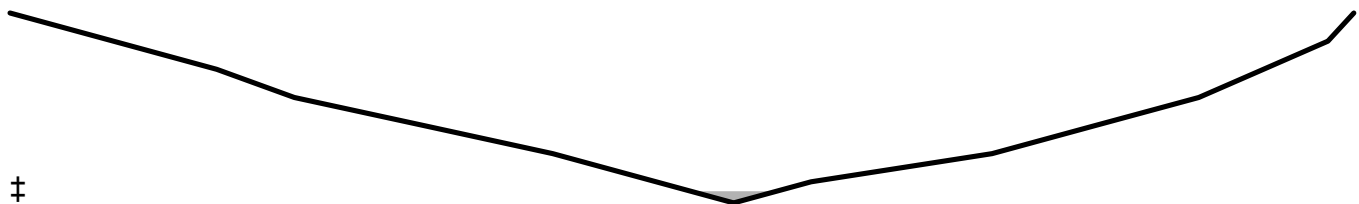
Average Depth at Peak Storage= 0.83'

Bank-Full Depth= 13.50' Flow Area= 787.0 sf, Capacity= 14,679.38 cfs

Custom cross-section, Length= 280.0' Slope= 0.0179 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 85.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -56.00           | 96.00               | 0.00                 |
| -48.00           | 94.00               | 2.00                 |
| -40.00           | 92.00               | 4.00                 |
| -34.00           | 90.00               | 6.00                 |
| -24.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 82.50               | 13.50                |
| 6.00             | 84.00               | 12.00                |
| 20.00            | 86.00               | 10.00                |
| 28.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 41.00            | 92.00               | 4.00                 |
| 46.00            | 94.00               | 2.00                 |
| 48.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.50            | 9.0                 | 12.4             | 2,520                   | 36.14              |
| 3.50            | 55.0                | 34.8             | 15,400                  | 370.77             |
| 5.50            | 141.0               | 53.2             | 39,480                  | 1,340.54           |
| 7.50            | 263.0               | 71.6             | 73,640                  | 3,106.91           |
| 9.50            | 414.0               | 83.4             | 115,920                 | 5,982.85           |
| 11.50           | 589.0               | 97.0             | 164,920                 | 9,733.01           |
| 13.50           | 787.0               | 108.1            | 220,360                 | 14,679.38          |

**Summary for Reach R30: (new Reach)**

Inflow Area = 3.363 ac, 6.30% Impervious, Inflow Depth > 0.94" for 2-yr event  
Inflow = 1.50 cfs @ 12.93 hrs, Volume= 0.263 af  
Outflow = 1.18 cfs @ 13.82 hrs, Volume= 0.245 af, Atten= 22%, Lag= 53.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.34 fps, Min. Travel Time= 32.5 min  
Avg. Velocity = 0.20 fps, Avg. Travel Time= 56.0 min

Peak Storage= 2,297 cf @ 13.28 hrs  
Average Depth at Peak Storage= 0.03'  
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 513.72 cfs

100.00' x 1.00' deep channel, n= 0.040  
Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
Length= 670.0' Slope= 0.0082 ' '  
Inlet Invert= 82.50', Outlet Invert= 77.00'

**Summary for Reach R31: (new Reach)**

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 0.86" for 2-yr event  
Inflow = 1.25 cfs @ 12.63 hrs, Volume= 0.174 af  
Outflow = 1.11 cfs @ 13.04 hrs, Volume= 0.170 af, Atten= 11%, Lag= 24.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.40 fps, Min. Travel Time= 14.6 min  
Avg. Velocity = 0.23 fps, Avg. Travel Time= 25.4 min

Peak Storage= 975 cf @ 12.80 hrs  
Average Depth at Peak Storage= 0.03'  
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 677.70 cfs

100.00' x 1.00' deep channel, n= 0.040  
Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
Length= 350.0' Slope= 0.0143 ' '  
Inlet Invert= 87.50', Outlet Invert= 82.50'



### Summary for Reach R32: (new Reach)

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 1.21" for 2-yr event  
 Inflow = 1.26 cfs @ 12.14 hrs, Volume= 0.095 af  
 Outflow = 0.84 cfs @ 12.53 hrs, Volume= 0.094 af, Atten= 33%, Lag= 23.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.39 fps, Min. Travel Time= 14.9 min  
 Avg. Velocity = 0.25 fps, Avg. Travel Time= 23.8 min

Peak Storage= 754 cf @ 12.28 hrs  
 Average Depth at Peak Storage= 0.02'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 784.49 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 '/' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0191 '/'  
 Inlet Invert= 89.20', Outlet Invert= 82.50'



### Summary for Reach R4: STREAM

Inflow Area = 18.079 ac, 14.99% Impervious, Inflow Depth > 0.77" for 2-yr event  
 Inflow = 12.26 cfs @ 12.28 hrs, Volume= 1.163 af  
 Outflow = 12.15 cfs @ 12.31 hrs, Volume= 1.161 af, Atten= 1%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.90 fps, Min. Travel Time= 1.0 min  
 Avg. Velocity = 1.53 fps, Avg. Travel Time= 1.9 min

Peak Storage= 717 cf @ 12.29 hrs  
 Average Depth at Peak Storage= 0.72'  
 Bank-Full Depth= 13.00' Flow Area= 734.0 sf, Capacity= 16,078.55 cfs

Custom cross-section, Length= 170.0' Slope= 0.0235 '/' (106 Elevation Intervals)  
 Constant n= 0.040  
 Inlet Invert= 84.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -48.00           | 96.00               | 0.00                 |
| -40.00           | 94.00               | 2.00                 |
| -32.00           | 92.00               | 4.00                 |
| -27.00           | 90.00               | 6.00                 |
| -20.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 83.00               | 13.00                |
| 10.00            | 84.00               | 12.00                |
| 30.00            | 86.00               | 10.00                |
| 32.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 38.00            | 92.00               | 4.00                 |
| 40.00            | 94.00               | 2.00                 |
| 44.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 8.0                 | 16.1             | 1,360                   | 28.56              |
| 3.00            | 68.0                | 44.5             | 11,560                  | 514.25             |
| 5.00            | 164.0               | 53.6             | 27,880                  | 1,968.90           |
| 7.00            | 279.0               | 65.4             | 47,430                  | 4,182.71           |
| 9.00            | 412.0               | 73.6             | 70,040                  | 7,402.04           |
| 11.00           | 562.0               | 84.7             | 95,540                  | 11,310.93          |
| 13.00           | 734.0               | 97.4             | 124,780                 | 16,078.55          |

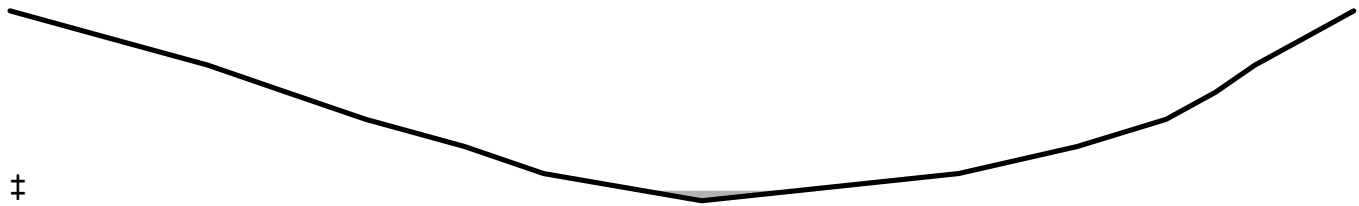
### Summary for Reach R5: STREAM

Inflow Area = 41.947 ac, 13.68% Impervious, Inflow Depth > 0.71" for 2-yr event  
 Inflow = 17.29 cfs @ 12.32 hrs, Volume= 2.473 af  
 Outflow = 17.08 cfs @ 12.38 hrs, Volume= 2.466 af, Atten= 1%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.91 fps, Min. Travel Time= 1.7 min  
 Avg. Velocity = 1.69 fps, Avg. Travel Time= 2.9 min

Peak Storage= 1,715 cf @ 12.35 hrs  
 Average Depth at Peak Storage= 0.75'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 26,019.95 cfs

Custom cross-section, Length= 290.0' Slope= 0.0224 '/' (106 Elevation Intervals)  
 Constant n= 0.040 Winding stream, pools & shoals  
 Inlet Invert= 80.00', Outlet Invert= 73.50'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 12,180                  | 232.85             |
| 4.00            | 146.0               | 62.6             | 42,340                  | 1,427.89           |
| 6.00            | 289.0               | 82.0             | 83,810                  | 3,721.59           |
| 8.00            | 464.0               | 95.7             | 134,560                 | 7,394.69           |
| 10.00           | 664.0               | 108.4            | 192,560                 | 12,365.06          |
| 12.00           | 891.0               | 124.0            | 258,390                 | 18,456.53          |
| 14.00           | 1,148.0             | 139.5            | 332,920                 | 26,019.95          |

### Summary for Reach R6: (new Reach)

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 0.81" for 2-yr event  
 Inflow = 8.22 cfs @ 12.52 hrs, Volume= 1.113 af  
 Outflow = 8.10 cfs @ 12.63 hrs, Volume= 1.106 af, Atten= 1%, Lag= 6.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 2.37 fps, Min. Travel Time= 3.7 min  
 Avg. Velocity= 1.21 fps, Avg. Travel Time= 7.2 min

Peak Storage= 1,797 cf @ 12.57 hrs  
 Average Depth at Peak Storage= 0.51'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,117.34 cfs

Custom cross-section, Length= 525.0' Slope= 0.0190 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 84.00', Outlet Invert= 74.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 525                     | 1.28               |
| 2.25            | 39.0                | 30.4             | 20,476                  | 236.25             |
| 4.25            | 119.0               | 50.8             | 62,475                  | 1,075.52           |
| 6.25            | 233.0               | 65.4             | 122,325                 | 2,786.24           |
| 8.25            | 375.0               | 80.0             | 196,875                 | 5,385.80           |
| 10.25           | 541.0               | 90.8             | 284,025                 | 9,117.34           |

### Summary for Reach R7: STREAM

Inflow Area = 58.420 ac, 11.48% Impervious, Inflow Depth > 0.73" for 2-yr event  
 Inflow = 23.43 cfs @ 12.52 hrs, Volume= 3.571 af  
 Outflow = 23.42 cfs @ 12.53 hrs, Volume= 3.567 af, Atten= 0%, Lag= 1.1 min

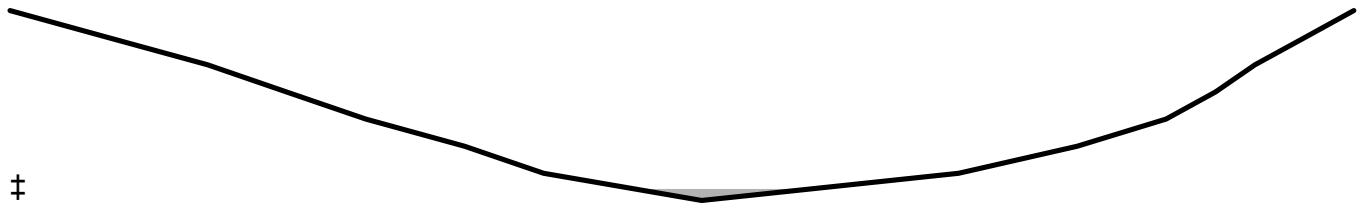
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.08 fps, Min. Travel Time= 0.7 min  
 Avg. Velocity= 1.80 fps, Avg. Travel Time= 1.2 min

Peak Storage= 1,028 cf @ 12.53 hrs  
 Average Depth at Peak Storage= 0.85'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 25,473.05 cfs

Custom cross-section, Length= 135.0' Slope= 0.0215 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 73.50', Outlet Invert= 70.60'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,670                   | 227.96             |
| 4.00            | 146.0               | 62.6             | 19,710                  | 1,397.88           |
| 6.00            | 289.0               | 82.0             | 39,015                  | 3,643.37           |
| 8.00            | 464.0               | 95.7             | 62,640                  | 7,239.27           |
| 10.00           | 664.0               | 108.4            | 89,640                  | 12,105.16          |
| 12.00           | 891.0               | 124.0            | 120,285                 | 18,068.60          |
| 14.00           | 1,148.0             | 139.5            | 154,980                 | 25,473.05          |

### Summary for Reach R8: STREAM

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 0.73" for 2-yr event  
 Inflow = 27.19 cfs @ 12.49 hrs, Volume= 4.107 af  
 Outflow = 27.13 cfs @ 12.53 hrs, Volume= 4.098 af, Atten= 0%, Lag= 2.4 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 1.59 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 1.00 fps, Avg. Travel Time= 2.0 min

Peak Storage= 2,055 cf @ 12.51 hrs

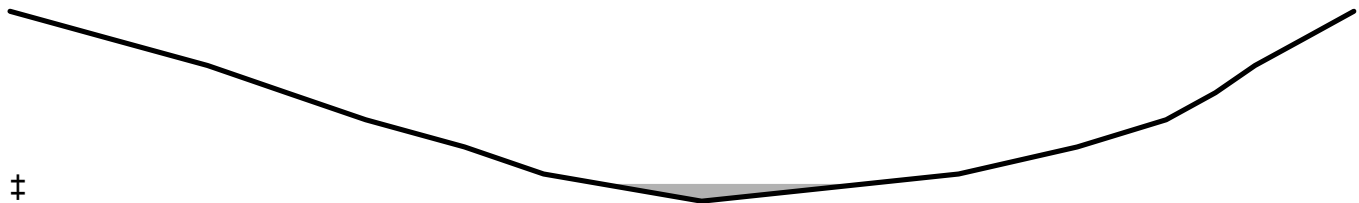
Average Depth at Peak Storage= 1.28'

Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 10,034.32 cfs

Custom cross-section, Length= 120.0' Slope= 0.0033 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 69.40', Outlet Invert= 69.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,040                   | 89.80              |
| 4.00            | 146.0               | 62.6             | 17,520                  | 550.65             |
| 6.00            | 289.0               | 82.0             | 34,680                  | 1,435.19           |
| 8.00            | 464.0               | 95.7             | 55,680                  | 2,851.69           |
| 10.00           | 664.0               | 108.4            | 79,680                  | 4,768.46           |
| 12.00           | 891.0               | 124.0            | 106,920                 | 7,117.57           |
| 14.00           | 1,148.0             | 139.5            | 137,760                 | 10,034.32          |

### Summary for Pond 1P: Phase2 POND W/OCS

Inflow Area = 14.432 ac, 38.43% Impervious, Inflow Depth > 1.47" for 2-yr event  
 Inflow = 15.47 cfs @ 12.40 hrs, Volume= 1.764 af  
 Outflow = 0.55 cfs @ 18.87 hrs, Volume= 0.306 af, Atten= 96%, Lag= 388.2 min  
 Primary = 0.55 cfs @ 18.87 hrs, Volume= 0.306 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Peak Elev= 82.19' @ 18.87 hrs Surf.Area= 56,882 sf Storage= 63,624 cf

Plug-Flow detention time= 292.6 min calculated for 0.305 af (17% of inflow)

Center-of-Mass det. time= 177.7 min ( 988.3 - 810.6 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 81.00'               | 718,507 cf                | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 81.00               | 49,980               | 0                         | 0  |
| 82.00               | 55,620               | 52,800                    | 52,800   |
| 84.00               | 68,740               | 124,360                   | 177,160  |
| 86.00               | 85,942               | 154,682                   | 331,842  |
| 88.00               | 97,175               | 183,117                   | 514,959  |
| 90.00               | 106,373              | 203,548                   | 718,507  |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 82.00' | <b>8.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 82.77' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #5     | Device 1 | 84.20' | <b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)<br>0.5' Crest Height  |
| #6     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=0.55 cfs @ 18.87 hrs HW=82.19' (Free Discharge)

- 1=Culvert (Passes 0.55 cfs of 5.60 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.88 fps)
- 3=Orifice/Grate (Orifice Controls 0.12 cfs @ 1.49 fps)
- 4=Orifice/Grate ( Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
- 6=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

### Summary for Pond C1: AMANDA'S WAY

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 0.63" for 2-yr event  
 Inflow = 6.49 cfs @ 12.66 hrs, Volume= 0.977 af  
 Outflow = 6.48 cfs @ 12.67 hrs, Volume= 0.976 af, Atten= 0%, Lag= 0.3 min  
 Primary = 6.48 cfs @ 12.67 hrs, Volume= 0.976 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 104.66' @ 12.67 hrs Surf.Area= 159 sf Storage= 98 cf

Plug-Flow detention time= 0.3 min calculated for 0.973 af (100% of inflow)  
 Center-of-Mass det. time= 0.2 min ( 859.0 - 858.8 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 103.50' | 38,020 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 103.50              | 10                   | 0                         | 0                         |
| 106.00              | 331                  | 426                       | 426                       |
| 108.00              | 1,889                | 2,220                     | 2,646                     |
| 110.00              | 4,295                | 6,184                     | 8,830                     |
| 112.00              | 7,099                | 11,394                    | 20,224                    |
| 114.00              | 10,697               | 17,796                    | 38,020                    |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 103.50' | <b>30.0" Round Culvert</b><br>L= 75.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 103.50' / 100.00' S= 0.0467 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 4.91 sf |

**Primary OutFlow** Max=6.46 cfs @ 12.67 hrs HW=104.66' (Free Discharge)

↑**1=Culvert** (Inlet Controls 6.46 cfs @ 2.90 fps)

### Summary for Pond C2: AMANDA'S WAY

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 0.73" for 2-yr event  
 Inflow = 10.18 cfs @ 12.21 hrs, Volume= 0.926 af  
 Outflow = 10.12 cfs @ 12.21 hrs, Volume= 0.925 af, Atten= 1%, Lag= 0.1 min  
 Primary = 10.12 cfs @ 12.21 hrs, Volume= 0.925 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 106.50' @ 12.21 hrs Surf.Area= 105 sf Storage= 86 cf

Plug-Flow detention time= 0.2 min calculated for 0.922 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 832.3 - 832.2 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 105.00' | 6,414 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 105.00              | 10                   | 0                         | 0                         |
| 108.00              | 200                  | 315                       | 315                       |
| 110.00              | 1,196                | 1,396                     | 1,711                     |
| 112.00              | 3,507                | 4,703                     | 6,414                     |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 105.00' | <b>30.0" Round Culvert</b><br>L= 63.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 105.00' / 103.00' S= 0.0317 '/' Cc= 0.900<br>n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf |

**Primary OutFlow** Max=10.00 cfs @ 12.21 hrs HW=106.49' (Free Discharge)

↑1=Culvert (Inlet Controls 10.00 cfs @ 3.28 fps)

### Summary for Pond C3: Stream Crossing #1

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 0.74" for 2-yr event  
 Inflow = 27.31 cfs @ 12.44 hrs, Volume= 4.121 af  
 Outflow = 27.19 cfs @ 12.49 hrs, Volume= 4.107 af, Atten= 0%, Lag= 2.9 min  
 Primary = 27.19 cfs @ 12.49 hrs, Volume= 4.107 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 73.74' @ 12.49 hrs Surf.Area= 3,410 sf Storage= 3,711 cf

Plug-Flow detention time= 3.2 min calculated for 4.107 af (100% of inflow)  
 Center-of-Mass det. time= 2.0 min ( 849.4 - 847.4 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 70.00' | 121,182 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 70.00               | 10                   | 0                         | 0                         |
| 72.00               | 395                  | 405                       | 405                       |
| 74.00               | 3,864                | 4,259                     | 4,664                     |
| 76.00               | 12,171               | 16,035                    | 20,699                    |
| 78.00               | 24,830               | 37,001                    | 57,700                    |
| 80.00               | 38,652               | 63,482                    | 121,182                   |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 72.00' | <b>72.0" W x 48.0" H Box Culvert</b><br>L= 65.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 72.00' / 71.90' S= 0.0015 ' S= 0.0015 ' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 24.00 sf |

**Primary OutFlow** Max=27.16 cfs @ 12.49 hrs HW=73.74' (Free Discharge)

↑1=Culvert (Barrel Controls 27.16 cfs @ 3.47 fps)

### Summary for Pond C4: Stream Crossing #3

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 0.75" for 2-yr event  
 Inflow = 11.38 cfs @ 12.25 hrs, Volume= 1.061 af  
 Outflow = 11.40 cfs @ 12.25 hrs, Volume= 1.061 af, Atten= 0%, Lag= 0.1 min  
 Primary = 11.40 cfs @ 12.25 hrs, Volume= 1.061 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.65' @ 12.25 hrs Surf.Area= 153 sf Storage= 59 cf

Plug-Flow detention time= 0.0 min calculated for 1.057 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 832.7 - 832.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 5,935 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 30                   | 0                         | 0                         |
| 92.00               | 220                  | 125                       | 125                       |
| 93.00               | 625                  | 423                       | 548                       |
| 94.00               | 1,304                | 965                       | 1,512                     |
| 95.00               | 2,150                | 1,727                     | 3,239                     |
| 96.00               | 3,242                | 2,696                     | 5,935                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.78' | <b>60.0" W x 24.0" H Box Culvert</b><br>L= 75.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 90.78' / 88.52' S= 0.0301 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 10.00 sf |

**Primary OutFlow** Max=11.38 cfs @ 12.25 hrs HW=91.64' (Free Discharge)

↑**1=Culvert** (Inlet Controls 11.38 cfs @ 2.63 fps)

### Summary for Pond C5: Stream Crossing #2

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 0.77" for 2-yr event  
 Inflow = 7.18 cfs @ 12.49 hrs, Volume= 0.906 af  
 Outflow = 7.18 cfs @ 12.49 hrs, Volume= 0.906 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.18 cfs @ 12.49 hrs, Volume= 0.906 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.01' @ 12.49 hrs Surf.Area= 28 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 0.906 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 843.4 - 843.4 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 94.00' | 8,050 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 94.00               | 25                   | 0                         | 0                         |
| 95.00               | 312                  | 169                       | 169                       |
| 96.00               | 1,535                | 924                       | 1,092                     |
| 97.00               | 3,670                | 2,603                     | 3,695                     |
| 98.00               | 5,041                | 4,356                     | 8,050                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 93.07' | <b>96.0" W x 24.0" H Box Culvert</b><br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.07' / 91.71' S= 0.0170 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 16.00 sf |

**Primary OutFlow** Max=23.47 cfs @ 12.49 hrs HW=94.01' (Free Discharge)

↑**1=Culvert** (Inlet Controls 23.47 cfs @ 3.12 fps)

### Summary for Pond C6: New Culvert

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 1.21" for 2-yr event  
 Inflow = 1.26 cfs @ 12.14 hrs, Volume= 0.095 af  
 Outflow = 1.26 cfs @ 12.14 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.26 cfs @ 12.14 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.01' @ 12.14 hrs Surf.Area= 116 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 0.095 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 806.4 - 806.4 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 91.00'               | 2,175 cf                  | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 91.00               | 112                  | 0                         | 0  |
| 92.00               | 892                  | 502                       | 502  |
| 93.00               | 2,453                | 1,673                     | 2,175  |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 89.50' | <b>15.0" Round Culvert</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 89.50' / 89.20' S= 0.0060 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.38 cfs @ 12.14 hrs HW=91.01' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.38 cfs @ 3.57 fps)

### Summary for Pond C7: New Culvert

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 0.86" for 2-yr event  
 Inflow = 1.25 cfs @ 12.61 hrs, Volume= 0.174 af  
 Outflow = 1.25 cfs @ 12.63 hrs, Volume= 0.174 af, Atten= 0%, Lag= 1.0 min  
 Primary = 1.25 cfs @ 12.63 hrs, Volume= 0.174 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 90.61' @ 12.63 hrs Surf.Area= 201 sf Storage= 64 cf

Plug-Flow detention time= 0.9 min calculated for 0.173 af (100% of inflow)  
 Center-of-Mass det. time= 0.7 min ( 845.9 - 845.2 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 90.00' | 5,179 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 90.00               | 10                   | 0                         | 0                         |
| 91.00               | 324                  | 167                       | 167                       |
| 92.00               | 2,291                | 1,308                     | 1,475                     |
| 93.00               | 5,117                | 3,704                     | 5,179                     |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 90.00' | <b>15.0" Round Culvert</b><br>L= 75.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 90.00' / 87.50' S= 0.0333 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=1.24 cfs @ 12.63 hrs HW=90.61' (Free Discharge)

↑**1=Culvert** (Inlet Controls 1.24 cfs @ 2.10 fps)

### Summary for Pond CB12: CB 12

Inflow Area = 7.439 ac, 46.36% Impervious, Inflow Depth > 1.64" for 2-yr event  
 Inflow = 14.82 cfs @ 12.09 hrs, Volume= 1.014 af  
 Outflow = 14.82 cfs @ 12.09 hrs, Volume= 1.014 af, Atten= 0%, Lag= 0.0 min  
 Primary = 14.82 cfs @ 12.09 hrs, Volume= 1.014 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 94.14' @ 12.09 hrs

Flood Elev= 100.72'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 92.50' | <b>30.0" Round Culvert</b><br>L= 946.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 92.50' / 85.03' S= 0.0079 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=14.48 cfs @ 12.09 hrs HW=94.11' (Free Discharge)

↑**1=Culvert** (Inlet Controls 14.48 cfs @ 4.32 fps)

### Summary for Pond CB42A: CB 42A

Inflow Area = 3.143 ac, 47.18% Impervious, Inflow Depth > 1.65" for 2-yr event  
 Inflow = 6.44 cfs @ 12.08 hrs, Volume= 0.433 af  
 Outflow = 6.44 cfs @ 12.08 hrs, Volume= 0.433 af, Atten= 0%, Lag= 0.0 min  
 Primary = 6.44 cfs @ 12.08 hrs, Volume= 0.433 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.00' @ 12.08 hrs

Flood Elev= 101.94'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 96.83' | <b>24.0" Round Culvert</b><br>L= 280.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 96.83' / 95.33' S= 0.0054 '/ Cc= 0.900<br>n= 0.012, Flow Area= 3.14 sf |

**Primary OutFlow** Max=6.24 cfs @ 12.08 hrs HW=97.97' (Free Discharge)

↑**1=Culvert** (Barrel Controls 6.24 cfs @ 4.84 fps)

### Summary for Pond CB43: CB 43

Inflow Area = 1.502 ac, 57.66% Impervious, Inflow Depth > 1.78" for 2-yr event  
 Inflow = 3.30 cfs @ 12.08 hrs, Volume= 0.223 af  
 Outflow = 3.30 cfs @ 12.08 hrs, Volume= 0.223 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.30 cfs @ 12.08 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 99.83' @ 12.08 hrs

Flood Elev= 102.69'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 98.91' | <b>18.0" Round Culvert</b><br>L= 395.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.91' / 96.94' S= 0.0050 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=3.20 cfs @ 12.08 hrs HW=99.81' (Free Discharge)

↑**1=Culvert** (Barrel Controls 3.20 cfs @ 4.14 fps)

### Summary for Pond DMH1: DMH1

Inflow Area = 10.518 ac, 45.91% Impervious, Inflow Depth > 1.63" for 2-yr event  
 Inflow = 20.33 cfs @ 12.10 hrs, Volume= 1.431 af  
 Outflow = 20.33 cfs @ 12.10 hrs, Volume= 1.431 af, Atten= 0%, Lag= 0.0 min  
 Primary = 20.33 cfs @ 12.10 hrs, Volume= 1.431 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 86.93' @ 12.10 hrs

Flood Elev= 102.51'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 84.93' | <b>30.0" Round Culvert</b><br>L= 55.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 84.93' / 84.00' S= 0.0169 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=20.20 cfs @ 12.10 hrs HW=86.93' (Free Discharge)

↑**1=Culvert** (Inlet Controls 20.20 cfs @ 4.81 fps)

**Summary for Pond P1: EXISTING POND W/OCS**

Inflow Area = 24.950 ac, 31.44% Impervious, Inflow Depth > 1.38" for 2-yr event  
 Inflow = 25.54 cfs @ 12.11 hrs, Volume= 2.877 af  
 Outflow = 1.32 cfs @ 17.05 hrs, Volume= 0.798 af, Atten= 95%, Lag= 296.3 min  
 Primary = 1.32 cfs @ 17.05 hrs, Volume= 0.798 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 82.71' @ 17.05 hrs Surf.Area= 60,273 sf Storage= 93,901 cf

Plug-Flow detention time= 275.9 min calculated for 0.795 af (28% of inflow)  
 Center-of-Mass det. time= 172.8 min ( 976.5 - 803.8 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 81.00'               | 718,507 cf                | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 81.00               | 49,980               | 0                         | 0  |
| 82.00               | 55,620               | 52,800                    | 52,800   |
| 84.00               | 68,740               | 124,360                   | 177,160  |
| 86.00               | 85,942               | 154,682                   | 331,842  |
| 88.00               | 97,175               | 183,117                   | 514,959  |
| 90.00               | 106,373              | 203,548                   | 718,507  |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 81.75' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 84.20' | <b>4.0' long x 0.40' rise Sharp-Crested Rectangular Weir</b><br>2 End Contraction(s)   |
| #5     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=1.32 cfs @ 17.05 hrs HW=82.71' (Free Discharge)

- 1=Culvert (Passes 1.32 cfs of 8.33 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.52 cfs @ 5.98 fps)
- 3=Orifice/Grate (Orifice Controls 0.80 cfs @ 4.06 fps)
- 4=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond POI 1: PROPERTY BOUNDARY**

Inflow Area = 17.126 ac, 10.85% Impervious, Inflow Depth > 0.90" for 2-yr event  
 Inflow = 5.78 cfs @ 12.76 hrs, Volume= 1.282 af  
 Primary = 5.78 cfs @ 12.76 hrs, Volume= 1.282 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



**Summary for Pond POI 2: POI**

Inflow Area = 69.028 ac, 10.79% Impervious, Inflow Depth > 0.73" for 2-yr event  
Inflow = 27.90 cfs @ 12.52 hrs, Volume= 4.205 af  
Primary = 27.90 cfs @ 12.52 hrs, Volume= 4.205 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2A: PROPERTY BOUNDARY**

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 0.66" for 2-yr event  
Inflow = 7.40 cfs @ 12.66 hrs, Volume= 1.315 af  
Primary = 7.40 cfs @ 12.66 hrs, Volume= 1.315 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2B: PROPERTY BOUNDARY**

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 0.75" for 2-yr event  
Inflow = 11.20 cfs @ 12.28 hrs, Volume= 1.059 af  
Primary = 11.20 cfs @ 12.28 hrs, Volume= 1.059 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2C: PROPERTY BOUNDARY**

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 0.81" for 2-yr event  
Inflow = 8.22 cfs @ 12.52 hrs, Volume= 1.113 af  
Primary = 8.22 cfs @ 12.52 hrs, Volume= 1.113 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 3: PROPERTY BOUNDARY**

Inflow Area = 27.281 ac, 29.14% Impervious, Inflow Depth > 0.44" for 2-yr event  
Inflow = 2.30 cfs @ 12.49 hrs, Volume= 0.997 af  
Primary = 2.30 cfs @ 12.49 hrs, Volume= 0.997 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 4: PROPERTY BOUNDARY**

Inflow Area = 2.525 ac, 50.69% Impervious, Inflow Depth > 1.41" for 2-yr event  
Inflow = 4.10 cfs @ 12.12 hrs, Volume= 0.296 af  
Primary = 4.10 cfs @ 12.12 hrs, Volume= 0.296 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 5: POI**

Inflow Area = 0.228 ac, 8.77% Impervious, Inflow Depth > 0.29" for 2-yr event  
 Inflow = 0.04 cfs @ 12.38 hrs, Volume= 0.005 af  
 Primary = 0.04 cfs @ 12.38 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 6: POI**

Inflow Area = 2.240 ac, 27.41% Impervious, Inflow Depth > 0.98" for 2-yr event  
 Inflow = 2.29 cfs @ 12.16 hrs, Volume= 0.183 af  
 Primary = 2.29 cfs @ 12.16 hrs, Volume= 0.183 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond UD1: UD Filter**

Inflow Area = 0.953 ac, 66.53% Impervious, Inflow Depth > 2.07" for 2-yr event  
 Inflow = 2.36 cfs @ 12.07 hrs, Volume= 0.165 af  
 Outflow = 1.80 cfs @ 12.16 hrs, Volume= 0.101 af, Atten= 24%, Lag= 5.2 min  
 Primary = 1.80 cfs @ 12.16 hrs, Volume= 0.101 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 84.94' @ 12.16 hrs Surf.Area= 2,680 sf Storage= 3,134 cf

Plug-Flow detention time= 146.1 min calculated for 0.100 af (61% of inflow)  
 Center-of-Mass det. time= 70.3 min ( 830.2 - 759.9 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 83.50' | 7,878 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 83.50               | 1,679                | 0                         | 0                         |
| 84.00               | 2,032                | 928                       | 928                       |
| 85.00               | 2,724                | 2,378                     | 3,306                     |
| 86.00               | 6,421                | 4,573                     | 7,878                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 84.80' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=1.73 cfs @ 12.16 hrs HW=84.93' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 1.73 cfs @ 0.86 fps)

**Summary for Pond UD2: UD Filter**

Inflow Area = 1.522 ac, 33.05% Impervious, Inflow Depth > 1.55" for 2-yr event  
 Inflow = 2.86 cfs @ 12.10 hrs, Volume= 0.197 af  
 Outflow = 1.58 cfs @ 12.26 hrs, Volume= 0.130 af, Atten= 45%, Lag= 9.5 min  
 Primary = 1.58 cfs @ 12.26 hrs, Volume= 0.130 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 81.23' @ 12.26 hrs Surf.Area= 4,579 sf Storage= 3,384 cf

Plug-Flow detention time= 124.7 min calculated for 0.130 af (66% of inflow)  
 Center-of-Mass det. time= 53.9 min ( 844.4 - 790.5 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 80.00' | 9,035 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 80.00               | 2,061                | 0                         | 0                         |
| 81.00               | 3,000                | 2,531                     | 2,531                     |
| 82.00               | 10,008               | 6,504                     | 9,035                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 81.10' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=1.56 cfs @ 12.26 hrs HW=81.22' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 1.56 cfs @ 0.84 fps)

**Summary for Subcatchment 10:**

Runoff = 12.15 cfs @ 12.75 hrs, Volume= 1.889 af, Depth> 2.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.296   | 98 | Paved parking & roofs - New House     |
| * 0.115   | 98 | Paved parking & roofs - New Road+SW   |
| * 0.098   | 98 | Paved parking & roofs - Exist         |
| * 0.586   | 61 | >75% Grass cover, Good, HSG B - Exist |
| * 0.095   | 80 | >75% Grass cover, Good, HSG D - Exist |
| * 0.018   | 61 | >75% Grass cover, Good, HSG B - New   |
| * 1.657   | 80 | >75% Grass cover, Good, HSG D - NEW   |
| 1.334     | 55 | Woods, Good, HSG B                    |
| 7.089     | 77 | Woods, Good, HSG D                    |
| 11.288    | 75 | Weighted Average                      |
| 10.779    |    | 95.49% Pervious Area                  |
| 0.509     |    | 4.51% Impervious Area                 |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 30.7     | 920           | 0.0100        | 0.50              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 53.9     | 1,070         | Total         |                   |                |   |

**Summary for Subcatchment 11:**

Runoff = 3.02 cfs @ 12.58 hrs, Volume= 0.407 af, Depth> 2.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.164   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.004   | 98 | Paved parking & roofs - Exist       |
| 0.574     | 70 | Woods, Good, HSG C                  |
| 1.677     | 77 | Woods, Good, HSG D                  |
| 2.419     | 75 | Weighted Average                    |
| 2.415     |    | 99.83% Pervious Area                |
| 0.004     |    | 0.17% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 36.4        | 150              | 0.0130           | 0.07                 |                   | <b>Sheet Flow, AB</b>                      |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5         | 232              | 0.0300           | 0.87                 |                   | <b>Shallow Concentrated Flow, BC</b>       |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 40.9        | 382              | Total            |                      |                   |  |

**Summary for Subcatchment 12:**

Runoff = 5.41 cfs @ 12.10 hrs, Volume= 0.380 af, Depth> 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.503     | 98 | Paved parking & roofs         |
| 1.019     | 80 | >75% Grass cover, Good, HSG D |
| 1.522     | 86 | Weighted Average              |
| 1.019     |    | 66.95% Pervious Area          |
| 0.503     |    | 33.05% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                           |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------|
| 5.8         | 50               | 0.0200           | 0.14                 |                   | <b>Sheet Flow, A-B</b>                |
|             |                  |                  |                      |                   | Grass: Short n= 0.150 P2= 3.00"       |
| 0.9         | 100              | 0.0160           | 1.90                 |                   | <b>Shallow Concentrated Flow, B-C</b> |
|             |                  |                  |                      |                   | Grassed Waterway Kv= 15.0 fps         |
| 6.7         | 150              | Total            |                      |                   |                                       |

**Summary for Subcatchment 13:**

Runoff = 1.26 cfs @ 12.07 hrs, Volume= 0.089 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.207     | 98 | Paved parking & roofs         |
| 0.083     | 80 | >75% Grass cover, Good, HSG D |
| 0.290     | 93 | Weighted Average              |
| 0.083     |    | 28.62% Pervious Area          |
| 0.207     |    | 71.38% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 13A:**

Runoff = 0.93 cfs @ 12.08 hrs, Volume= 0.062 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.059     | 98 | Paved parking & roofs         |
| 0.206     | 80 | >75% Grass cover, Good, HSG D |
| 0.265     | 84 | Weighted Average              |
| 0.206     |    | 77.74% Pervious Area          |
| 0.059     |    | 22.26% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 14:**

Runoff = 0.41 cfs @ 12.07 hrs, Volume= 0.031 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.070   | 98 | Paved parking & roofs - New Road + SW |
| * 0.019   | 98 | Paved parking & roofs - Exist         |
| 0.089     | 98 | Weighted Average                      |
| 0.089     |    | 100.00% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 15:**

Runoff = 0.49 cfs @ 12.07 hrs, Volume= 0.037 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.106   | 98 | Paved parking & roofs - New Road + SW |
| 0.106     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 16:**

Runoff = 0.19 cfs @ 12.07 hrs, Volume= 0.015 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New Road + SW |
| 0.042     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 17:**

Runoff = 0.72 cfs @ 12.07 hrs, Volume= 0.052 af, Depth> 3.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.131   | 98 | Paved parking & roofs - New Road + SW |
| 0.030     | 80 | >75% Grass cover, Good, HSG D         |
| 0.161     | 95 | Weighted Average                      |
| 0.030     |    | 18.63% Pervious Area                  |
| 0.131     |    | 81.37% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 18:**

Runoff = 2.63 cfs @ 12.14 hrs, Volume= 0.200 af, Depth> 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.224   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.150   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.208   | 98 | Paved parking & roofs - Exist       |
| 0.003     | 70 | Woods, Good, HSG C                  |
| 0.359     | 77 | Woods, Good, HSG D                  |
| 0.944     | 81 | Weighted Average                    |
| 0.736     |    | 77.97% Pervious Area                |
| 0.208     |    | 22.03% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.5      | 150           | 0.0530        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00" |

**Summary for Subcatchment 20:**

Runoff = 10.82 cfs @ 12.27 hrs, Volume= 1.048 af, Depth> 1.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.588   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.027   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.066   | 74 | >75% Grass cover, Good, HSG C-New   |
| * 0.083   | 98 | Paved parking & roofs - New Roof    |
| * 0.069   | 98 | Paved parking & roofs - Exist       |
| 6.225     | 70 | Woods, Good, HSG C                  |
| 0.198     | 77 | Woods, Good, HSG D                  |
| 7.256     | 71 | Weighted Average                    |
| 7.104     |    | 97.91% Pervious Area                |
| 0.152     |    | 2.09% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 17.6     | 65            | 0.0150        | 0.06              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"      |
| 0.6      | 90            | 0.2200        | 2.35              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps             |
| 0.7      | 440           | 0.0200        | 11.23             | 1,122.98       | <b>Channel Flow, CD</b><br>Area= 100.0 sf Perim= 32.0' r= 3.13' n= 0.040 |
| 18.9     | 595           | Total         |                   |                |  |

**Summary for Subcatchment 20A:**

Runoff = 10.91 cfs @ 12.14 hrs, Volume= 0.829 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"



| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.022   | 98 | Paved parking & roofs - New House   |
| * 0.153   | 74 | >75% Grass cover, Good, HSG C - New |
| 0.038     | 98 | Paved parking & roofs               |
| 0.429     | 98 | Paved parking & roofs               |
| * 0.016   | 98 | Walkways, Impervious                |
| 0.166     | 89 | Gravel roads, HSG C                 |
| 0.339     | 61 | >75% Grass cover, Good, HSG B       |
| 1.777     | 74 | >75% Grass cover, Good, HSG C       |
| 0.618     | 58 | Meadow, non-grazed, HSG B           |
| 0.071     | 71 | Meadow, non-grazed, HSG C           |
| 0.016     | 55 | Woods, Good, HSG B                  |
| 1.583     | 70 | Woods, Good, HSG C                  |
| 0.040     | 77 | Woods, Good, HSG D                  |
| 5.268     | 73 | Weighted Average                    |
| 4.763     |    | 90.41% Pervious Area                |
| 0.505     |    | 9.59% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4      | 85            | 0.0700        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 3.5      | 330           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps   |
| 0.7      | 350           | 0.0100        | 8.97              | 1,345.05       | <b>Channel Flow, CD</b><br>Area= 150.0 sf Perim= 40.0' r= 3.75'<br>n= 0.040 Winding stream, pools & shoals |
| 9.6      | 765           | Total         |                   |                |  |

### Summary for Subcatchment 20B:

Runoff = 3.41 cfs @ 12.23 hrs, Volume= 0.309 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.074   | 98 | Paved parking & roofs - New House |
| * 0.081   | 98 | Paved parking & roofs - Existing  |
| 0.185     | 55 | Woods, Good, HSG B                |
| 0.052     | 70 | Woods, Good, HSG C                |
| 1.000     | 77 | Woods, Good, HSG D                |
| 0.293     | 80 | >75% Grass cover, Good, HSG D     |
| 1.685     | 77 | Weighted Average                  |
| 1.530     |    | 90.80% Pervious Area              |
| 0.155     |    | 9.20% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 15.4        | 90               | 0.0400           | 0.10                 |                   | <b>Sheet Flow, AB</b>                        |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00"   |
| 0.6         | 80               | 0.1700           | 2.06                 |                   | <b>Shallow Concentrated Flow, BC</b>         |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                         |
| 0.2         | 120              | 0.0250           | 10.26                | 615.46            | <b>Channel Flow, DE</b>                      |
|             |                  |                  |                      |                   | Area= 60.0 sf Perim= 26.0' r= 2.31' n= 0.040 |
| 16.2        | 290              | Total            |                      |                   |  |

**Summary for Subcatchment 20C:**

Runoff = 18.42 cfs @ 12.46 hrs, Volume= 2.208 af, Depth> 1.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.179   | 98 | Paved parking & roofs - Exist     |
| * 0.654   | 98 | Paved parking & roofs - New Roof  |
| * 0.491   | 80 | >75% Grass cover, Good, HSG D-NEW |
| 0.222     | 61 | >75% Grass cover, Good, HSG B     |
| 0.465     | 74 | >75% Grass cover, Good, HSG C     |
| 1.265     | 80 | >75% Grass cover, Good, HSG D     |
| 0.578     | 71 | Meadow, non-grazed, HSG C         |
| 1.196     | 78 | Meadow, non-grazed, HSG D         |
| 1.896     | 55 | Woods, Good, HSG B                |
| 3.522     | 70 | Woods, Good, HSG C                |
| 3.687     | 77 | Woods, Good, HSG D                |
| 14.155    | 73 | Weighted Average                  |
| 13.322    |    | 94.12% Pervious Area              |
| 0.833     |    | 5.88% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 25.0        | 150              | 0.0333           | 0.10                 |                   | <b>Sheet Flow, AB</b>                      |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 6.1         | 310              | 0.0290           | 0.85                 |                   | <b>Shallow Concentrated Flow, BC</b>       |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 0.8         | 482              | 0.0380           | 10.18                | 407.20            | <b>Channel Flow, CD</b>                    |
|             |                  |                  |                      |                   | Area= 40.0 sf Perim= 24.0' r= 1.67'        |
|             |                  |                  |                      |                   | n= 0.040 Winding stream, pools & shoals    |
| 31.9        | 942              | Total            |                      |                   |  |

**Summary for Subcatchment 21:**

Runoff = 2.89 cfs @ 12.15 hrs, Volume= 0.226 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.537     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.043   | 98 | Paved parking & roofs - New Road + SW |
| * 0.265   | 98 | Paved parking & roofs - Exist         |
| 0.300     | 70 | Woods, Good, HSG C                    |
| 1.145     | 79 | Weighted Average                      |
| 0.837     |    | 73.10% Pervious Area                  |
| 0.308     |    | 26.90% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.6      | 145           | 0.0480        | 0.25              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.3      | 50            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.9      | 250           | 0.0520        | 4.63              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps            |
| 10.8     | 445           | Total         |                   |                |   |

**Summary for Subcatchment 21B:**

Runoff = 2.33 cfs @ 12.27 hrs, Volume= 0.225 af, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.060   | 98 | Paved parking & roofs - New House |
| 0.191     | 80 | >75% Grass cover, Good, HSG D     |
| 0.893     | 77 | Woods, Good, HSG D                |
| 1.144     | 79 | Weighted Average                  |
| 1.084     |    | 94.76% Pervious Area              |
| 0.060     |    | 5.24% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 18.9     | 110           | 0.0360        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 0.3      | 50            | 0.2800        | 2.65              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 19.2     | 160           | Total         |                   |                |   |

**Summary for Subcatchment 21C:**

Runoff = 5.45 cfs @ 12.19 hrs, Volume= 0.457 af, Depth> 2.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.576     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.015   | 98 | Paved parking & roofs - Road + SW  |
| * 0.119   | 98 | Paved parking & roofs - New Houses |
| 1.608     | 77 | Woods, Good, HSG D                 |
| 2.318     | 79 | Weighted Average                   |
| 2.184     |    | 94.22% Pervious Area               |
| 0.134     |    | 5.78% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 60            | 0.0420        | 0.20              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                |
| 7.4      | 40            | 0.0500        | 0.09              |                | <b>Sheet Flow, BC</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"     |
| 0.2      | 30            | 0.3000        | 2.74              |                | <b>Shallow Concentrated Flow, CD</b><br>Woodland Kv= 5.0 fps            |
| 0.5      | 240           | 0.0250        | 8.26              | 330.28         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67' n= 0.040 |
| 13.1     | 370           | Total         |                   |                |   |

**Summary for Subcatchment 22:**

Runoff = 1.10 cfs @ 12.14 hrs, Volume= 0.083 af, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.092     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.108   | 98 | Paved parking & roofs - New Road + SW |
| 0.044     | 77 | Woods, Good, HSG D                    |
| 0.194     | 70 | Woods, Good, HSG C                    |
| 0.438     | 78 | Weighted Average                      |
| 0.330     |    | 75.34% Pervious Area                  |
| 0.108     |    | 24.66% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.7      | 150           | 0.0660        | 0.29              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 0.9      | 230           | 0.0480        | 4.45              |                | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps |
| 9.6      | 380           | Total         |                   |                |  |

**Summary for Subcatchment 22B:**

Runoff = 1.11 cfs @ 12.07 hrs, Volume= 0.078 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New House  |
| * 0.131   | 98 | Paved parking & roofs - Roads + SW |
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| 0.018     | 74 | >75% Grass cover, Good, HSG C      |
| 0.261     | 92 | Weighted Average                   |
| 0.088     |    | 33.72% Pervious Area               |
| 0.173     |    | 66.28% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 22C:**

Runoff = 1.63 cfs @ 12.07 hrs, Volume= 0.110 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.258     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.071   | 98 | Paved parking & roofs - New Houses |
| * 0.099   | 98 | Paved parking & roofs - Road + SW  |
| 0.428     | 87 | Weighted Average                   |
| 0.258     |    | 60.28% Pervious Area               |
| 0.170     |    | 39.72% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23B:**

Runoff = 3.17 cfs @ 12.07 hrs, Volume= 0.215 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.177   | 98 | Paved parking & roofs - New House  |
| * 0.272   | 98 | Paved parking & roofs - Roads + SW |
| 0.051     | 80 | >75% Grass cover, Good, HSG D      |
| 0.332     | 74 | >75% Grass cover, Good, HSG C      |
| 0.832     | 87 | Weighted Average                   |
| 0.383     |    | 46.03% Pervious Area               |
| 0.449     |    | 53.97% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23C:**

Runoff = 0.58 cfs @ 12.07 hrs, Volume= 0.041 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.026     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.105   | 98 | Paved parking & roofs - Road + SW |
| 0.131     | 94 | Weighted Average                  |
| 0.026     |    | 19.85% Pervious Area              |
| 0.105     |    | 80.15% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 24B:**

Runoff = 0.47 cfs @ 12.07 hrs, Volume= 0.031 af, Depth> 2.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.027   | 98 | Paved parking & roofs - Road + SW  |
| * 0.014   | 98 | Paved parking & roofs - New Houses |
| 0.018     | 77 | Woods, Good, HSG D                 |
| 0.129     | 85 | Weighted Average                   |
| 0.088     |    | 68.22% Pervious Area               |
| 0.041     |    | 31.78% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 24C:**

Runoff = 3.35 cfs @ 12.08 hrs, Volume= 0.224 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.353     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.136   | 98 | Paved parking & roofs - Road + SW  |
| * 0.135   | 98 | Paved parking & roofs - New Houses |
| 0.046     | 55 | Woods, Good, HSG B                 |
| 0.037     | 70 | Woods, Good, HSG C                 |
| 0.281     | 77 | Woods, Good, HSG D                 |
| 0.988     | 83 | Weighted Average                   |
| 0.717     |    | 72.57% Pervious Area               |
| 0.271     |    | 27.43% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25B:**

Runoff = 1.22 cfs @ 12.07 hrs, Volume= 0.086 af, Depth> 3.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.059   | 98 | Paved parking & roofs - New House     |
| * 0.144   | 98 | Paved parking & roofs - New Road + SW |
| 0.077     | 80 | >75% Grass cover, Good, HSG D         |
| 0.280     | 93 | Weighted Average                      |
| 0.077     |    | 27.50% Pervious Area                  |
| 0.203     |    | 72.50% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25C:**

Runoff = 0.42 cfs @ 12.07 hrs, Volume= 0.030 af, Depth> 3.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.023     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.071   | 98 | Paved parking & roofs - Road + SW |
| 0.094     | 94 | Weighted Average                  |
| 0.023     |    | 24.47% Pervious Area              |
| 0.071     |    | 75.53% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 30:**

Runoff = 3.92 cfs @ 12.39 hrs, Volume= 0.441 af, Depth> 2.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| 1.881     | 77 | Woods, Good, HSG D                  |
| * 0.104   | 98 | New Houses                          |
| * 0.346   | 80 | >75% Grass cover, Good, HSG D - New |
| 2.331     | 78 | Weighted Average                    |
| 2.227     |    | 95.54% Pervious Area                |
| 0.104     |    | 4.46% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5      | 155           | 0.0130        | 0.57              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 27.7     | 305           | Total         |                   |                |  |

**Summary for Subcatchment 40:**

Runoff = 8.08 cfs @ 12.12 hrs, Volume= 0.591 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"



| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 1.280     | 98 | Paved parking & roofs         |
| 0.104     | 39 | >75% Grass cover, Good, HSG A |
| 0.109     | 74 | >75% Grass cover, Good, HSG C |
| 0.818     | 71 | Meadow, non-grazed, HSG C     |
| 0.214     | 78 | Meadow, non-grazed, HSG D     |
| 2.525     | 84 | Weighted Average              |
| 1.245     |    | 49.31% Pervious Area          |
| 1.280     |    | 50.69% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 7.7      | 150           | 0.0660        | 0.32              |                | <b>Sheet Flow, AB</b><br>Range n= 0.130 P2= 3.00"   |
| 0.5      | 440           | 0.0750        | 14.94             | 239.03         | <b>Channel Flow, CD</b><br>Area= 16.0 sf Perim= 12.0' r= 1.33'<br>n= 0.033 Earth, grassed & winding |
| 8.2      | 590           | Total         |                   |                |   |

### Summary for Subcatchment 50:

Runoff = 26.55 cfs @ 12.40 hrs, Volume= 3.035 af, Depth> 2.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 3.437   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 0.768   | 98 | Paved parking & roofs - New Houses       |
| * 1.542   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.126   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.015     | 77 | Woods, Good, HSG D                       |
| 0.466     | 70 | Woods, Good, HSG C                       |
| 14.432    | 81 | Weighted Average                         |
| 11.416    |    | 79.10% Pervious Area                     |
| 3.016     |    | 20.90% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 50A: Including Phase 2**

Runoff = 30.01 cfs @ 12.39 hrs, Volume= 3.468 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 0.577   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 2.860   | 98 | Paved parking & roofs - Phase 2          |
| * 0.438   | 98 | Paved parking & roofs - New Houses       |
| * 0.898   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.071   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.975     | 77 | Woods, Good, HSG D                       |
| 0.535     | 70 | Woods, Good, HSG C                       |
| 14.432    | 85 | Weighted Average                         |
| 8.886     |    | 61.57% Pervious Area                     |
| 5.546     |    | 38.43% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 51:**

Runoff = 15.76 cfs @ 12.10 hrs, Volume= 1.107 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.725     | 74 | >75% Grass cover, Good, HSG C      |
| 1.605     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.871   | 98 | Paved parking & roofs - New Houses |
| * 1.095   | 98 | Paved parking & roofs - Road + SW  |
| 4.296     | 87 | Weighted Average                   |
| 2.330     |    | 54.24% Pervious Area               |
| 1.966     |    | 45.76% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 3.0         | 35               | 0.0500           | 0.19                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 0.6         | 180              | 0.0700           | 5.37                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps                           |
| 2.9         | 1,575            | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 6.5         | 1,790            | Total            |                      |                   |  |

**Summary for Subcatchment 52:**

Runoff = 10.63 cfs @ 12.12 hrs, Volume= 0.793 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.174     | 71 | Meadow, non-grazed, HSG C          |
| 0.056     | 74 | >75% Grass cover, Good, HSG C      |
| * 0.641   | 98 | Paved parking & roofs - New Houses |
| * 0.739   | 98 | Paved parking & roofs - Road + SW  |
| 1.469     | 80 | >75% Grass cover, Good, HSG D      |
| 3.079     | 87 | Weighted Average                   |
| 1.699     |    | 55.18% Pervious Area               |
| 1.380     |    | 44.82% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.6         | 90               | 0.0700           | 0.27                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 1.2         | 135              | 0.0150           | 1.84                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                |
| 1.6         | 860              | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 8.4         | 1,085            | Total            |                      |                   |  |

**Summary for Subcatchment 60: Main Street**

Runoff = 5.27 cfs @ 12.15 hrs, Volume= 0.411 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.418     | 98 | Paved parking & roofs           |
| 0.938     | 70 | Woods, Good, HSG C              |
| 0.196     | 98 | Paved parking & roofs           |
| 0.688     | 69 | 50-75% Grass cover, Fair, HSG B |
| 2.240     | 77 | Weighted Average                |
| 1.626     |    | 72.59% Pervious Area            |
| 0.614     |    | 27.41% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 6.7      | 85            | 0.0400        | 0.21              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 4.0      | 378           | 0.0160        | 1.58              | 0.21           | <b>Trap/Vee/Rect Channel Flow, BC</b><br>Bot.W=1.00' D=0.10' Z= 3.0 ' Top.W=1.60'<br>n= 0.022 Earth, clean & straight |
| 10.7     | 463           | Total         |                   |                |   |

**Summary for Subcatchment 70:**

Runoff = 2.78 cfs @ 12.27 hrs, Volume= 0.266 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.121   | 98 | Paved parking & roofs-New Road + SW |
| * 0.052   | 98 | Paved parking & roofs - Exist.      |
| 0.048     | 61 | >75% Grass cover, Good, HSG B       |
| 1.548     | 70 | Woods, Good, HSG C                  |
| 1.769     | 72 | Weighted Average                    |
| 1.596     |    | 90.22% Pervious Area                |
| 0.173     |    | 9.78% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 16.6     | 150           | 0.0930        | 0.15              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                                       |
| 1.7      | 170           | 0.1100        | 1.66              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps  |
| 0.2      | 79            | 0.0130        | 7.40              | 443.81         | <b>Channel Flow, CD</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.040 Winding stream, pools & shoals |
| 18.5     | 399           | Total         |                   |                |   |

**Summary for Subcatchment 80:**

Runoff = 0.20 cfs @ 12.24 hrs, Volume= 0.019 af, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.020   | 98 | Paved parking & roofs - Exist |
| 0.051     | 61 | >75% Grass cover, Good, HSG B |
| 0.157     | 55 | Woods, Good, HSG B            |
| 0.228     | 60 | Weighted Average              |
| 0.208     |    | 91.23% Pervious Area          |
| 0.020     |    | 8.77% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 15.0     | 106           | 0.0600        | 0.12              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |

**Summary for Subcatchment OS1:**

Runoff = 18.39 cfs @ 12.62 hrs, Volume= 2.548 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.159     | 98 | Paved parking & roofs         |
| 1.167     | 98 | Paved parking & roofs         |
| 1.048     | 98 | Paved parking & roofs         |
| 0.051     | 98 | Water Surface                 |
| 0.057     | 98 | Water Surface                 |
| * 0.002   | 98 | Walkway, Impervious           |
| * 0.041   | 98 | Walkway, Impervious           |
| 0.900     | 39 | >75% Grass cover, Good, HSG A |
| 3.053     | 61 | >75% Grass cover, Good, HSG B |
| 5.742     | 74 | >75% Grass cover, Good, HSG C |
| 0.077     | 58 | Meadow, non-grazed, HSG B     |
| 0.329     | 71 | Meadow, non-grazed, HSG C     |
| 0.694     | 30 | Woods, Good, HSG A            |
| 1.195     | 55 | Woods, Good, HSG B            |
| 4.085     | 70 | Woods, Good, HSG C            |
| 18.600    | 70 | Weighted Average              |
| 16.075    |    | 86.42% Pervious Area          |
| 2.525     |    | 13.58% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 27.4        | 150              | 0.0266           | 0.09                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                               |
| 4.5         | 250              | 0.0345           | 0.93                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps                                      |
| 1.2         | 196              | 0.0306           | 2.62                 |                   | <b>Shallow Concentrated Flow, CD</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.6         | 80               | 0.0125           | 2.27                 |                   | <b>Shallow Concentrated Flow, DE</b><br>Paved Kv= 20.3 fps  |
| 3.6         | 320              | 0.0219           | 1.48                 |                   | <b>Shallow Concentrated Flow, EF</b><br>Nearly Bare & Untilled Kv= 10.0 fps                       |
| 0.2         | 36               | 0.0208           | 2.93                 |                   | <b>Shallow Concentrated Flow, FG</b><br>Paved Kv= 20.3 fps  |
| 0.3         | 60               | 0.0500           | 3.35                 |                   | <b>Shallow Concentrated Flow, GH</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.3         | 70               | 0.0429           | 4.20                 |                   | <b>Shallow Concentrated Flow, HI</b><br>Paved Kv= 20.3 fps  |
| 0.6         | 148              | 0.0777           | 4.18                 |                   | <b>Shallow Concentrated Flow, IJ</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 3.4         | 310              | 0.0935           | 1.53                 |                   | <b>Shallow Concentrated Flow, JK</b><br>Woodland Kv= 5.0 fps                                      |
| 0.2         | 130              | 0.0231           | 13.15                | 788.81            | <b>Channel Flow, KL</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.030 Earth, clean & winding |
| 42.3        | 1,750            | Total            |                      |                   |   |

**Summary for Subcatchment OS2:**

Runoff = 27.08 cfs @ 12.20 hrs, Volume= 2.301 af, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=4.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.751     | 98 | Paved parking & roofs         |
| 1.187     | 98 | Paved parking & roofs         |
| 0.404     | 98 | Paved parking & roofs         |
| 0.080     | 98 | Water Surface                 |
| 0.039     | 98 | Water Surface                 |
| 0.001     | 98 | Water Surface                 |
| * 0.026   | 98 | Walkways, Impervious          |
| * 0.007   | 98 | Walkways, Impervious          |
| 0.289     | 74 | Farmsteads, HSG B             |
| 0.233     | 82 | Farmsteads, HSG C             |
| 1.691     | 61 | >75% Grass cover, Good, HSG B |
| 4.263     | 74 | >75% Grass cover, Good, HSG C |
| 0.871     | 80 | >75% Grass cover, Good, HSG D |
| 0.437     | 58 | Meadow, non-grazed, HSG B     |
| 0.026     | 71 | Meadow, non-grazed, HSG C     |
| 2.871     | 55 | Woods, Good, HSG B            |
| 2.044     | 70 | Woods, Good, HSG C            |
| 0.030     | 77 | Woods, Good, HSG D            |
| 15.250    | 72 | Weighted Average              |
| 12.755    |    | 83.64% Pervious Area          |
| 2.495     |    | 16.36% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 10.5     | 150           | 0.0407        | 0.24              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 1.1      | 170           | 0.0294        | 2.57              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.1      | 30            | 0.0333        | 3.70              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps  |
| 1.2      | 300           | 0.0767        | 4.15              |                | <b>Shallow Concentrated Flow, DE</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.5      | 400           | 0.0375        | 13.48             | 539.35         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67'<br>n= 0.030 Earth, clean & winding |
| 13.4     | 1,050         | Total         |                   |                |   |

### Summary for Reach R1: 2C

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 1.64" for 10-yr event  
 Inflow = 18.37 cfs @ 12.63 hrs, Volume= 2.548 af  
 Outflow = 18.32 cfs @ 12.65 hrs, Volume= 2.544 af, Atten= 0%, Lag= 1.5 min

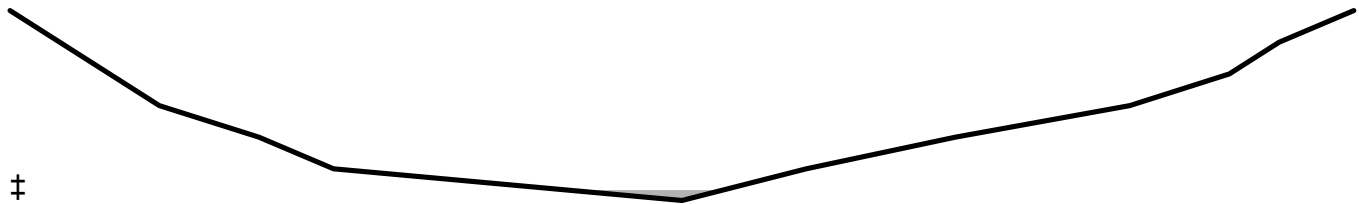
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.44 fps, Min. Travel Time= 0.9 min  
 Avg. Velocity= 2.57 fps, Avg. Travel Time= 1.6 min

Peak Storage= 992 cf @ 12.63 hrs  
 Average Depth at Peak Storage= 0.66'  
 Bank-Full Depth= 12.00' Flow Area= 828.0 sf, Capacity= 29,251.95 cfs

Custom cross-section, Length= 240.0' Slope= 0.0625 '/' (104 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 100.00', Outlet Invert= 85.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -54.00           | 100.00              | 0.00                 |
| -50.00           | 98.00               | 2.00                 |
| -46.00           | 96.00               | 4.00                 |
| -42.00           | 94.00               | 6.00                 |
| -34.00           | 92.00               | 8.00                 |
| -28.00           | 90.00               | 10.00                |
| 0.00             | 88.00               | 12.00                |
| 10.00            | 90.00               | 10.00                |
| 22.00            | 92.00               | 8.00                 |
| 36.00            | 94.00               | 6.00                 |
| 44.00            | 96.00               | 4.00                 |
| 48.00            | 98.00               | 2.00                 |
| 54.00            | 100.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 38.0                | 38.3             | 9,120                   | 351.27             |
| 4.00            | 132.0               | 56.8             | 31,680                  | 2,151.94           |
| 6.00            | 266.0               | 79.1             | 63,840                  | 5,542.97           |
| 8.00            | 434.0               | 91.9             | 104,160                 | 11,348.66          |
| 10.00           | 622.0               | 100.8            | 149,280                 | 19,433.27          |
| 12.00           | 828.0               | 111.6            | 198,720                 | 29,251.95          |

### Summary for Reach R10: Stream

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 1.87" for 10-yr event  
 Inflow = 18.42 cfs @ 12.46 hrs, Volume= 2.208 af  
 Outflow = 18.30 cfs @ 12.51 hrs, Volume= 2.202 af, Atten= 1%, Lag= 3.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.17 fps, Min. Travel Time= 1.7 min  
 Avg. Velocity= 1.49 fps, Avg. Travel Time= 3.6 min

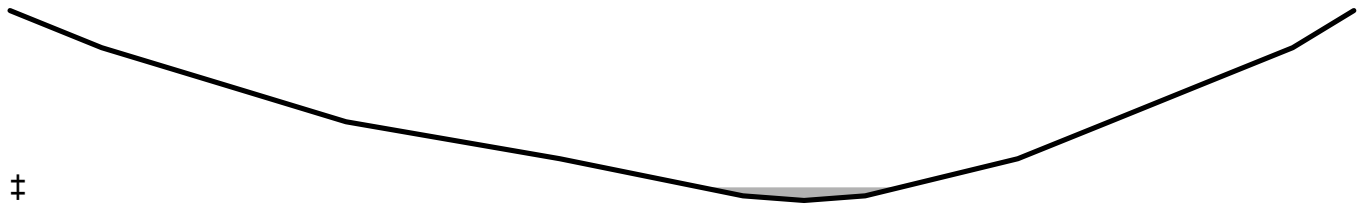
Peak Storage= 1,884 cf @ 12.48 hrs  
 Average Depth at Peak Storage= 0.71'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,695.16 cfs



Custom cross-section, Length= 325.0' Slope= 0.0215 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 91.00', Outlet Invert= 84.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 325                     | 1.36               |
| 2.25            | 39.0                | 30.4             | 12,676                  | 251.23             |
| 4.25            | 119.0               | 50.8             | 38,675                  | 1,143.69           |
| 6.25            | 233.0               | 65.4             | 75,725                  | 2,962.82           |
| 8.25            | 375.0               | 80.0             | 121,875                 | 5,727.13           |
| 10.25           | 541.0               | 90.8             | 175,825                 | 9,695.16           |

### Summary for Reach R20: STREAM

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 1.85" for 10-yr event  
 Inflow = 29.71 cfs @ 12.24 hrs, Volume= 2.607 af  
 Outflow = 29.44 cfs @ 12.26 hrs, Volume= 2.604 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.23 fps, Min. Travel Time= 0.7 min  
 Avg. Velocity= 2.06 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1,263 cf @ 12.25 hrs  
 Average Depth at Peak Storage= 1.18'  
 Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 14,699.46 cfs

Custom cross-section, Length= 180.0' Slope= 0.0278 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 88.00', Outlet Invert= 83.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 900                     | 19.24              |
| 3.00            | 49.0                | 34.6             | 8,820                   | 382.78             |
| 5.00            | 127.0               | 45.4             | 22,860                  | 1,561.76           |
| 7.00            | 227.0               | 58.0             | 40,860                  | 3,489.69           |
| 9.00            | 351.0               | 70.7             | 63,180                  | 6,326.40           |
| 11.00           | 499.0               | 83.4             | 89,820                  | 10,183.56          |
| 13.00           | 679.0               | 103.9            | 122,220                 | 14,699.46          |

### Summary for Reach R21: STREAM

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 1.81" for 10-yr event  
 Inflow = 26.72 cfs @ 12.21 hrs, Volume= 2.301 af  
 Outflow = 26.30 cfs @ 12.23 hrs, Volume= 2.298 af, Atten= 2%, Lag= 1.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.76 fps, Min. Travel Time= 0.9 min  
 Avg. Velocity= 2.40 fps, Avg. Travel Time= 1.7 min

Peak Storage= 1,399 cf @ 12.22 hrs

Average Depth at Peak Storage= 1.06'

Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 17,639.35 cfs

Custom cross-section, Length= 250.0' Slope= 0.0400 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 101.00', Outlet Invert= 91.00'



±

| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 1,250                   | 23.09              |
| 3.00            | 49.0                | 34.6             | 12,250                  | 459.33             |
| 5.00            | 127.0               | 45.4             | 31,750                  | 1,874.11           |
| 7.00            | 227.0               | 58.0             | 56,750                  | 4,187.63           |
| 9.00            | 351.0               | 70.7             | 87,750                  | 7,591.68           |
| 11.00           | 499.0               | 83.4             | 124,750                 | 12,220.27          |
| 13.00           | 679.0               | 103.9            | 169,750                 | 17,639.35          |

### Summary for Reach R3: STREAM

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 1.70" for 10-yr event  
 Inflow = 20.88 cfs @ 12.57 hrs, Volume= 3.373 af  
 Outflow = 20.83 cfs @ 12.62 hrs, Volume= 3.367 af, Atten= 0%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.50 fps, Min. Travel Time= 1.3 min

Avg. Velocity = 2.02 fps, Avg. Travel Time= 2.3 min

Peak Storage= 1,668 cf @ 12.59 hrs

Average Depth at Peak Storage= 1.22'

Bank-Full Depth= 13.50' Flow Area= 787.0 sf, Capacity= 14,679.38 cfs

Custom cross-section, Length= 280.0' Slope= 0.0179 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 85.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -56.00           | 96.00               | 0.00                 |
| -48.00           | 94.00               | 2.00                 |
| -40.00           | 92.00               | 4.00                 |
| -34.00           | 90.00               | 6.00                 |
| -24.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 82.50               | 13.50                |
| 6.00             | 84.00               | 12.00                |
| 20.00            | 86.00               | 10.00                |
| 28.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 41.00            | 92.00               | 4.00                 |
| 46.00            | 94.00               | 2.00                 |
| 48.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.50            | 9.0                 | 12.4             | 2,520                   | 36.14              |
| 3.50            | 55.0                | 34.8             | 15,400                  | 370.77             |
| 5.50            | 141.0               | 53.2             | 39,480                  | 1,340.54           |
| 7.50            | 263.0               | 71.6             | 73,640                  | 3,106.91           |
| 9.50            | 414.0               | 83.4             | 115,920                 | 5,982.85           |
| 11.50           | 589.0               | 97.0             | 164,920                 | 9,733.01           |
| 13.50           | 787.0               | 108.1            | 220,360                 | 14,679.38          |

**Summary for Reach R30: (new Reach)**

Inflow Area = 3.363 ac, 6.30% Impervious, Inflow Depth > 2.13" for 10-yr event  
 Inflow = 3.68 cfs @ 12.78 hrs, Volume= 0.597 af  
 Outflow = 3.24 cfs @ 13.39 hrs, Volume= 0.573 af, Atten= 12%, Lag= 36.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.50 fps, Min. Travel Time= 22.2 min  
 Avg. Velocity = 0.24 fps, Avg. Travel Time= 47.1 min

Peak Storage= 4,325 cf @ 13.02 hrs  
 Average Depth at Peak Storage= 0.06'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 513.72 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
 Length= 670.0' Slope= 0.0082 ' '  
 Inlet Invert= 82.50', Outlet Invert= 77.00'

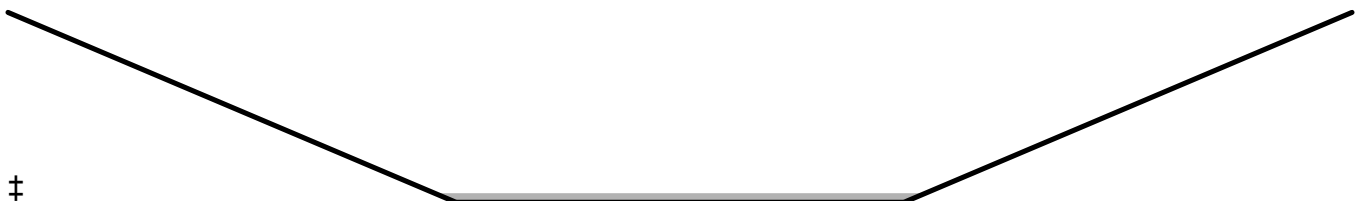
**Summary for Reach R31: (new Reach)**

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 2.02" for 10-yr event  
 Inflow = 3.01 cfs @ 12.61 hrs, Volume= 0.407 af  
 Outflow = 2.85 cfs @ 12.89 hrs, Volume= 0.400 af, Atten= 5%, Lag= 17.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.57 fps, Min. Travel Time= 10.2 min  
 Avg. Velocity = 0.26 fps, Avg. Travel Time= 22.1 min

Peak Storage= 1,756 cf @ 12.72 hrs  
 Average Depth at Peak Storage= 0.05'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 677.70 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0143 ' '  
 Inlet Invert= 87.50', Outlet Invert= 82.50'



**Summary for Reach R32: (new Reach)**

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 2.54" for 10-yr event  
 Inflow = 2.63 cfs @ 12.14 hrs, Volume= 0.200 af  
 Outflow = 2.02 cfs @ 12.41 hrs, Volume= 0.197 af, Atten= 23%, Lag= 16.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.55 fps, Min. Travel Time= 10.6 min  
 Avg. Velocity = 0.26 fps, Avg. Travel Time= 22.8 min

Peak Storage= 1,294 cf @ 12.23 hrs  
 Average Depth at Peak Storage= 0.04'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 784.49 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' / ' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0191 ' / '  
 Inlet Invert= 89.20', Outlet Invert= 82.50'

**Summary for Reach R4: STREAM**

Inflow Area = 18.079 ac, 14.99% Impervious, Inflow Depth > 1.88" for 10-yr event  
 Inflow = 31.77 cfs @ 12.26 hrs, Volume= 2.829 af  
 Outflow = 31.32 cfs @ 12.28 hrs, Volume= 2.826 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.67 fps, Min. Travel Time= 0.8 min  
 Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.6 min

Peak Storage= 1,469 cf @ 12.27 hrs  
 Average Depth at Peak Storage= 1.04'  
 Bank-Full Depth= 13.00' Flow Area= 734.0 sf, Capacity= 16,078.55 cfs

Custom cross-section, Length= 170.0' Slope= 0.0235 ' / ' (106 Elevation Intervals)  
 Constant n= 0.040  
 Inlet Invert= 84.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -48.00           | 96.00               | 0.00                 |
| -40.00           | 94.00               | 2.00                 |
| -32.00           | 92.00               | 4.00                 |
| -27.00           | 90.00               | 6.00                 |
| -20.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 83.00               | 13.00                |
| 10.00            | 84.00               | 12.00                |
| 30.00            | 86.00               | 10.00                |
| 32.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 38.00            | 92.00               | 4.00                 |
| 40.00            | 94.00               | 2.00                 |
| 44.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 8.0                 | 16.1             | 1,360                   | 28.56              |
| 3.00            | 68.0                | 44.5             | 11,560                  | 514.25             |
| 5.00            | 164.0               | 53.6             | 27,880                  | 1,968.90           |
| 7.00            | 279.0               | 65.4             | 47,430                  | 4,182.71           |
| 9.00            | 412.0               | 73.6             | 70,040                  | 7,402.04           |
| 11.00           | 562.0               | 84.7             | 95,540                  | 11,310.93          |
| 13.00           | 734.0               | 97.4             | 124,780                 | 16,078.55          |

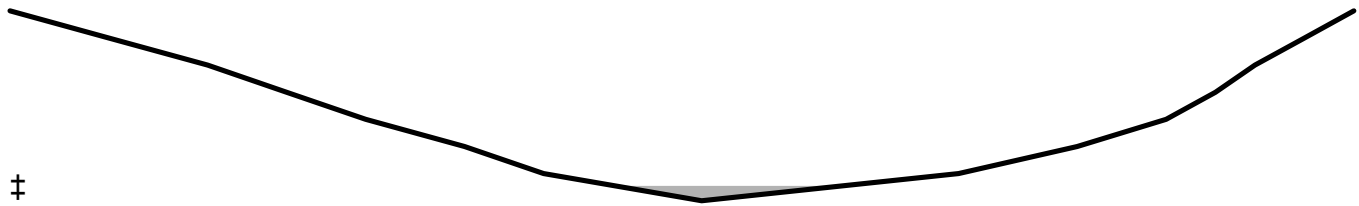
### Summary for Reach R5: STREAM

Inflow Area = 41.947 ac, 13.68% Impervious, Inflow Depth > 1.77" for 10-yr event  
 Inflow = 47.18 cfs @ 12.29 hrs, Volume= 6.193 af  
 Outflow = 46.77 cfs @ 12.33 hrs, Volume= 6.182 af, Atten= 1%, Lag= 2.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.72 fps, Min. Travel Time= 1.3 min  
 Avg. Velocity = 1.95 fps, Avg. Travel Time= 2.5 min

Peak Storage= 3,671 cf @ 12.31 hrs  
 Average Depth at Peak Storage= 1.10'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 26,019.95 cfs

Custom cross-section, Length= 290.0' Slope= 0.0224 '/' (106 Elevation Intervals)  
 Constant n= 0.040 Winding stream, pools & shoals  
 Inlet Invert= 80.00', Outlet Invert= 73.50'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 12,180                  | 232.85             |
| 4.00            | 146.0               | 62.6             | 42,340                  | 1,427.89           |
| 6.00            | 289.0               | 82.0             | 83,810                  | 3,721.59           |
| 8.00            | 464.0               | 95.7             | 134,560                 | 7,394.69           |
| 10.00           | 664.0               | 108.4            | 192,560                 | 12,365.06          |
| 12.00           | 891.0               | 124.0            | 258,390                 | 18,456.53          |
| 14.00           | 1,148.0             | 139.5            | 332,920                 | 26,019.95          |

### Summary for Reach R6: (new Reach)

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 1.94" for 10-yr event  
 Inflow = 20.79 cfs @ 12.48 hrs, Volume= 2.659 af  
 Outflow = 20.65 cfs @ 12.56 hrs, Volume= 2.647 af, Atten= 1%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.14 fps, Min. Travel Time= 2.8 min  
 Avg. Velocity= 1.42 fps, Avg. Travel Time= 6.2 min

Peak Storage= 3,453 cf @ 12.51 hrs  
 Average Depth at Peak Storage= 0.76'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,117.34 cfs



Custom cross-section, Length= 525.0' Slope= 0.0190 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 84.00', Outlet Invert= 74.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 525                     | 1.28               |
| 2.25            | 39.0                | 30.4             | 20,476                  | 236.25             |
| 4.25            | 119.0               | 50.8             | 62,475                  | 1,075.52           |
| 6.25            | 233.0               | 65.4             | 122,325                 | 2,786.24           |
| 8.25            | 375.0               | 80.0             | 196,875                 | 5,385.80           |
| 10.25           | 541.0               | 90.8             | 284,025                 | 9,117.34           |

### Summary for Reach R7: STREAM

Inflow Area = 58.420 ac, 11.48% Impervious, Inflow Depth > 1.81" for 10-yr event  
 Inflow = 63.05 cfs @ 12.40 hrs, Volume= 8.829 af  
 Outflow = 63.03 cfs @ 12.42 hrs, Volume= 8.822 af, Atten= 0%, Lag= 1.2 min

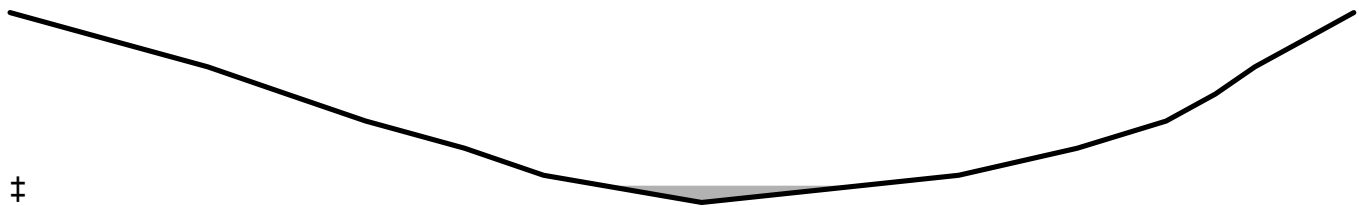
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.94 fps, Min. Travel Time= 0.6 min  
 Avg. Velocity= 2.07 fps, Avg. Travel Time= 1.1 min

Peak Storage= 2,160 cf @ 12.40 hrs  
 Average Depth at Peak Storage= 1.23'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 25,473.05 cfs

Custom cross-section, Length= 135.0' Slope= 0.0215 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 73.50', Outlet Invert= 70.60'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,670                   | 227.96             |
| 4.00            | 146.0               | 62.6             | 19,710                  | 1,397.88           |
| 6.00            | 289.0               | 82.0             | 39,015                  | 3,643.37           |
| 8.00            | 464.0               | 95.7             | 62,640                  | 7,239.27           |
| 10.00           | 664.0               | 108.4            | 89,640                  | 12,105.16          |
| 12.00           | 891.0               | 124.0            | 120,285                 | 18,068.60          |
| 14.00           | 1,148.0             | 139.5            | 154,980                 | 25,473.05          |

### Summary for Reach R8: STREAM

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 1.81" for 10-yr event  
 Inflow = 72.73 cfs @ 12.46 hrs, Volume= 10.160 af  
 Outflow = 72.54 cfs @ 12.49 hrs, Volume= 10.146 af, Atten= 0%, Lag= 1.9 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.03 fps, Min. Travel Time= 1.0 min

Avg. Velocity= 1.15 fps, Avg. Travel Time= 1.7 min

Peak Storage= 4,300 cf @ 12.47 hrs

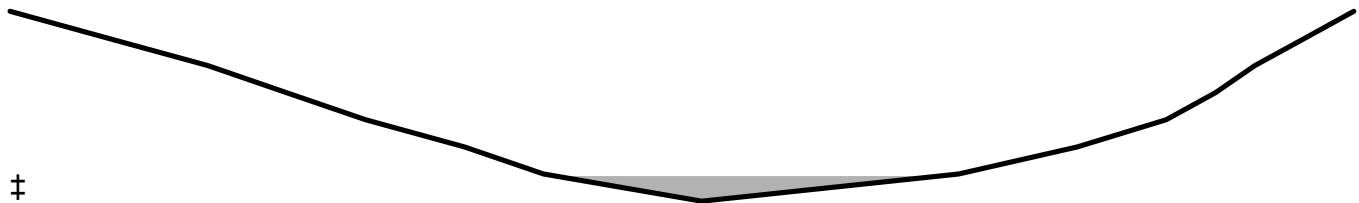
Average Depth at Peak Storage= 1.85'

Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 10,034.32 cfs

Custom cross-section, Length= 120.0' Slope= 0.0033 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 69.40', Outlet Invert= 69.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,040                   | 89.80              |
| 4.00            | 146.0               | 62.6             | 17,520                  | 550.65             |
| 6.00            | 289.0               | 82.0             | 34,680                  | 1,435.19           |
| 8.00            | 464.0               | 95.7             | 55,680                  | 2,851.69           |
| 10.00           | 664.0               | 108.4            | 79,680                  | 4,768.46           |
| 12.00           | 891.0               | 124.0            | 106,920                 | 7,117.57           |
| 14.00           | 1,148.0             | 139.5            | 137,760                 | 10,034.32          |

### Summary for Pond 1P: Phase2 POND W/OCS

Inflow Area = 14.432 ac, 38.43% Impervious, Inflow Depth > 2.88" for 10-yr event  
 Inflow = 30.01 cfs @ 12.39 hrs, Volume= 3.468 af  
 Outflow = 2.00 cfs @ 15.87 hrs, Volume= 1.165 af, Atten= 93%, Lag= 209.0 min  
 Primary = 2.00 cfs @ 15.87 hrs, Volume= 1.165 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 82.97' @ 15.87 hrs Surf.Area= 62,007 sf Storage= 110,059 cf

Plug-Flow detention time= 277.3 min calculated for 1.161 af (33% of inflow)

Center-of-Mass det. time= 178.6 min ( 973.8 - 795.2 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 81.00' | 718,507 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 81.00               | 49,980               | 0                         | 0                         |
| 82.00               | 55,620               | 52,800                    | 52,800                    |
| 84.00               | 68,740               | 124,360                   | 177,160                   |
| 86.00               | 85,942               | 154,682                   | 331,842                   |
| 88.00               | 97,175               | 183,117                   | 514,959                   |
| 90.00               | 106,373              | 203,548                   | 718,507                   |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 82.00' | <b>8.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 82.77' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #5     | Device 1 | 84.20' | <b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)<br>0.5' Crest Height  |
| #6     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=2.00 cfs @ 15.87 hrs HW=82.97' (Free Discharge)

- 1=Culvert (Passes 2.00 cfs of 9.27 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.56 cfs @ 6.47 fps)
- 3=Orifice/Grate (Orifice Controls 1.34 cfs @ 3.85 fps)
- 4=Orifice/Grate (Orifice Controls 0.09 cfs @ 1.54 fps)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
- 6=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

### Summary for Pond C1: AMANDA'S WAY

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 1.64" for 10-yr event  
 Inflow = 18.39 cfs @ 12.62 hrs, Volume= 2.548 af  
 Outflow = 18.37 cfs @ 12.63 hrs, Volume= 2.548 af, Atten= 0%, Lag= 0.5 min  
 Primary = 18.37 cfs @ 12.63 hrs, Volume= 2.548 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 105.71' @ 12.63 hrs Surf.Area= 294 sf Storage= 336 cf

Plug-Flow detention time= 0.3 min calculated for 2.539 af (100% of inflow)  
 Center-of-Mass det. time= 0.2 min ( 838.1 - 837.8 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 103.50' | 38,020 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 103.50              | 10                   | 0                         | 0                         |
| 106.00              | 331                  | 426                       | 426                       |
| 108.00              | 1,889                | 2,220                     | 2,646                     |
| 110.00              | 4,295                | 6,184                     | 8,830                     |
| 112.00              | 7,099                | 11,394                    | 20,224                    |
| 114.00              | 10,697               | 17,796                    | 38,020                    |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 103.50' | <b>30.0" Round Culvert</b><br>L= 75.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 103.50' / 100.00' S= 0.0467 ' S= 0.0467 ' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 4.91 sf |

**Primary OutFlow** Max=18.33 cfs @ 12.63 hrs HW=105.71' (Free Discharge)

↑**1=Culvert** (Inlet Controls 18.33 cfs @ 3.99 fps)

### Summary for Pond C2: AMANDA'S WAY

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 1.81" for 10-yr event  
 Inflow = 27.08 cfs @ 12.20 hrs, Volume= 2.301 af  
 Outflow = 26.72 cfs @ 12.21 hrs, Volume= 2.301 af, Atten= 1%, Lag= 0.6 min  
 Primary = 26.72 cfs @ 12.21 hrs, Volume= 2.301 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 108.30' @ 12.21 hrs Surf.Area= 349 sf Storage= 397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.1 min ( 811.8 - 811.7 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 105.00' | 6,414 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 105.00              | 10                   | 0                         | 0                         |
| 108.00              | 200                  | 315                       | 315                       |
| 110.00              | 1,196                | 1,396                     | 1,711                     |
| 112.00              | 3,507                | 4,703                     | 6,414                     |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 105.00' | <b>30.0" Round Culvert</b><br>L= 63.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 105.00' / 103.00' S= 0.0317 ' S= 0.0317 ' Cc= 0.900<br>n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf |

**Primary OutFlow** Max=26.57 cfs @ 12.21 hrs HW=108.28' (Free Discharge)

↑1=Culvert (Inlet Controls 26.57 cfs @ 5.41 fps)

### Summary for Pond C3: Stream Crossing #1

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 1.82" for 10-yr event  
 Inflow = 74.59 cfs @ 12.37 hrs, Volume= 10.179 af  
 Outflow = 72.73 cfs @ 12.46 hrs, Volume= 10.160 af, Atten= 2%, Lag= 5.4 min  
 Primary = 72.73 cfs @ 12.46 hrs, Volume= 10.160 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 75.22' @ 12.46 hrs Surf.Area= 8,918 sf Storage= 12,441 cf

Plug-Flow detention time= 2.7 min calculated for 10.126 af (99% of inflow)  
 Center-of-Mass det. time= 2.1 min ( 828.7 - 826.5 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 70.00' | 121,182 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 70.00               | 10                   | 0                         | 0                         |
| 72.00               | 395                  | 405                       | 405                       |
| 74.00               | 3,864                | 4,259                     | 4,664                     |
| 76.00               | 12,171               | 16,035                    | 20,699                    |
| 78.00               | 24,830               | 37,001                    | 57,700                    |
| 80.00               | 38,652               | 63,482                    | 121,182                   |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 72.00' | <b>72.0" W x 48.0" H Box Culvert</b><br>L= 65.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 72.00' / 71.90' S= 0.0015 ' S= 0.0015 ' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 24.00 sf |

**Primary OutFlow** Max=72.63 cfs @ 12.46 hrs HW=75.21' (Free Discharge)

↑1=Culvert (Barrel Controls 72.63 cfs @ 5.02 fps)

### Summary for Pond C4: Stream Crossing #3

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 1.85" for 10-yr event  
 Inflow = 29.70 cfs @ 12.23 hrs, Volume= 2.607 af  
 Outflow = 29.71 cfs @ 12.24 hrs, Volume= 2.607 af, Atten= 0%, Lag= 0.3 min  
 Primary = 29.71 cfs @ 12.24 hrs, Volume= 2.607 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 92.42' @ 12.24 hrs Surf.Area= 390 sf Storage= 253 cf

Plug-Flow detention time= 0.1 min calculated for 2.607 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 812.5 - 812.4 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 5,935 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 30                   | 0                         | 0                         |
| 92.00               | 220                  | 125                       | 125                       |
| 93.00               | 625                  | 423                       | 548                       |
| 94.00               | 1,304                | 965                       | 1,512                     |
| 95.00               | 2,150                | 1,727                     | 3,239                     |
| 96.00               | 3,242                | 2,696                     | 5,935                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.78' | <b>60.0" W x 24.0" H Box Culvert</b><br>L= 75.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 90.78' / 88.52' S= 0.0301 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 10.00 sf |

**Primary OutFlow** Max=29.44 cfs @ 12.24 hrs HW=92.41' (Free Discharge)

↑**1=Culvert** (Inlet Controls 29.44 cfs @ 3.61 fps)

### Summary for Pond C5: Stream Crossing #2

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 1.87" for 10-yr event  
 Inflow = 18.42 cfs @ 12.46 hrs, Volume= 2.208 af  
 Outflow = 18.42 cfs @ 12.46 hrs, Volume= 2.208 af, Atten= 0%, Lag= 0.0 min  
 Primary = 18.42 cfs @ 12.46 hrs, Volume= 2.208 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.03' @ 12.46 hrs Surf.Area= 34 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 2.201 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 824.0 - 824.0 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 94.00' | 8,050 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 94.00               | 25                   | 0                         | 0                         |
| 95.00               | 312                  | 169                       | 169                       |
| 96.00               | 1,535                | 924                       | 1,092                     |
| 97.00               | 3,670                | 2,603                     | 3,695                     |
| 98.00               | 5,041                | 4,356                     | 8,050                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 93.07' | <b>96.0" W x 24.0" H Box Culvert</b><br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.07' / 91.71' S= 0.0170 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 16.00 sf |

**Primary OutFlow** Max=24.15 cfs @ 12.46 hrs HW=94.03' (Free Discharge)

↑**1=Culvert** (Inlet Controls 24.15 cfs @ 3.15 fps)

### Summary for Pond C6: New Culvert

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 2.54" for 10-yr event  
 Inflow = 2.63 cfs @ 12.14 hrs, Volume= 0.200 af  
 Outflow = 2.63 cfs @ 12.14 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.63 cfs @ 12.14 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 91.01' @ 12.14 hrs Surf.Area= 121 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 0.199 af (100% of inflow)

Center-of-Mass det. time= 0.0 min ( 789.7 - 789.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 2,175 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 112                  | 0                         | 0                         |
| 92.00               | 892                  | 502                       | 502                       |
| 93.00               | 2,453                | 1,673                     | 2,175                     |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 89.50' | <b>15.0" Round Culvert</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 89.50' / 89.20' S= 0.0060 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.39 cfs @ 12.14 hrs HW=91.01' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.39 cfs @ 3.58 fps)

### Summary for Pond C7: New Culvert

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 2.02" for 10-yr event  
 Inflow = 3.02 cfs @ 12.58 hrs, Volume= 0.407 af  
 Outflow = 3.01 cfs @ 12.61 hrs, Volume= 0.407 af, Atten= 0%, Lag= 1.5 min  
 Primary = 3.01 cfs @ 12.61 hrs, Volume= 0.407 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 91.05' @ 12.61 hrs Surf.Area= 414 sf Storage= 184 cf

Plug-Flow detention time= 0.9 min calculated for 0.405 af (100% of inflow)

Center-of-Mass det. time= 0.8 min ( 827.8 - 827.0 )



| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 90.00' | 5,179 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 90.00               | 10                   | 0                         | 0                         |
| 91.00               | 324                  | 167                       | 167                       |
| 92.00               | 2,291                | 1,308                     | 1,475                     |
| 93.00               | 5,117                | 3,704                     | 5,179                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.00' | <b>15.0" Round Culvert</b><br>L= 75.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 90.00' / 87.50' S= 0.0333 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=3.01 cfs @ 12.61 hrs HW=91.04' (Free Discharge)

↑**1=Culvert** (Inlet Controls 3.01 cfs @ 2.75 fps)

### Summary for Pond CB12: CB 12

Inflow Area = 7.439 ac, 46.36% Impervious, Inflow Depth > 3.10" for 10-yr event  
 Inflow = 27.47 cfs @ 12.09 hrs, Volume= 1.922 af  
 Outflow = 27.47 cfs @ 12.09 hrs, Volume= 1.922 af, Atten= 0%, Lag= 0.0 min  
 Primary = 27.47 cfs @ 12.09 hrs, Volume= 1.922 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 95.09' @ 12.09 hrs

Flood Elev= 100.72'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 92.50' | <b>30.0" Round Culvert</b><br>L= 946.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 92.50' / 85.03' S= 0.0079 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=26.72 cfs @ 12.09 hrs HW=95.03' (Free Discharge)

↑**1=Culvert** (Inlet Controls 26.72 cfs @ 5.44 fps)

### Summary for Pond CB42A: CB 42A

Inflow Area = 3.143 ac, 47.18% Impervious, Inflow Depth > 3.11" for 10-yr event  
 Inflow = 11.97 cfs @ 12.07 hrs, Volume= 0.815 af  
 Outflow = 11.97 cfs @ 12.07 hrs, Volume= 0.815 af, Atten= 0%, Lag= 0.0 min  
 Primary = 11.97 cfs @ 12.07 hrs, Volume= 0.815 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.55' @ 12.07 hrs

Flood Elev= 101.94'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 96.83' | <b>24.0" Round Culvert</b><br>L= 280.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 96.83' / 95.33' S= 0.0054 '/ Cc= 0.900<br>n= 0.012, Flow Area= 3.14 sf |

**Primary OutFlow** Max=11.52 cfs @ 12.07 hrs HW=98.50' (Free Discharge)

↑**1=Culvert** (Barrel Controls 11.52 cfs @ 5.55 fps)

### Summary for Pond CB43: CB 43

Inflow Area = 1.502 ac, 57.66% Impervious, Inflow Depth > 3.27" for 10-yr event  
 Inflow = 5.97 cfs @ 12.07 hrs, Volume= 0.410 af  
 Outflow = 5.97 cfs @ 12.07 hrs, Volume= 0.410 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.97 cfs @ 12.07 hrs, Volume= 0.410 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 100.24' @ 12.07 hrs

Flood Elev= 102.69'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 98.91' | <b>18.0" Round Culvert</b><br>L= 395.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.91' / 96.94' S= 0.0050 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=5.75 cfs @ 12.07 hrs HW=100.21' (Free Discharge)

↑**1=Culvert** (Barrel Controls 5.75 cfs @ 4.73 fps)

### Summary for Pond DMH1: DMH1

Inflow Area = 10.518 ac, 45.91% Impervious, Inflow Depth > 3.10" for 10-yr event  
 Inflow = 37.74 cfs @ 12.09 hrs, Volume= 2.716 af  
 Outflow = 37.74 cfs @ 12.09 hrs, Volume= 2.716 af, Atten= 0%, Lag= 0.0 min  
 Primary = 37.74 cfs @ 12.09 hrs, Volume= 2.716 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 88.73' @ 12.10 hrs

Flood Elev= 102.51'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 84.93' | <b>30.0" Round Culvert</b><br>L= 55.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 84.93' / 84.00' S= 0.0169 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=37.30 cfs @ 12.09 hrs HW=88.67' (Free Discharge)

↑**1=Culvert** (Inlet Controls 37.30 cfs @ 7.60 fps)

**Summary for Pond P1: EXISTING POND W/OCS**

Inflow Area = 24.950 ac, 31.44% Impervious, Inflow Depth > 2.77" for 10-yr event  
 Inflow = 49.97 cfs @ 12.11 hrs, Volume= 5.751 af  
 Outflow = 2.28 cfs @ 17.12 hrs, Volume= 1.405 af, Atten= 95%, Lag= 300.9 min  
 Primary = 2.28 cfs @ 17.12 hrs, Volume= 1.405 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 84.24' @ 17.12 hrs Surf.Area= 70,840 sf Storage= 194,200 cf

Plug-Flow detention time= 292.4 min calculated for 1.401 af (24% of inflow)  
 Center-of-Mass det. time= 176.1 min ( 965.2 - 789.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 81.00' | 718,507 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 81.00               | 49,980               | 0                         | 0                         |
| 82.00               | 55,620               | 52,800                    | 52,800                    |
| 84.00               | 68,740               | 124,360                   | 177,160                   |
| 86.00               | 85,942               | 154,682                   | 331,842                   |
| 88.00               | 97,175               | 183,117                   | 514,959                   |
| 90.00               | 106,373              | 203,548                   | 718,507                   |

| Device | Routing  | Invert | Outlet Devices  |
|--------|----------|--------|---|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 ' /' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600  |
| #3     | Device 1 | 81.75' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600  |
| #4     | Device 1 | 84.20' | <b>4.0' long x 0.40' rise Sharp-Crested Rectangular Weir</b><br>2 End Contraction(s)  |
| #5     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)  |

**Primary OutFlow** Max=2.27 cfs @ 17.12 hrs HW=84.24' (Free Discharge)

1=Culvert (Passes 2.27 cfs of 10.97 cfs potential flow)  
 2=Orifice/Grate (Orifice Controls 0.74 cfs @ 8.45 fps)  
 3=Orifice/Grate (Orifice Controls 1.42 cfs @ 7.21 fps)  
 4=Sharp-Crested Rectangular Weir (Weir Controls 0.12 cfs @ 0.69 fps)  
 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond POI 1: PROPERTY BOUNDARY**

Inflow Area = 17.126 ac, 10.85% Impervious, Inflow Depth > 2.10" for 10-yr event  
 Inflow = 14.41 cfs @ 12.80 hrs, Volume= 2.995 af  
 Primary = 14.41 cfs @ 12.80 hrs, Volume= 2.995 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2: POI**

Inflow Area = 69.028 ac, 10.79% Impervious, Inflow Depth > 1.81" for 10-yr event  
Inflow = 74.47 cfs @ 12.48 hrs, Volume= 10.413 af  
Primary = 74.47 cfs @ 12.48 hrs, Volume= 10.413 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2A: PROPERTY BOUNDARY**

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 1.70" for 10-yr event  
Inflow = 20.88 cfs @ 12.57 hrs, Volume= 3.373 af  
Primary = 20.88 cfs @ 12.57 hrs, Volume= 3.373 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2B: PROPERTY BOUNDARY**

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 1.85" for 10-yr event  
Inflow = 29.44 cfs @ 12.26 hrs, Volume= 2.604 af  
Primary = 29.44 cfs @ 12.26 hrs, Volume= 2.604 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2C: PROPERTY BOUNDARY**

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 1.94" for 10-yr event  
Inflow = 20.79 cfs @ 12.48 hrs, Volume= 2.659 af  
Primary = 20.79 cfs @ 12.48 hrs, Volume= 2.659 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 3: PROPERTY BOUNDARY**

Inflow Area = 27.281 ac, 29.14% Impervious, Inflow Depth > 0.81" for 10-yr event  
Inflow = 5.42 cfs @ 12.41 hrs, Volume= 1.846 af  
Primary = 5.42 cfs @ 12.41 hrs, Volume= 1.846 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 4: PROPERTY BOUNDARY**

Inflow Area = 2.525 ac, 50.69% Impervious, Inflow Depth > 2.81" for 10-yr event  
Inflow = 8.08 cfs @ 12.12 hrs, Volume= 0.591 af  
Primary = 8.08 cfs @ 12.12 hrs, Volume= 0.591 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 5: POI**

Inflow Area = 0.228 ac, 8.77% Impervious, Inflow Depth > 1.01" for 10-yr event  
 Inflow = 0.20 cfs @ 12.24 hrs, Volume= 0.019 af  
 Primary = 0.20 cfs @ 12.24 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 6: POI**

Inflow Area = 2.240 ac, 27.41% Impervious, Inflow Depth > 2.20" for 10-yr event  
 Inflow = 5.27 cfs @ 12.15 hrs, Volume= 0.411 af  
 Primary = 5.27 cfs @ 12.15 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond UD1: UD Filter**

Inflow Area = 0.953 ac, 66.53% Impervious, Inflow Depth > 3.59" for 10-yr event  
 Inflow = 4.01 cfs @ 12.07 hrs, Volume= 0.285 af  
 Outflow = 3.80 cfs @ 12.10 hrs, Volume= 0.221 af, Atten= 5%, Lag= 2.0 min  
 Primary = 3.80 cfs @ 12.10 hrs, Volume= 0.221 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 85.02' @ 12.10 hrs Surf.Area= 2,813 sf Storage= 3,372 cf

Plug-Flow detention time= 107.7 min calculated for 0.221 af (77% of inflow)  
 Center-of-Mass det. time= 49.5 min ( 801.2 - 751.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 83.50' | 7,878 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 83.50               | 1,679                | 0                         | 0                         |
| 84.00               | 2,032                | 928                       | 928                       |
| 85.00               | 2,724                | 2,378                     | 3,306                     |
| 86.00               | 6,421                | 4,573                     | 7,878                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 84.80' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=3.75 cfs @ 12.10 hrs HW=85.02' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 3.75 cfs @ 1.12 fps)

**Summary for Pond UD2: UD Filter**

Inflow Area = 1.522 ac, 33.05% Impervious, Inflow Depth > 3.00" for 10-yr event  
 Inflow = 5.41 cfs @ 12.10 hrs, Volume= 0.380 af  
 Outflow = 4.78 cfs @ 12.15 hrs, Volume= 0.313 af, Atten= 12%, Lag= 3.0 min  
 Primary = 4.78 cfs @ 12.15 hrs, Volume= 0.313 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 81.36' @ 12.15 hrs Surf.Area= 5,518 sf Storage= 4,061 cf

Plug-Flow detention time= 82.2 min calculated for 0.312 af (82% of inflow)  
 Center-of-Mass det. time= 34.3 min ( 809.4 - 775.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 80.00' | 9,035 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 80.00               | 2,061                | 0                         | 0                         |
| 81.00               | 3,000                | 2,531                     | 2,531                     |
| 82.00               | 10,008               | 6,504                     | 9,035                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 81.10' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=4.76 cfs @ 12.15 hrs HW=81.36' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 4.76 cfs @ 1.23 fps)

**Summary for Subcatchment 10:**

Runoff = 15.84 cfs @ 12.75 hrs, Volume= 2.459 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.296   | 98 | Paved parking & roofs - New House     |
| * 0.115   | 98 | Paved parking & roofs - New Road+SW   |
| * 0.098   | 98 | Paved parking & roofs - Exist         |
| * 0.586   | 61 | >75% Grass cover, Good, HSG B - Exist |
| * 0.095   | 80 | >75% Grass cover, Good, HSG D - Exist |
| * 0.018   | 61 | >75% Grass cover, Good, HSG B - New   |
| * 1.657   | 80 | >75% Grass cover, Good, HSG D - NEW   |
| 1.334     | 55 | Woods, Good, HSG B                    |
| 7.089     | 77 | Woods, Good, HSG D                    |
| 11.288    | 75 | Weighted Average                      |
| 10.779    |    | 95.49% Pervious Area                  |
| 0.509     |    | 4.51% Impervious Area                 |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 30.7     | 920           | 0.0100        | 0.50              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 53.9     | 1,070         | Total         |                   |                |  |

**Summary for Subcatchment 11:**

Runoff = 3.94 cfs @ 12.58 hrs, Volume= 0.530 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.164   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.004   | 98 | Paved parking & roofs - Exist       |
| 0.574     | 70 | Woods, Good, HSG C                  |
| 1.677     | 77 | Woods, Good, HSG D                  |
| 2.419     | 75 | Weighted Average                    |
| 2.415     |    | 99.83% Pervious Area                |
| 0.004     |    | 0.17% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 36.4        | 150              | 0.0130           | 0.07                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5         | 232              | 0.0300           | 0.87                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 40.9        | 382              | Total            |                      |                   |   |

**Summary for Subcatchment 12:**

Runoff = 6.63 cfs @ 12.10 hrs, Volume= 0.470 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.503     | 98 | Paved parking & roofs         |
| 1.019     | 80 | >75% Grass cover, Good, HSG D |
| 1.522     | 86 | Weighted Average              |
| 1.019     |    | 66.95% Pervious Area          |
| 0.503     |    | 33.05% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.8         | 50               | 0.0200           | 0.14                 |                   | <b>Sheet Flow, A-B</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.9         | 100              | 0.0160           | 1.90                 |                   | <b>Shallow Concentrated Flow, B-C</b><br>Grassed Waterway Kv= 15.0 fps |
| 6.7         | 150              | Total            |                      |                   |  |

**Summary for Subcatchment 13:**

Runoff = 1.50 cfs @ 12.07 hrs, Volume= 0.107 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.207     | 98 | Paved parking & roofs         |
| 0.083     | 80 | >75% Grass cover, Good, HSG D |
| 0.290     | 93 | Weighted Average              |
| 0.083     |    | 28.62% Pervious Area          |
| 0.207     |    | 71.38% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |



**Summary for Subcatchment 13A:**

Runoff = 1.15 cfs @ 12.07 hrs, Volume= 0.077 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.059     | 98 | Paved parking & roofs         |
| 0.206     | 80 | >75% Grass cover, Good, HSG D |
| 0.265     | 84 | Weighted Average              |
| 0.206     |    | 77.74% Pervious Area          |
| 0.059     |    | 22.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 14:**

Runoff = 0.48 cfs @ 12.07 hrs, Volume= 0.036 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.070   | 98 | Paved parking & roofs - New Road + SW |
| * 0.019   | 98 | Paved parking & roofs - Exist         |
| 0.089     | 98 | Weighted Average                      |
| 0.089     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 15:**

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 0.043 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.106   | 98 | Paved parking & roofs - New Road + SW |
| 0.106     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 16:**

Runoff = 0.23 cfs @ 12.07 hrs, Volume= 0.017 af, Depth> 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New Road + SW |
| 0.042     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 17:**

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.062 af, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.131   | 98 | Paved parking & roofs - New Road + SW |
| 0.030     | 80 | >75% Grass cover, Good, HSG D         |
| 0.161     | 95 | Weighted Average                      |
| 0.030     |    | 18.63% Pervious Area                  |
| 0.131     |    | 81.37% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 18:**

Runoff = 3.31 cfs @ 12.14 hrs, Volume= 0.253 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.224   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.150   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.208   | 98 | Paved parking & roofs - Exist       |
| 0.003     | 70 | Woods, Good, HSG C                  |
| 0.359     | 77 | Woods, Good, HSG D                  |
| 0.944     | 81 | Weighted Average                    |
| 0.736     |    | 77.97% Pervious Area                |
| 0.208     |    | 22.03% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.5      | 150           | 0.0530        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00" |

**Summary for Subcatchment 20:**

Runoff = 14.50 cfs @ 12.27 hrs, Volume= 1.392 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.588   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.027   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.066   | 74 | >75% Grass cover, Good, HSG C-New   |
| * 0.083   | 98 | Paved parking & roofs - New Roof    |
| * 0.069   | 98 | Paved parking & roofs - Exist       |
| 6.225     | 70 | Woods, Good, HSG C                  |
| 0.198     | 77 | Woods, Good, HSG D                  |
| 7.256     | 71 | Weighted Average                    |
| 7.104     |    | 97.91% Pervious Area                |
| 0.152     |    | 2.09% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 17.6     | 65            | 0.0150        | 0.06              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"      |
| 0.6      | 90            | 0.2200        | 2.35              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps             |
| 0.7      | 440           | 0.0200        | 11.23             | 1,122.98       | <b>Channel Flow, CD</b><br>Area= 100.0 sf Perim= 32.0' r= 3.13' n= 0.040 |
| 18.9     | 595           | Total         |                   |                |  |

**Summary for Subcatchment 20A:**

Runoff = 14.38 cfs @ 12.14 hrs, Volume= 1.089 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.022   | 98 | Paved parking & roofs - New House   |
| * 0.153   | 74 | >75% Grass cover, Good, HSG C - New |
| 0.038     | 98 | Paved parking & roofs               |
| 0.429     | 98 | Paved parking & roofs               |
| * 0.016   | 98 | Walkways, Impervious                |
| 0.166     | 89 | Gravel roads, HSG C                 |
| 0.339     | 61 | >75% Grass cover, Good, HSG B       |
| 1.777     | 74 | >75% Grass cover, Good, HSG C       |
| 0.618     | 58 | Meadow, non-grazed, HSG B           |
| 0.071     | 71 | Meadow, non-grazed, HSG C           |
| 0.016     | 55 | Woods, Good, HSG B                  |
| 1.583     | 70 | Woods, Good, HSG C                  |
| 0.040     | 77 | Woods, Good, HSG D                  |
| 5.268     | 73 | Weighted Average                    |
| 4.763     |    | 90.41% Pervious Area                |
| 0.505     |    | 9.59% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4      | 85            | 0.0700        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 3.5      | 330           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps   |
| 0.7      | 350           | 0.0100        | 8.97              | 1,345.05       | <b>Channel Flow, CD</b><br>Area= 150.0 sf Perim= 40.0' r= 3.75'<br>n= 0.040 Winding stream, pools & shoals |
| 9.6      | 765           | Total         |                   |                |  |

### Summary for Subcatchment 20B:

Runoff = 4.41 cfs @ 12.22 hrs, Volume= 0.398 af, Depth> 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.074   | 98 | Paved parking & roofs - New House |
| * 0.081   | 98 | Paved parking & roofs - Existing  |
| 0.185     | 55 | Woods, Good, HSG B                |
| 0.052     | 70 | Woods, Good, HSG C                |
| 1.000     | 77 | Woods, Good, HSG D                |
| 0.293     | 80 | >75% Grass cover, Good, HSG D     |
| 1.685     | 77 | Weighted Average                  |
| 1.530     |    | 90.80% Pervious Area              |
| 0.155     |    | 9.20% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 15.4        | 90               | 0.0400           | 0.10                 |                   | <b>Sheet Flow, AB</b>                        |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00"   |
| 0.6         | 80               | 0.1700           | 2.06                 |                   | <b>Shallow Concentrated Flow, BC</b>         |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                         |
| 0.2         | 120              | 0.0250           | 10.26                | 615.46            | <b>Channel Flow, DE</b>                      |
|             |                  |                  |                      |                   | Area= 60.0 sf Perim= 26.0' r= 2.31' n= 0.040 |
| 16.2        | 290              | Total            |                      |                   |  |

**Summary for Subcatchment 20C:**

Runoff = 24.30 cfs @ 12.46 hrs, Volume= 2.903 af, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.179   | 98 | Paved parking & roofs - Exist     |
| * 0.654   | 98 | Paved parking & roofs - New Roof  |
| * 0.491   | 80 | >75% Grass cover, Good, HSG D-NEW |
| 0.222     | 61 | >75% Grass cover, Good, HSG B     |
| 0.465     | 74 | >75% Grass cover, Good, HSG C     |
| 1.265     | 80 | >75% Grass cover, Good, HSG D     |
| 0.578     | 71 | Meadow, non-grazed, HSG C         |
| 1.196     | 78 | Meadow, non-grazed, HSG D         |
| 1.896     | 55 | Woods, Good, HSG B                |
| 3.522     | 70 | Woods, Good, HSG C                |
| 3.687     | 77 | Woods, Good, HSG D                |
| 14.155    | 73 | Weighted Average                  |
| 13.322    |    | 94.12% Pervious Area              |
| 0.833     |    | 5.88% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 25.0        | 150              | 0.0333           | 0.10                 |                   | <b>Sheet Flow, AB</b>                      |
|             |                  |                  |                      |                   | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 6.1         | 310              | 0.0290           | 0.85                 |                   | <b>Shallow Concentrated Flow, BC</b>       |
|             |                  |                  |                      |                   | Woodland Kv= 5.0 fps                       |
| 0.8         | 482              | 0.0380           | 10.18                | 407.20            | <b>Channel Flow, CD</b>                    |
|             |                  |                  |                      |                   | Area= 40.0 sf Perim= 24.0' r= 1.67'        |
|             |                  |                  |                      |                   | n= 0.040 Winding stream, pools & shoals    |
| 31.9        | 942              | Total            |                      |                   |  |

**Summary for Subcatchment 21:**

Runoff = 3.67 cfs @ 12.15 hrs, Volume= 0.288 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.537     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.043   | 98 | Paved parking & roofs - New Road + SW |
| * 0.265   | 98 | Paved parking & roofs - Exist         |
| 0.300     | 70 | Woods, Good, HSG C                    |
| 1.145     | 79 | Weighted Average                      |
| 0.837     |    | 73.10% Pervious Area                  |
| 0.308     |    | 26.90% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.6      | 145           | 0.0480        | 0.25              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.3      | 50            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.9      | 250           | 0.0520        | 4.63              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps            |
| 10.8     | 445           | Total         |                   |                |   |

**Summary for Subcatchment 21B:**

Runoff = 2.97 cfs @ 12.26 hrs, Volume= 0.287 af, Depth> 3.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.060   | 98 | Paved parking & roofs - New House |
| 0.191     | 80 | >75% Grass cover, Good, HSG D     |
| 0.893     | 77 | Woods, Good, HSG D                |
| 1.144     | 79 | Weighted Average                  |
| 1.084     |    | 94.76% Pervious Area              |
| 0.060     |    | 5.24% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 18.9     | 110           | 0.0360        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 0.3      | 50            | 0.2800        | 2.65              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 19.2     | 160           | Total         |                   |                |   |

**Summary for Subcatchment 21C:**

Runoff = 6.93 cfs @ 12.18 hrs, Volume= 0.583 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.576     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.015   | 98 | Paved parking & roofs - Road + SW  |
| * 0.119   | 98 | Paved parking & roofs - New Houses |
| 1.608     | 77 | Woods, Good, HSG D                 |
| 2.318     | 79 | Weighted Average                   |
| 2.184     |    | 94.22% Pervious Area               |
| 0.134     |    | 5.78% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 60            | 0.0420        | 0.20              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                |
| 7.4      | 40            | 0.0500        | 0.09              |                | <b>Sheet Flow, BC</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"     |
| 0.2      | 30            | 0.3000        | 2.74              |                | <b>Shallow Concentrated Flow, CD</b><br>Woodland Kv= 5.0 fps            |
| 0.5      | 240           | 0.0250        | 8.26              | 330.28         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67' n= 0.040 |
| 13.1     | 370           | Total         |                   |                |   |

### Summary for Subcatchment 22:

Runoff = 1.41 cfs @ 12.14 hrs, Volume= 0.107 af, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.092     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.108   | 98 | Paved parking & roofs - New Road + SW |
| 0.044     | 77 | Woods, Good, HSG D                    |
| 0.194     | 70 | Woods, Good, HSG C                    |
| 0.438     | 78 | Weighted Average                      |
| 0.330     |    | 75.34% Pervious Area                  |
| 0.108     |    | 24.66% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.7      | 150           | 0.0660        | 0.29              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 0.9      | 230           | 0.0480        | 4.45              |                | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps |
| 9.6      | 380           | Total         |                   |                |  |

**Summary for Subcatchment 22B:**

Runoff = 1.33 cfs @ 12.07 hrs, Volume= 0.094 af, Depth> 4.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New House  |
| * 0.131   | 98 | Paved parking & roofs - Roads + SW |
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| 0.018     | 74 | >75% Grass cover, Good, HSG C      |
| 0.261     | 92 | Weighted Average                   |
| 0.088     |    | 33.72% Pervious Area               |
| 0.173     |    | 66.28% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 22C:**

Runoff = 1.99 cfs @ 12.07 hrs, Volume= 0.136 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.258     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.071   | 98 | Paved parking & roofs - New Houses |
| * 0.099   | 98 | Paved parking & roofs - Road + SW  |
| 0.428     | 87 | Weighted Average                   |
| 0.258     |    | 60.28% Pervious Area               |
| 0.170     |    | 39.72% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23B:**

Runoff = 3.87 cfs @ 12.07 hrs, Volume= 0.264 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"



| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.177   | 98 | Paved parking & roofs - New House  |
| * 0.272   | 98 | Paved parking & roofs - Roads + SW |
| 0.051     | 80 | >75% Grass cover, Good, HSG D      |
| 0.332     | 74 | >75% Grass cover, Good, HSG C      |
| 0.832     | 87 | Weighted Average                   |
| 0.383     |    | 46.03% Pervious Area               |
| 0.449     |    | 53.97% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23C:**

Runoff = 0.69 cfs @ 12.07 hrs, Volume= 0.049 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.026     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.105   | 98 | Paved parking & roofs - Road + SW |
| 0.131     | 94 | Weighted Average                  |
| 0.026     |    | 19.85% Pervious Area              |
| 0.105     |    | 80.15% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 24B:**

Runoff = 0.57 cfs @ 12.07 hrs, Volume= 0.039 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.027   | 98 | Paved parking & roofs - Road + SW  |
| * 0.014   | 98 | Paved parking & roofs - New Houses |
| 0.018     | 77 | Woods, Good, HSG D                 |
| 0.129     | 85 | Weighted Average                   |
| 0.088     |    | 68.22% Pervious Area               |
| 0.041     |    | 31.78% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 24C:**

Runoff = 4.19 cfs @ 12.07 hrs, Volume= 0.281 af, Depth> 3.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.353     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.136   | 98 | Paved parking & roofs - Road + SW  |
| * 0.135   | 98 | Paved parking & roofs - New Houses |
| 0.046     | 55 | Woods, Good, HSG B                 |
| 0.037     | 70 | Woods, Good, HSG C                 |
| 0.281     | 77 | Woods, Good, HSG D                 |
| 0.988     | 83 | Weighted Average                   |
| 0.717     |    | 72.57% Pervious Area               |
| 0.271     |    | 27.43% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25B:**

Runoff = 1.45 cfs @ 12.07 hrs, Volume= 0.103 af, Depth> 4.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.059   | 98 | Paved parking & roofs - New House     |
| * 0.144   | 98 | Paved parking & roofs - New Road + SW |
| 0.077     | 80 | >75% Grass cover, Good, HSG D         |
| 0.280     | 93 | Weighted Average                      |
| 0.077     |    | 27.50% Pervious Area                  |
| 0.203     |    | 72.50% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25C:**

Runoff = 0.49 cfs @ 12.07 hrs, Volume= 0.035 af, Depth> 4.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.023     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.071   | 98 | Paved parking & roofs - Road + SW |
| 0.094     | 94 | Weighted Average                  |
| 0.023     |    | 24.47% Pervious Area              |
| 0.071     |    | 75.53% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 30:**

Runoff = 5.02 cfs @ 12.39 hrs, Volume= 0.566 af, Depth> 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| 1.881     | 77 | Woods, Good, HSG D                  |
| * 0.104   | 98 | New Houses                          |
| * 0.346   | 80 | >75% Grass cover, Good, HSG D - New |
| 2.331     | 78 | Weighted Average                    |
| 2.227     |    | 95.54% Pervious Area                |
| 0.104     |    | 4.46% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5      | 155           | 0.0130        | 0.57              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 27.7     | 305           | Total         |                   |                |  |

**Summary for Subcatchment 40:**

Runoff = 10.00 cfs @ 12.12 hrs, Volume= 0.738 af, Depth> 3.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 1.280     | 98 | Paved parking & roofs         |
| 0.104     | 39 | >75% Grass cover, Good, HSG A |
| 0.109     | 74 | >75% Grass cover, Good, HSG C |
| 0.818     | 71 | Meadow, non-grazed, HSG C     |
| 0.214     | 78 | Meadow, non-grazed, HSG D     |
| 2.525     | 84 | Weighted Average              |
| 1.245     |    | 49.31% Pervious Area          |
| 1.280     |    | 50.69% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 7.7      | 150           | 0.0660        | 0.32              |                | <b>Sheet Flow, AB</b><br>Range n= 0.130 P2= 3.00"   |
| 0.5      | 440           | 0.0750        | 14.94             | 239.03         | <b>Channel Flow, CD</b><br>Area= 16.0 sf Perim= 12.0' r= 1.33'<br>n= 0.033 Earth, grassed & winding |
| 8.2      | 590           | Total         |                   |                |   |

### Summary for Subcatchment 50:

Runoff = 33.41 cfs @ 12.39 hrs, Volume= 3.839 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 3.437   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 0.768   | 98 | Paved parking & roofs - New Houses       |
| * 1.542   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.126   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.015     | 77 | Woods, Good, HSG D                       |
| 0.466     | 70 | Woods, Good, HSG C                       |
| 14.432    | 81 | Weighted Average                         |
| 11.416    |    | 79.10% Pervious Area                     |
| 3.016     |    | 20.90% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 50A: Including Phase 2**

Runoff = 36.99 cfs @ 12.39 hrs, Volume= 4.310 af, Depth> 3.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 0.577   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 2.860   | 98 | Paved parking & roofs - Phase 2          |
| * 0.438   | 98 | Paved parking & roofs - New Houses       |
| * 0.898   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.071   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.975     | 77 | Woods, Good, HSG D                       |
| 0.535     | 70 | Woods, Good, HSG C                       |
| 14.432    | 85 | Weighted Average                         |
| 8.886     |    | 61.57% Pervious Area                     |
| 5.546     |    | 38.43% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

**Summary for Subcatchment 51:**

Runoff = 19.21 cfs @ 12.10 hrs, Volume= 1.364 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.725     | 74 | >75% Grass cover, Good, HSG C      |
| 1.605     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.871   | 98 | Paved parking & roofs - New Houses |
| * 1.095   | 98 | Paved parking & roofs - Road + SW  |
| 4.296     | 87 | Weighted Average                   |
| 2.330     |    | 54.24% Pervious Area               |
| 1.966     |    | 45.76% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 3.0         | 35               | 0.0500           | 0.19                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 0.6         | 180              | 0.0700           | 5.37                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps                           |
| 2.9         | 1,575            | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 6.5         | 1,790            | Total            |                      |                   |  |

**Summary for Subcatchment 52:**

Runoff = 12.96 cfs @ 12.12 hrs, Volume= 0.977 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.174     | 71 | Meadow, non-grazed, HSG C          |
| 0.056     | 74 | >75% Grass cover, Good, HSG C      |
| * 0.641   | 98 | Paved parking & roofs - New Houses |
| * 0.739   | 98 | Paved parking & roofs - Road + SW  |
| 1.469     | 80 | >75% Grass cover, Good, HSG D      |
| 3.079     | 87 | Weighted Average                   |
| 1.699     |    | 55.18% Pervious Area               |
| 1.380     |    | 44.82% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.6         | 90               | 0.0700           | 0.27                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 1.2         | 135              | 0.0150           | 1.84                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                |
| 1.6         | 860              | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 8.4         | 1,085            | Total            |                      |                   |  |

**Summary for Subcatchment 60: Main Street**

Runoff = 6.78 cfs @ 12.15 hrs, Volume= 0.529 af, Depth> 2.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.418     | 98 | Paved parking & roofs           |
| 0.938     | 70 | Woods, Good, HSG C              |
| 0.196     | 98 | Paved parking & roofs           |
| 0.688     | 69 | 50-75% Grass cover, Fair, HSG B |
| 2.240     | 77 | Weighted Average                |
| 1.626     |    | 72.59% Pervious Area            |
| 0.614     |    | 27.41% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 6.7      | 85            | 0.0400        | 0.21              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 4.0      | 378           | 0.0160        | 1.58              | 0.21           | <b>Trap/Vee/Rect Channel Flow, BC</b><br>Bot.W=1.00' D=0.10' Z= 3.0 ' Top.W=1.60'<br>n= 0.022 Earth, clean & straight |
| 10.7     | 463           | Total         |                   |                |   |

### Summary for Subcatchment 70:

Runoff = 3.70 cfs @ 12.26 hrs, Volume= 0.352 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.121   | 98 | Paved parking & roofs-New Road + SW |
| * 0.052   | 98 | Paved parking & roofs - Exist.      |
| 0.048     | 61 | >75% Grass cover, Good, HSG B       |
| 1.548     | 70 | Woods, Good, HSG C                  |
| 1.769     | 72 | Weighted Average                    |
| 1.596     |    | 90.22% Pervious Area                |
| 0.173     |    | 9.78% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 16.6     | 150           | 0.0930        | 0.15              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                                       |
| 1.7      | 170           | 0.1100        | 1.66              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps  |
| 0.2      | 79            | 0.0130        | 7.40              | 443.81         | <b>Channel Flow, CD</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.040 Winding stream, pools & shoals |
| 18.5     | 399           | Total         |                   |                |   |

**Summary for Subcatchment 80:**

Runoff = 0.29 cfs @ 12.23 hrs, Volume= 0.028 af, Depth> 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.020   | 98 | Paved parking & roofs - Exist |
| 0.051     | 61 | >75% Grass cover, Good, HSG B |
| 0.157     | 55 | Woods, Good, HSG B            |
| 0.228     | 60 | Weighted Average              |
| 0.208     |    | 91.23% Pervious Area          |
| 0.020     |    | 8.77% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 15.0     | 106           | 0.0600        | 0.12              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |

**Summary for Subcatchment OS1:**

Runoff = 24.80 cfs @ 12.61 hrs, Volume= 3.407 af, Depth> 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.159     | 98 | Paved parking & roofs         |
| 1.167     | 98 | Paved parking & roofs         |
| 1.048     | 98 | Paved parking & roofs         |
| 0.051     | 98 | Water Surface                 |
| 0.057     | 98 | Water Surface                 |
| * 0.002   | 98 | Walkway, Impervious           |
| * 0.041   | 98 | Walkway, Impervious           |
| 0.900     | 39 | >75% Grass cover, Good, HSG A |
| 3.053     | 61 | >75% Grass cover, Good, HSG B |
| 5.742     | 74 | >75% Grass cover, Good, HSG C |
| 0.077     | 58 | Meadow, non-grazed, HSG B     |
| 0.329     | 71 | Meadow, non-grazed, HSG C     |
| 0.694     | 30 | Woods, Good, HSG A            |
| 1.195     | 55 | Woods, Good, HSG B            |
| 4.085     | 70 | Woods, Good, HSG C            |
| 18.600    | 70 | Weighted Average              |
| 16.075    |    | 86.42% Pervious Area          |
| 2.525     |    | 13.58% Impervious Area        |



| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 27.4        | 150              | 0.0266           | 0.09                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                               |
| 4.5         | 250              | 0.0345           | 0.93                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps                                      |
| 1.2         | 196              | 0.0306           | 2.62                 |                   | <b>Shallow Concentrated Flow, CD</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.6         | 80               | 0.0125           | 2.27                 |                   | <b>Shallow Concentrated Flow, DE</b><br>Paved Kv= 20.3 fps  |
| 3.6         | 320              | 0.0219           | 1.48                 |                   | <b>Shallow Concentrated Flow, EF</b><br>Nearly Bare & Untilled Kv= 10.0 fps                       |
| 0.2         | 36               | 0.0208           | 2.93                 |                   | <b>Shallow Concentrated Flow, FG</b><br>Paved Kv= 20.3 fps  |
| 0.3         | 60               | 0.0500           | 3.35                 |                   | <b>Shallow Concentrated Flow, GH</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.3         | 70               | 0.0429           | 4.20                 |                   | <b>Shallow Concentrated Flow, HI</b><br>Paved Kv= 20.3 fps  |
| 0.6         | 148              | 0.0777           | 4.18                 |                   | <b>Shallow Concentrated Flow, IJ</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 3.4         | 310              | 0.0935           | 1.53                 |                   | <b>Shallow Concentrated Flow, JK</b><br>Woodland Kv= 5.0 fps                                      |
| 0.2         | 130              | 0.0231           | 13.15                | 788.81            | <b>Channel Flow, KL</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.030 Earth, clean & winding |
| 42.3        | 1,750            | Total            |                      |                   |   |

**Summary for Subcatchment OS2:**

Runoff = 36.00 cfs @ 12.19 hrs, Volume= 3.040 af, Depth> 2.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=5.50"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.751     | 98 | Paved parking & roofs         |
| 1.187     | 98 | Paved parking & roofs         |
| 0.404     | 98 | Paved parking & roofs         |
| 0.080     | 98 | Water Surface                 |
| 0.039     | 98 | Water Surface                 |
| 0.001     | 98 | Water Surface                 |
| * 0.026   | 98 | Walkways, Impervious          |
| * 0.007   | 98 | Walkways, Impervious          |
| 0.289     | 74 | Farmsteads, HSG B             |
| 0.233     | 82 | Farmsteads, HSG C             |
| 1.691     | 61 | >75% Grass cover, Good, HSG B |
| 4.263     | 74 | >75% Grass cover, Good, HSG C |
| 0.871     | 80 | >75% Grass cover, Good, HSG D |
| 0.437     | 58 | Meadow, non-grazed, HSG B     |
| 0.026     | 71 | Meadow, non-grazed, HSG C     |
| 2.871     | 55 | Woods, Good, HSG B            |
| 2.044     | 70 | Woods, Good, HSG C            |
| 0.030     | 77 | Woods, Good, HSG D            |
| 15.250    | 72 | Weighted Average              |
| 12.755    |    | 83.64% Pervious Area          |
| 2.495     |    | 16.36% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 10.5     | 150           | 0.0407        | 0.24              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 1.1      | 170           | 0.0294        | 2.57              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.1      | 30            | 0.0333        | 3.70              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps  |
| 1.2      | 300           | 0.0767        | 4.15              |                | <b>Shallow Concentrated Flow, DE</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.5      | 400           | 0.0375        | 13.48             | 539.35         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67'<br>n= 0.030 Earth, clean & winding |
| 13.4     | 1,050         | Total         |                   |                |   |

### Summary for Reach R1: 2C

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 2.20" for 25-yr event  
 Inflow = 24.71 cfs @ 12.63 hrs, Volume= 3.407 af  
 Outflow = 24.65 cfs @ 12.66 hrs, Volume= 3.403 af, Atten= 0%, Lag= 1.4 min

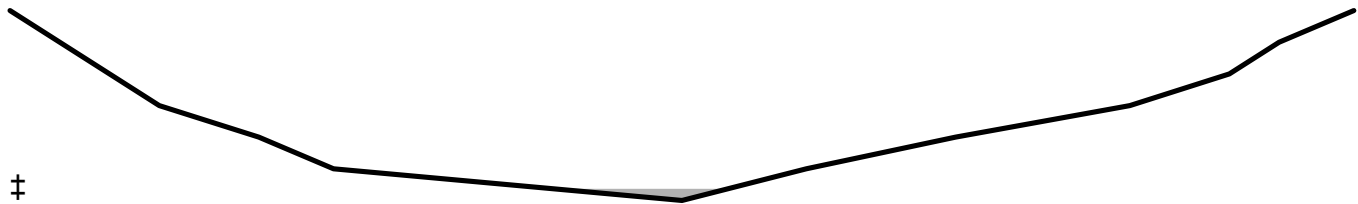
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.77 fps, Min. Travel Time= 0.8 min  
 Avg. Velocity = 2.69 fps, Avg. Travel Time= 1.5 min

Peak Storage= 1,242 cf @ 12.64 hrs  
 Average Depth at Peak Storage= 0.74'  
 Bank-Full Depth= 12.00' Flow Area= 828.0 sf, Capacity= 29,251.95 cfs

Custom cross-section, Length= 240.0' Slope= 0.0625 '/' (104 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 100.00', Outlet Invert= 85.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -54.00           | 100.00              | 0.00                 |
| -50.00           | 98.00               | 2.00                 |
| -46.00           | 96.00               | 4.00                 |
| -42.00           | 94.00               | 6.00                 |
| -34.00           | 92.00               | 8.00                 |
| -28.00           | 90.00               | 10.00                |
| 0.00             | 88.00               | 12.00                |
| 10.00            | 90.00               | 10.00                |
| 22.00            | 92.00               | 8.00                 |
| 36.00            | 94.00               | 6.00                 |
| 44.00            | 96.00               | 4.00                 |
| 48.00            | 98.00               | 2.00                 |
| 54.00            | 100.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 38.0                | 38.3             | 9,120                   | 351.27             |
| 4.00            | 132.0               | 56.8             | 31,680                  | 2,151.94           |
| 6.00            | 266.0               | 79.1             | 63,840                  | 5,542.97           |
| 8.00            | 434.0               | 91.9             | 104,160                 | 11,348.66          |
| 10.00           | 622.0               | 100.8            | 149,280                 | 19,433.27          |
| 12.00           | 828.0               | 111.6            | 198,720                 | 29,251.95          |

### Summary for Reach R10: Stream

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 2.46" for 25-yr event  
 Inflow = 24.30 cfs @ 12.46 hrs, Volume= 2.903 af  
 Outflow = 24.15 cfs @ 12.50 hrs, Volume= 2.896 af, Atten= 1%, Lag= 2.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.43 fps, Min. Travel Time= 1.6 min  
 Avg. Velocity= 1.57 fps, Avg. Travel Time= 3.4 min

Peak Storage= 2,295 cf @ 12.47 hrs  
 Average Depth at Peak Storage= 0.80'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,695.16 cfs

Custom cross-section, Length= 325.0' Slope= 0.0215 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 91.00', Outlet Invert= 84.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 325                     | 1.36               |
| 2.25            | 39.0                | 30.4             | 12,676                  | 251.23             |
| 4.25            | 119.0               | 50.8             | 38,675                  | 1,143.69           |
| 6.25            | 233.0               | 65.4             | 75,725                  | 2,962.82           |
| 8.25            | 375.0               | 80.0             | 121,875                 | 5,727.13           |
| 10.25           | 541.0               | 90.8             | 175,825                 | 9,695.16           |

### Summary for Reach R20: STREAM

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 2.43" for 25-yr event  
 Inflow = 38.41 cfs @ 12.26 hrs, Volume= 3.435 af  
 Outflow = 38.10 cfs @ 12.28 hrs, Volume= 3.431 af, Atten= 1%, Lag= 1.2 min

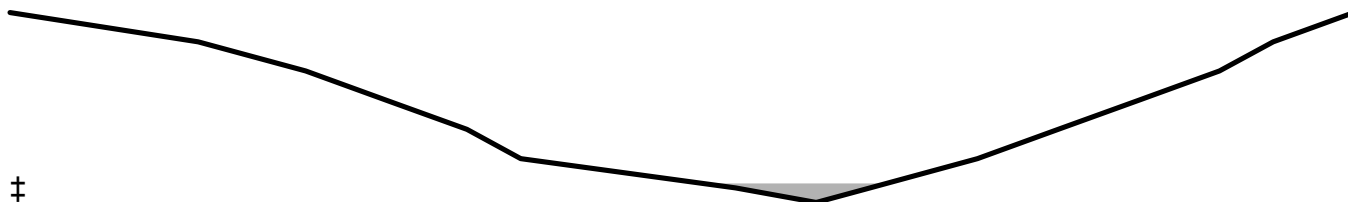
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.48 fps, Min. Travel Time= 0.7 min  
 Avg. Velocity= 2.15 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,539 cf @ 12.27 hrs  
 Average Depth at Peak Storage= 1.30'  
 Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 14,699.46 cfs

Custom cross-section, Length= 180.0' Slope= 0.0278 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 88.00', Outlet Invert= 83.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 900                     | 19.24              |
| 3.00            | 49.0                | 34.6             | 8,820                   | 382.78             |
| 5.00            | 127.0               | 45.4             | 22,860                  | 1,561.76           |
| 7.00            | 227.0               | 58.0             | 40,860                  | 3,489.69           |
| 9.00            | 351.0               | 70.7             | 63,180                  | 6,326.40           |
| 11.00           | 499.0               | 83.4             | 89,820                  | 10,183.56          |
| 13.00           | 679.0               | 103.9            | 122,220                 | 14,699.46          |

### Summary for Reach R21: STREAM

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 2.39" for 25-yr event  
 Inflow = 34.42 cfs @ 12.23 hrs, Volume= 3.041 af  
 Outflow = 34.10 cfs @ 12.25 hrs, Volume= 3.037 af, Atten= 1%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.04 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 2.52 fps, Avg. Travel Time= 1.7 min

Peak Storage= 1,706 cf @ 12.24 hrs

Average Depth at Peak Storage= 1.17'

Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 17,639.35 cfs

Custom cross-section, Length= 250.0' Slope= 0.0400 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 101.00', Outlet Invert= 91.00'



±

| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 1,250                   | 23.09              |
| 3.00            | 49.0                | 34.6             | 12,250                  | 459.33             |
| 5.00            | 127.0               | 45.4             | 31,750                  | 1,874.11           |
| 7.00            | 227.0               | 58.0             | 56,750                  | 4,187.63           |
| 9.00            | 351.0               | 70.7             | 87,750                  | 7,591.68           |
| 11.00           | 499.0               | 83.4             | 124,750                 | 12,220.27          |
| 13.00           | 679.0               | 103.9            | 169,750                 | 17,639.35          |

### Summary for Reach R3: STREAM

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 2.26" for 25-yr event  
 Inflow = 27.85 cfs @ 12.57 hrs, Volume= 4.493 af  
 Outflow = 27.80 cfs @ 12.61 hrs, Volume= 4.485 af, Atten= 0%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.76 fps, Min. Travel Time= 1.2 min

Avg. Velocity = 2.12 fps, Avg. Travel Time= 2.2 min

Peak Storage= 2,070 cf @ 12.59 hrs

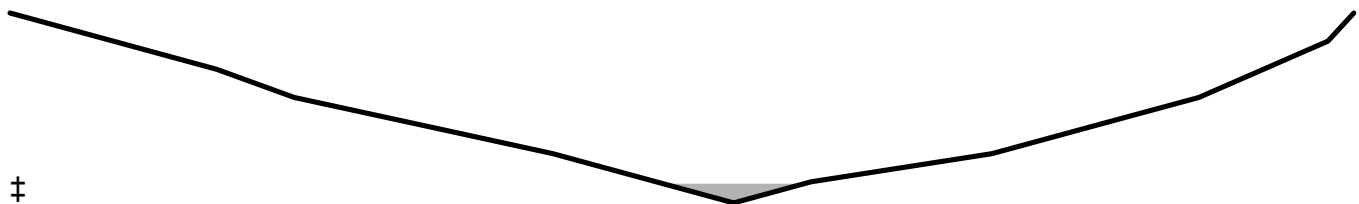
Average Depth at Peak Storage= 1.36'

Bank-Full Depth= 13.50' Flow Area= 787.0 sf, Capacity= 14,679.38 cfs

Custom cross-section, Length= 280.0' Slope= 0.0179 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 85.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -56.00           | 96.00               | 0.00                 |
| -48.00           | 94.00               | 2.00                 |
| -40.00           | 92.00               | 4.00                 |
| -34.00           | 90.00               | 6.00                 |
| -24.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 82.50               | 13.50                |
| 6.00             | 84.00               | 12.00                |
| 20.00            | 86.00               | 10.00                |
| 28.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 41.00            | 92.00               | 4.00                 |
| 46.00            | 94.00               | 2.00                 |
| 48.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.50            | 9.0                 | 12.4             | 2,520                   | 36.14              |
| 3.50            | 55.0                | 34.8             | 15,400                  | 370.77             |
| 5.50            | 141.0               | 53.2             | 39,480                  | 1,340.54           |
| 7.50            | 263.0               | 71.6             | 73,640                  | 3,106.91           |
| 9.50            | 414.0               | 83.4             | 115,920                 | 5,982.85           |
| 11.50           | 589.0               | 97.0             | 164,920                 | 9,733.01           |
| 13.50           | 787.0               | 108.1            | 220,360                 | 14,679.38          |

**Summary for Reach R30: (new Reach)**

Inflow Area = 3.363 ac, 6.30% Impervious, Inflow Depth > 2.75" for 25-yr event  
 Inflow = 4.69 cfs @ 12.76 hrs, Volume= 0.771 af  
 Outflow = 4.29 cfs @ 13.32 hrs, Volume= 0.744 af, Atten= 9%, Lag= 33.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.56 fps, Min. Travel Time= 20.0 min  
 Avg. Velocity = 0.25 fps, Avg. Travel Time= 44.7 min

Peak Storage= 5,157 cf @ 12.99 hrs  
 Average Depth at Peak Storage= 0.07'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 513.72 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
 Length= 670.0' Slope= 0.0082 ' '  
 Inlet Invert= 82.50', Outlet Invert= 77.00'

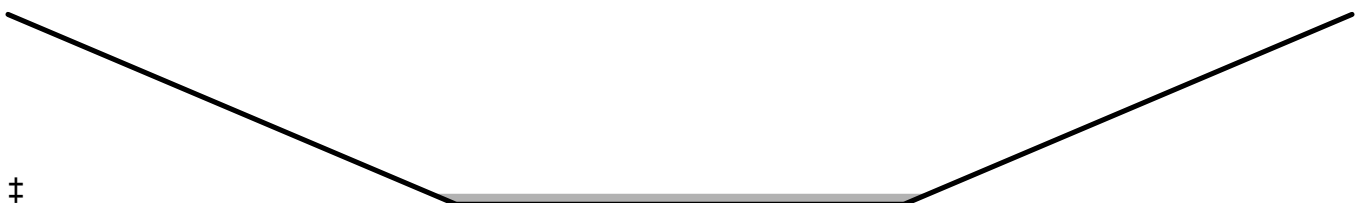
**Summary for Reach R31: (new Reach)**

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 2.63" for 25-yr event  
 Inflow = 3.85 cfs @ 12.65 hrs, Volume= 0.529 af  
 Outflow = 3.73 cfs @ 12.90 hrs, Volume= 0.521 af, Atten= 3%, Lag= 15.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.63 fps, Min. Travel Time= 9.3 min  
 Avg. Velocity = 0.28 fps, Avg. Travel Time= 21.0 min

Peak Storage= 2,071 cf @ 12.74 hrs  
 Average Depth at Peak Storage= 0.06'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 677.70 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0143 ' '  
 Inlet Invert= 87.50', Outlet Invert= 82.50'





**Summary for Reach R32: (new Reach)**

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 3.21" for 25-yr event  
 Inflow = 3.31 cfs @ 12.14 hrs, Volume= 0.253 af  
 Outflow = 2.61 cfs @ 12.39 hrs, Volume= 0.250 af, Atten= 21%, Lag= 15.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.60 fps, Min. Travel Time= 9.7 min  
 Avg. Velocity = 0.26 fps, Avg. Travel Time= 22.4 min

Peak Storage= 1,529 cf @ 12.22 hrs  
 Average Depth at Peak Storage= 0.04'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 784.49 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 '/' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0191 '/'  
 Inlet Invert= 89.20', Outlet Invert= 82.50'

**Summary for Reach R4: STREAM**

Inflow Area = 18.079 ac, 14.99% Impervious, Inflow Depth > 2.47" for 25-yr event  
 Inflow = 41.06 cfs @ 12.28 hrs, Volume= 3.719 af  
 Outflow = 40.75 cfs @ 12.30 hrs, Volume= 3.715 af, Atten= 1%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.94 fps, Min. Travel Time= 0.7 min  
 Avg. Velocity = 1.82 fps, Avg. Travel Time= 1.6 min

Peak Storage= 1,769 cf @ 12.28 hrs  
 Average Depth at Peak Storage= 1.14'  
 Bank-Full Depth= 13.00' Flow Area= 734.0 sf, Capacity= 16,078.55 cfs

Custom cross-section, Length= 170.0' Slope= 0.0235 '/' (106 Elevation Intervals)  
 Constant n= 0.040  
 Inlet Invert= 84.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -48.00           | 96.00               | 0.00                 |
| -40.00           | 94.00               | 2.00                 |
| -32.00           | 92.00               | 4.00                 |
| -27.00           | 90.00               | 6.00                 |
| -20.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 83.00               | 13.00                |
| 10.00            | 84.00               | 12.00                |
| 30.00            | 86.00               | 10.00                |
| 32.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 38.00            | 92.00               | 4.00                 |
| 40.00            | 94.00               | 2.00                 |
| 44.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 8.0                 | 16.1             | 1,360                   | 28.56              |
| 3.00            | 68.0                | 44.5             | 11,560                  | 514.25             |
| 5.00            | 164.0               | 53.6             | 27,880                  | 1,968.90           |
| 7.00            | 279.0               | 65.4             | 47,430                  | 4,182.71           |
| 9.00            | 412.0               | 73.6             | 70,040                  | 7,402.04           |
| 11.00           | 562.0               | 84.7             | 95,540                  | 11,310.93          |
| 13.00           | 734.0               | 97.4             | 124,780                 | 16,078.55          |

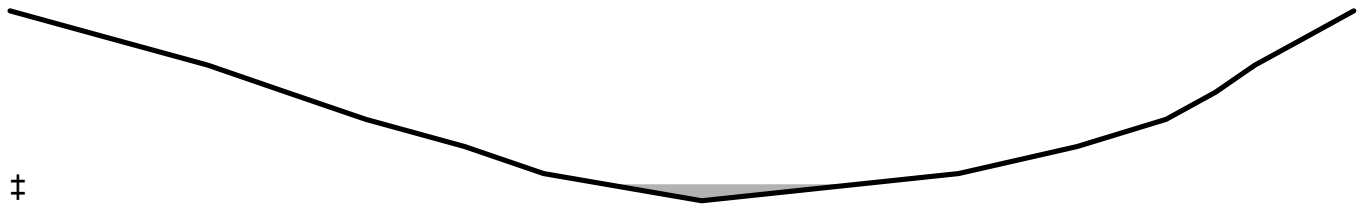
### Summary for Reach R5: STREAM

Inflow Area = 41.947 ac, 13.68% Impervious, Inflow Depth > 2.35" for 25-yr event  
 Inflow = 62.68 cfs @ 12.31 hrs, Volume= 8.200 af  
 Outflow = 62.31 cfs @ 12.35 hrs, Volume= 8.187 af, Atten= 1%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.99 fps, Min. Travel Time= 1.2 min  
 Avg. Velocity = 2.03 fps, Avg. Travel Time= 2.4 min

Peak Storage= 4,537 cf @ 12.33 hrs  
 Average Depth at Peak Storage= 1.22'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 26,019.95 cfs

Custom cross-section, Length= 290.0' Slope= 0.0224 '/' (106 Elevation Intervals)  
 Constant n= 0.040 Winding stream, pools & shoals  
 Inlet Invert= 80.00', Outlet Invert= 73.50'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 12,180                  | 232.85             |
| 4.00            | 146.0               | 62.6             | 42,340                  | 1,427.89           |
| 6.00            | 289.0               | 82.0             | 83,810                  | 3,721.59           |
| 8.00            | 464.0               | 95.7             | 134,560                 | 7,394.69           |
| 10.00           | 664.0               | 108.4            | 192,560                 | 12,365.06          |
| 12.00           | 891.0               | 124.0            | 258,390                 | 18,456.53          |
| 14.00           | 1,148.0             | 139.5            | 332,920                 | 26,019.95          |

### Summary for Reach R6: (new Reach)

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 2.53" for 25-yr event  
 Inflow = 27.35 cfs @ 12.47 hrs, Volume= 3.479 af  
 Outflow = 27.16 cfs @ 12.54 hrs, Volume= 3.466 af, Atten= 1%, Lag= 4.5 min

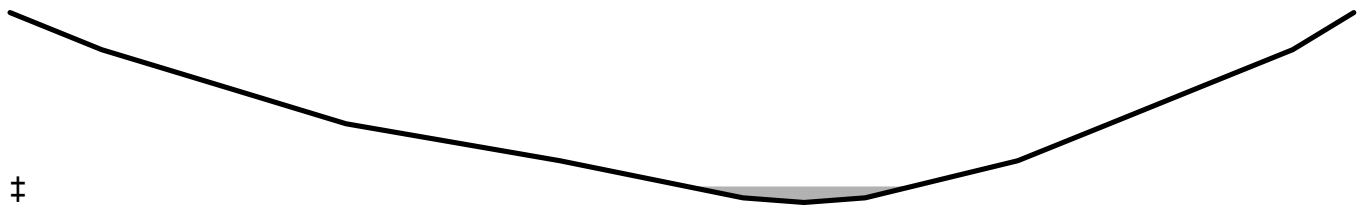
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.40 fps, Min. Travel Time= 2.6 min  
 Avg. Velocity= 1.49 fps, Avg. Travel Time= 5.9 min

Peak Storage= 4,205 cf @ 12.50 hrs  
 Average Depth at Peak Storage= 0.86'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,117.34 cfs

Custom cross-section, Length= 525.0' Slope= 0.0190 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 84.00', Outlet Invert= 74.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 525                     | 1.28               |
| 2.25            | 39.0                | 30.4             | 20,476                  | 236.25             |
| 4.25            | 119.0               | 50.8             | 62,475                  | 1,075.52           |
| 6.25            | 233.0               | 65.4             | 122,325                 | 2,786.24           |
| 8.25            | 375.0               | 80.0             | 196,875                 | 5,385.80           |
| 10.25           | 541.0               | 90.8             | 284,025                 | 9,117.34           |

### Summary for Reach R7: STREAM

Inflow Area = 58.420 ac, 11.48% Impervious, Inflow Depth > 2.39" for 25-yr event  
 Inflow = 85.16 cfs @ 12.40 hrs, Volume= 11.653 af  
 Outflow = 85.03 cfs @ 12.42 hrs, Volume= 11.644 af, Atten= 0%, Lag= 1.0 min

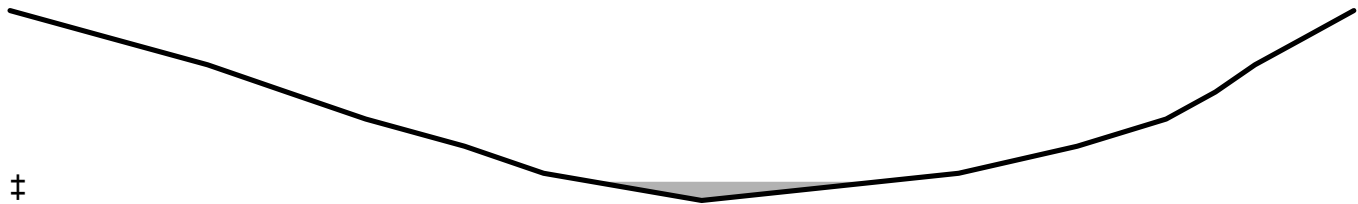
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.25 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity= 2.16 fps, Avg. Travel Time= 1.0 min

Peak Storage= 2,707 cf @ 12.41 hrs  
 Average Depth at Peak Storage= 1.38'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 25,473.05 cfs

Custom cross-section, Length= 135.0' Slope= 0.0215 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 73.50', Outlet Invert= 70.60'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,670                   | 227.96             |
| 4.00            | 146.0               | 62.6             | 19,710                  | 1,397.88           |
| 6.00            | 289.0               | 82.0             | 39,015                  | 3,643.37           |
| 8.00            | 464.0               | 95.7             | 62,640                  | 7,239.27           |
| 10.00           | 664.0               | 108.4            | 89,640                  | 12,105.16          |
| 12.00           | 891.0               | 124.0            | 120,285                 | 18,068.60          |
| 14.00           | 1,148.0             | 139.5            | 154,980                 | 25,473.05          |

### Summary for Reach R8: STREAM

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 2.39" for 25-yr event  
 Inflow = 96.77 cfs @ 12.47 hrs, Volume= 13.411 af  
 Outflow = 96.51 cfs @ 12.50 hrs, Volume= 13.395 af, Atten= 0%, Lag= 1.7 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.19 fps, Min. Travel Time= 0.9 min

Avg. Velocity= 1.21 fps, Avg. Travel Time= 1.7 min

Peak Storage= 5,291 cf @ 12.48 hrs

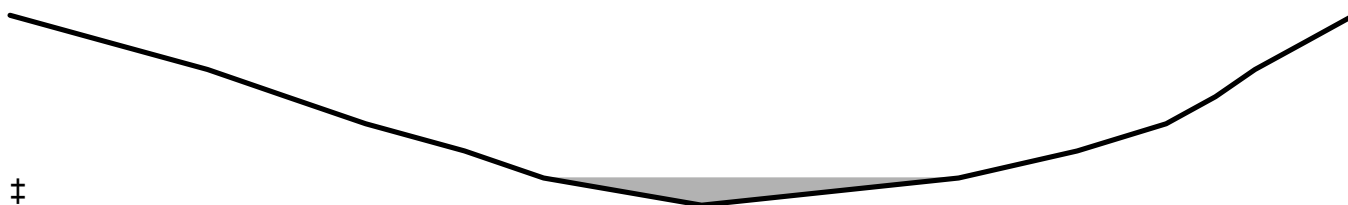
Average Depth at Peak Storage= 2.05'

Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 10,034.32 cfs

Custom cross-section, Length= 120.0' Slope= 0.0033 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 69.40', Outlet Invert= 69.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,040                   | 89.80              |
| 4.00            | 146.0               | 62.6             | 17,520                  | 550.65             |
| 6.00            | 289.0               | 82.0             | 34,680                  | 1,435.19           |
| 8.00            | 464.0               | 95.7             | 55,680                  | 2,851.69           |
| 10.00           | 664.0               | 108.4            | 79,680                  | 4,768.46           |
| 12.00           | 891.0               | 124.0            | 106,920                 | 7,117.57           |
| 14.00           | 1,148.0             | 139.5            | 137,760                 | 10,034.32          |

### Summary for Pond 1P: Phase2 POND W/OCS

Inflow Area = 14.432 ac, 38.43% Impervious, Inflow Depth > 3.58" for 25-yr event  
 Inflow = 36.99 cfs @ 12.39 hrs, Volume= 4.310 af  
 Outflow = 2.60 cfs @ 15.62 hrs, Volume= 1.563 af, Atten= 93%, Lag= 194.2 min  
 Primary = 2.60 cfs @ 15.62 hrs, Volume= 1.563 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 83.36' @ 15.62 hrs Surf.Area= 64,557 sf Storage= 134,665 cf

Plug-Flow detention time= 277.6 min calculated for 1.563 af (36% of inflow)

Center-of-Mass det. time= 179.3 min ( 969.5 - 790.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 81.00' | 718,507 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 81.00               | 49,980               | 0                         | 0                         |
| 82.00               | 55,620               | 52,800                    | 52,800                    |
| 84.00               | 68,740               | 124,360                   | 177,160                   |
| 86.00               | 85,942               | 154,682                   | 331,842                   |
| 88.00               | 97,175               | 183,117                   | 514,959                   |
| 90.00               | 106,373              | 203,548                   | 718,507                   |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 82.00' | <b>8.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 82.77' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #5     | Device 1 | 84.20' | <b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)<br>0.5' Crest Height  |
| #6     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=2.60 cfs @ 15.62 hrs HW=83.36' (Free Discharge)

- 1=Culvert (Passes 2.60 cfs of 9.60 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.62 cfs @ 7.13 fps)
- 3=Orifice/Grate (Orifice Controls 1.70 cfs @ 4.88 fps)
- 4=Orifice/Grate (Orifice Controls 0.27 cfs @ 3.14 fps)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
- 6=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

### Summary for Pond C1: AMANDA'S WAY

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 2.20" for 25-yr event  
 Inflow = 24.80 cfs @ 12.61 hrs, Volume= 3.407 af  
 Outflow = 24.71 cfs @ 12.63 hrs, Volume= 3.407 af, Atten= 0%, Lag= 1.6 min  
 Primary = 24.71 cfs @ 12.63 hrs, Volume= 3.407 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 106.50' @ 12.63 hrs Surf.Area= 724 sf Storage= 692 cf

Plug-Flow detention time= 0.3 min calculated for 3.396 af (100% of inflow)  
 Center-of-Mass det. time= 0.3 min ( 831.9 - 831.7 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 103.50' | 38,020 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 103.50              | 10                   | 0                         | 0                         |
| 106.00              | 331                  | 426                       | 426                       |
| 108.00              | 1,889                | 2,220                     | 2,646                     |
| 110.00              | 4,295                | 6,184                     | 8,830                     |
| 112.00              | 7,099                | 11,394                    | 20,224                    |
| 114.00              | 10,697               | 17,796                    | 38,020                    |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 103.50' | <b>30.0" Round Culvert</b><br>L= 75.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 103.50' / 100.00' S= 0.0467 '/' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 4.91 sf |

**Primary OutFlow** Max=24.66 cfs @ 12.63 hrs HW=106.50' (Free Discharge)

↑**1=Culvert** (Inlet Controls 24.66 cfs @ 5.02 fps)

### Summary for Pond C2: AMANDA'S WAY

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 2.39" for 25-yr event  
 Inflow = 36.00 cfs @ 12.19 hrs, Volume= 3.040 af  
 Outflow = 34.42 cfs @ 12.23 hrs, Volume= 3.041 af, Atten= 4%, Lag= 2.2 min  
 Primary = 34.42 cfs @ 12.23 hrs, Volume= 3.041 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 109.65' @ 12.23 hrs Surf.Area= 1,022 sf Storage= 1,324 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.2 min ( 805.7 - 805.5 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 105.00' | 6,414 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 105.00              | 10                   | 0                         | 0                         |
| 108.00              | 200                  | 315                       | 315                       |
| 110.00              | 1,196                | 1,396                     | 1,711                     |
| 112.00              | 3,507                | 4,703                     | 6,414                     |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 105.00' | <b>30.0" Round Culvert</b><br>L= 63.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 105.00' / 103.00' S= 0.0317 '/' Cc= 0.900<br>n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf |



**Primary OutFlow** Max=34.11 cfs @ 12.23 hrs HW=109.59' (Free Discharge)

↑**1=Culvert** (Inlet Controls 34.11 cfs @ 6.95 fps)

### Summary for Pond C3: Stream Crossing #1

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 2.40" for 25-yr event  
 Inflow = 99.71 cfs @ 12.38 hrs, Volume= 13.432 af  
 Outflow = 96.77 cfs @ 12.47 hrs, Volume= 13.411 af, Atten= 3%, Lag= 5.5 min  
 Primary = 96.77 cfs @ 12.47 hrs, Volume= 13.411 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 75.86' @ 12.47 hrs Surf.Area= 11,588 sf Storage= 19,031 cf

Plug-Flow detention time= 2.8 min calculated for 13.367 af (100% of inflow)  
 Center-of-Mass det. time= 2.3 min ( 822.5 - 820.3 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 70.00' | 121,182 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 70.00               | 10                   | 0                         | 0                         |
| 72.00               | 395                  | 405                       | 405                       |
| 74.00               | 3,864                | 4,259                     | 4,664                     |
| 76.00               | 12,171               | 16,035                    | 20,699                    |
| 78.00               | 24,830               | 37,001                    | 57,700                    |
| 80.00               | 38,652               | 63,482                    | 121,182                   |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 72.00' | <b>72.0" W x 48.0" H Box Culvert</b><br>L= 65.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 72.00' / 71.90' S= 0.0015 ' S= 0.0015 ' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 24.00 sf |

**Primary OutFlow** Max=96.54 cfs @ 12.47 hrs HW=75.85' (Free Discharge)

↑**1=Culvert** (Barrel Controls 96.54 cfs @ 5.57 fps)

### Summary for Pond C4: Stream Crossing #3

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 2.43" for 25-yr event  
 Inflow = 38.43 cfs @ 12.25 hrs, Volume= 3.435 af  
 Outflow = 38.41 cfs @ 12.26 hrs, Volume= 3.435 af, Atten= 0%, Lag= 0.3 min  
 Primary = 38.41 cfs @ 12.26 hrs, Volume= 3.435 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 92.72' @ 12.26 hrs Surf.Area= 514 sf Storage= 391 cf

Plug-Flow detention time= 0.1 min calculated for 3.423 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 806.4 - 806.3 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 5,935 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 30                   | 0                         | 0                         |
| 92.00               | 220                  | 125                       | 125                       |
| 93.00               | 625                  | 423                       | 548                       |
| 94.00               | 1,304                | 965                       | 1,512                     |
| 95.00               | 2,150                | 1,727                     | 3,239                     |
| 96.00               | 3,242                | 2,696                     | 5,935                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.78' | <b>60.0" W x 24.0" H Box Culvert</b><br>L= 75.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 90.78' / 88.52' S= 0.0301 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 10.00 sf |

**Primary OutFlow** Max=38.26 cfs @ 12.26 hrs HW=92.72' (Free Discharge)

↑**1=Culvert** (Inlet Controls 38.26 cfs @ 3.94 fps)

### Summary for Pond C5: Stream Crossing #2

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 2.46" for 25-yr event  
 Inflow = 24.30 cfs @ 12.46 hrs, Volume= 2.903 af  
 Outflow = 24.30 cfs @ 12.46 hrs, Volume= 2.903 af, Atten= 0%, Lag= 0.0 min  
 Primary = 24.30 cfs @ 12.46 hrs, Volume= 2.903 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.04' @ 12.46 hrs Surf.Area= 36 sf Storage= 1 cf

Plug-Flow detention time= 0.0 min calculated for 2.894 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 818.1 - 818.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 94.00' | 8,050 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 94.00               | 25                   | 0                         | 0                         |
| 95.00               | 312                  | 169                       | 169                       |
| 96.00               | 1,535                | 924                       | 1,092                     |
| 97.00               | 3,670                | 2,603                     | 3,695                     |
| 98.00               | 5,041                | 4,356                     | 8,050                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 93.07' | <b>96.0" W x 24.0" H Box Culvert</b><br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.07' / 91.71' S= 0.0170 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 16.00 sf |

**Primary OutFlow** Max=24.52 cfs @ 12.46 hrs HW=94.04' (Free Discharge)

↑**1=Culvert** (Inlet Controls 24.52 cfs @ 3.16 fps)

### Summary for Pond C6: New Culvert

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 3.21" for 25-yr event  
 Inflow = 3.31 cfs @ 12.14 hrs, Volume= 0.253 af  
 Outflow = 3.31 cfs @ 12.14 hrs, Volume= 0.253 af, Atten= 0%, Lag= 0.0 min  
 Primary = 3.31 cfs @ 12.14 hrs, Volume= 0.253 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 91.01' @ 12.14 hrs Surf.Area= 124 sf Storage= 2 cf

Plug-Flow detention time= 0.0 min calculated for 0.253 af (100% of inflow)

Center-of-Mass det. time= 0.0 min ( 784.3 - 784.3 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 2,175 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 112                  | 0                         | 0                         |
| 92.00               | 892                  | 502                       | 502                       |
| 93.00               | 2,453                | 1,673                     | 2,175                     |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 89.50' | <b>15.0" Round Culvert</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 89.50' / 89.20' S= 0.0060 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.40 cfs @ 12.14 hrs HW=91.01' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.40 cfs @ 3.59 fps)

### Summary for Pond C7: New Culvert

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 2.63" for 25-yr event  
 Inflow = 3.94 cfs @ 12.58 hrs, Volume= 0.530 af  
 Outflow = 3.85 cfs @ 12.65 hrs, Volume= 0.529 af, Atten= 2%, Lag= 4.2 min  
 Primary = 3.85 cfs @ 12.65 hrs, Volume= 0.529 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 91.31' @ 12.65 hrs Surf.Area= 927 sf Storage= 359 cf

Plug-Flow detention time= 1.0 min calculated for 0.529 af (100% of inflow)

Center-of-Mass det. time= 0.9 min ( 822.2 - 821.3 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 90.00' | 5,179 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 90.00               | 10                   | 0                         | 0                         |
| 91.00               | 324                  | 167                       | 167                       |
| 92.00               | 2,291                | 1,308                     | 1,475                     |
| 93.00               | 5,117                | 3,704                     | 5,179                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.00' | <b>15.0" Round Culvert</b><br>L= 75.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 90.00' / 87.50' S= 0.0333 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=3.85 cfs @ 12.65 hrs HW=91.31' (Free Discharge)

↑**1=Culvert** (Inlet Controls 3.85 cfs @ 3.14 fps)

### Summary for Pond CB12: CB 12

Inflow Area = 7.439 ac, 46.36% Impervious, Inflow Depth > 3.82" for 25-yr event  
 Inflow = 33.47 cfs @ 12.09 hrs, Volume= 2.366 af  
 Outflow = 33.47 cfs @ 12.09 hrs, Volume= 2.366 af, Atten= 0%, Lag= 0.0 min  
 Primary = 33.47 cfs @ 12.09 hrs, Volume= 2.366 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 95.75' @ 12.09 hrs

Flood Elev= 100.72'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 92.50' | <b>30.0" Round Culvert</b><br>L= 946.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 92.50' / 85.03' S= 0.0079 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=32.59 cfs @ 12.09 hrs HW=95.65' (Free Discharge)

↑**1=Culvert** (Inlet Controls 32.59 cfs @ 6.64 fps)

### Summary for Pond CB42A: CB 42A

Inflow Area = 3.143 ac, 47.18% Impervious, Inflow Depth > 3.83" for 25-yr event  
 Inflow = 14.58 cfs @ 12.07 hrs, Volume= 1.002 af  
 Outflow = 14.58 cfs @ 12.07 hrs, Volume= 1.002 af, Atten= 0%, Lag= 0.0 min  
 Primary = 14.58 cfs @ 12.07 hrs, Volume= 1.002 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.81' @ 12.07 hrs

Flood Elev= 101.94'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 96.83' | <b>24.0" Round Culvert</b><br>L= 280.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 96.83' / 95.33' S= 0.0054 '/ Cc= 0.900<br>n= 0.012, Flow Area= 3.14 sf |

**Primary OutFlow** Max=14.04 cfs @ 12.07 hrs HW=98.76' (Free Discharge)

↑**1=Culvert** (Barrel Controls 14.04 cfs @ 5.77 fps)

### Summary for Pond CB43: CB 43

Inflow Area = 1.502 ac, 57.66% Impervious, Inflow Depth > 4.00" for 25-yr event  
 Inflow = 7.22 cfs @ 12.07 hrs, Volume= 0.501 af  
 Outflow = 7.22 cfs @ 12.07 hrs, Volume= 0.501 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.22 cfs @ 12.07 hrs, Volume= 0.501 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 100.45' @ 12.07 hrs

Flood Elev= 102.69'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 98.91' | <b>18.0" Round Culvert</b><br>L= 395.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.91' / 96.94' S= 0.0050 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=6.95 cfs @ 12.07 hrs HW=100.41' (Free Discharge)

↑**1=Culvert** (Barrel Controls 6.95 cfs @ 4.90 fps)

### Summary for Pond DMH1: DMH1

Inflow Area = 10.518 ac, 45.91% Impervious, Inflow Depth > 3.81" for 25-yr event  
 Inflow = 46.00 cfs @ 12.09 hrs, Volume= 3.344 af  
 Outflow = 46.00 cfs @ 12.09 hrs, Volume= 3.344 af, Atten= 0%, Lag= 0.0 min  
 Primary = 46.00 cfs @ 12.09 hrs, Volume= 3.344 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 89.97' @ 12.09 hrs

Flood Elev= 102.51'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 84.93' | <b>30.0" Round Culvert</b><br>L= 55.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 84.93' / 84.00' S= 0.0169 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=45.41 cfs @ 12.09 hrs HW=89.87' (Free Discharge)

↑**1=Culvert** (Inlet Controls 45.41 cfs @ 9.25 fps)

**Summary for Pond P1: EXISTING POND W/OCS**

Inflow Area = 24.950 ac, 31.44% Impervious, Inflow Depth > 3.45" for 25-yr event  
 Inflow = 61.79 cfs @ 12.11 hrs, Volume= 7.183 af  
 Outflow = 5.47 cfs @ 14.72 hrs, Volume= 2.631 af, Atten= 91%, Lag= 156.5 min  
 Primary = 5.47 cfs @ 14.72 hrs, Volume= 2.631 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 84.59' @ 14.72 hrs Surf.Area= 73,849 sf Storage= 219,506 cf

Plug-Flow detention time= 266.9 min calculated for 2.631 af (37% of inflow)  
 Center-of-Mass det. time= 167.3 min ( 951.4 - 784.2 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 81.00'               | 718,507 cf                | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 81.00               | 49,980               | 0                         | 0  |
| 82.00               | 55,620               | 52,800                    | 52,800   |
| 84.00               | 68,740               | 124,360                   | 177,160  |
| 86.00               | 85,942               | 154,682                   | 331,842  |
| 88.00               | 97,175               | 183,117                   | 514,959  |
| 90.00               | 106,373              | 203,548                   | 718,507  |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 81.75' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 84.20' | <b>4.0' long x 0.40' rise Sharp-Crested Rectangular Weir</b><br>2 End Contraction(s)   |
| #5     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=5.47 cfs @ 14.72 hrs HW=84.59' (Free Discharge)

- 1=Culvert (Passes 5.47 cfs of 11.47 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.78 cfs @ 8.91 fps)
- 3=Orifice/Grate (Orifice Controls 1.52 cfs @ 7.75 fps)
- 4=Sharp-Crested Rectangular Weir (Weir Controls 3.17 cfs @ 2.05 fps)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond POI 1: PROPERTY BOUNDARY**

Inflow Area = 17.126 ac, 10.85% Impervious, Inflow Depth > 2.72" for 25-yr event  
 Inflow = 19.31 cfs @ 12.80 hrs, Volume= 3.884 af  
 Primary = 19.31 cfs @ 12.80 hrs, Volume= 3.884 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2: POI**

Inflow Area = 69.028 ac, 10.79% Impervious, Inflow Depth > 2.39" for 25-yr event  
Inflow = 98.99 cfs @ 12.49 hrs, Volume= 13.747 af  
Primary = 98.99 cfs @ 12.49 hrs, Volume= 13.747 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2A: PROPERTY BOUNDARY**

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 2.26" for 25-yr event  
Inflow = 27.85 cfs @ 12.57 hrs, Volume= 4.493 af  
Primary = 27.85 cfs @ 12.57 hrs, Volume= 4.493 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2B: PROPERTY BOUNDARY**

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 2.43" for 25-yr event  
Inflow = 38.10 cfs @ 12.28 hrs, Volume= 3.431 af  
Primary = 38.10 cfs @ 12.28 hrs, Volume= 3.431 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2C: PROPERTY BOUNDARY**

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 2.53" for 25-yr event  
Inflow = 27.35 cfs @ 12.47 hrs, Volume= 3.479 af  
Primary = 27.35 cfs @ 12.47 hrs, Volume= 3.479 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 3: PROPERTY BOUNDARY**

Inflow Area = 27.281 ac, 29.14% Impervious, Inflow Depth > 1.41" for 25-yr event  
Inflow = 6.79 cfs @ 12.40 hrs, Volume= 3.196 af  
Primary = 6.79 cfs @ 12.40 hrs, Volume= 3.196 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 4: PROPERTY BOUNDARY**

Inflow Area = 2.525 ac, 50.69% Impervious, Inflow Depth > 3.51" for 25-yr event  
Inflow = 10.00 cfs @ 12.12 hrs, Volume= 0.738 af  
Primary = 10.00 cfs @ 12.12 hrs, Volume= 0.738 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 5: POI**

Inflow Area = 0.228 ac, 8.77% Impervious, Inflow Depth > 1.45" for 25-yr event  
 Inflow = 0.29 cfs @ 12.23 hrs, Volume= 0.028 af  
 Primary = 0.29 cfs @ 12.23 hrs, Volume= 0.028 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 6: POI**

Inflow Area = 2.240 ac, 27.41% Impervious, Inflow Depth > 2.84" for 25-yr event  
 Inflow = 6.78 cfs @ 12.15 hrs, Volume= 0.529 af  
 Primary = 6.78 cfs @ 12.15 hrs, Volume= 0.529 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond UD1: UD Filter**

Inflow Area = 0.953 ac, 66.53% Impervious, Inflow Depth > 4.32" for 25-yr event  
 Inflow = 4.79 cfs @ 12.07 hrs, Volume= 0.343 af  
 Outflow = 4.55 cfs @ 12.10 hrs, Volume= 0.278 af, Atten= 5%, Lag= 1.9 min  
 Primary = 4.55 cfs @ 12.10 hrs, Volume= 0.278 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 85.05' @ 12.10 hrs Surf.Area= 2,914 sf Storage= 3,451 cf

Plug-Flow detention time= 96.8 min calculated for 0.277 af (81% of inflow)  
 Center-of-Mass det. time= 45.5 min ( 794.6 - 749.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 83.50' | 7,878 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 83.50               | 1,679                | 0                         | 0                         |
| 84.00               | 2,032                | 928                       | 928                       |
| 85.00               | 2,724                | 2,378                     | 3,306                     |
| 86.00               | 6,421                | 4,573                     | 7,878                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 84.80' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=4.51 cfs @ 12.10 hrs HW=85.05' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 4.51 cfs @ 1.20 fps)



**Summary for Pond UD2: UD Filter**

Inflow Area = 1.522 ac, 33.05% Impervious, Inflow Depth > 3.71" for 25-yr event  
 Inflow = 6.63 cfs @ 12.10 hrs, Volume= 0.470 af  
 Outflow = 5.89 cfs @ 12.15 hrs, Volume= 0.403 af, Atten= 11%, Lag= 2.8 min  
 Primary = 5.89 cfs @ 12.15 hrs, Volume= 0.403 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 81.40' @ 12.15 hrs Surf.Area= 5,776 sf Storage= 4,269 cf

Plug-Flow detention time= 73.5 min calculated for 0.401 af (85% of inflow)  
 Center-of-Mass det. time= 31.9 min ( 801.9 - 770.0 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 80.00' | 9,035 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 80.00               | 2,061                | 0                         | 0                         |
| 81.00               | 3,000                | 2,531                     | 2,531                     |
| 82.00               | 10,008               | 6,504                     | 9,035                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 81.10' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=5.85 cfs @ 12.15 hrs HW=81.39' (Free Discharge)

↑1=**Broad-Crested Rectangular Weir** (Weir Controls 5.85 cfs @ 1.32 fps)

**Summary for Subcatchment 10:**

Runoff = 21.57 cfs @ 12.74 hrs, Volume= 3.360 af, Depth> 3.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.296   | 98 | Paved parking & roofs - New House     |
| * 0.115   | 98 | Paved parking & roofs - New Road+SW   |
| * 0.098   | 98 | Paved parking & roofs - Exist         |
| * 0.586   | 61 | >75% Grass cover, Good, HSG B - Exist |
| * 0.095   | 80 | >75% Grass cover, Good, HSG D - Exist |
| * 0.018   | 61 | >75% Grass cover, Good, HSG B - New   |
| * 1.657   | 80 | >75% Grass cover, Good, HSG D - NEW   |
| 1.334     | 55 | Woods, Good, HSG B                    |
| 7.089     | 77 | Woods, Good, HSG D                    |
| 11.288    | 75 | Weighted Average                      |
| 10.779    |    | 95.49% Pervious Area                  |
| 0.509     |    | 4.51% Impervious Area                 |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 30.7     | 920           | 0.0100        | 0.50              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 53.9     | 1,070         | Total         |                   |                |  |

**Summary for Subcatchment 11:**

Runoff = 5.36 cfs @ 12.57 hrs, Volume= 0.723 af, Depth> 3.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.164   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.004   | 98 | Paved parking & roofs - Exist       |
| 0.574     | 70 | Woods, Good, HSG C                  |
| 1.677     | 77 | Woods, Good, HSG D                  |
| 2.419     | 75 | Weighted Average                    |
| 2.415     |    | 99.83% Pervious Area                |
| 0.004     |    | 0.17% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 36.4        | 150              | 0.0130           | 0.07                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5         | 232              | 0.0300           | 0.87                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 40.9        | 382              | Total            |                      |                   |   |

**Summary for Subcatchment 12:**

Runoff = 8.45 cfs @ 12.10 hrs, Volume= 0.608 af, Depth> 4.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.503     | 98 | Paved parking & roofs         |
| 1.019     | 80 | >75% Grass cover, Good, HSG D |
| 1.522     | 86 | Weighted Average              |
| 1.019     |    | 66.95% Pervious Area          |
| 0.503     |    | 33.05% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.8         | 50               | 0.0200           | 0.14                 |                   | <b>Sheet Flow, A-B</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.9         | 100              | 0.0160           | 1.90                 |                   | <b>Shallow Concentrated Flow, B-C</b><br>Grassed Waterway Kv= 15.0 fps |
| 6.7         | 150              | Total            |                      |                   |  |

**Summary for Subcatchment 13:**

Runoff = 1.85 cfs @ 12.07 hrs, Volume= 0.134 af, Depth> 5.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.207     | 98 | Paved parking & roofs         |
| 0.083     | 80 | >75% Grass cover, Good, HSG D |
| 0.290     | 93 | Weighted Average              |
| 0.083     |    | 28.62% Pervious Area          |
| 0.207     |    | 71.38% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 13A:**

Runoff = 1.49 cfs @ 12.07 hrs, Volume= 0.101 af, Depth> 4.58"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.059     | 98 | Paved parking & roofs         |
| 0.206     | 80 | >75% Grass cover, Good, HSG D |
| 0.265     | 84 | Weighted Average              |
| 0.206     |    | 77.74% Pervious Area          |
| 0.059     |    | 22.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 14:**

Runoff = 0.59 cfs @ 12.07 hrs, Volume= 0.044 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.070   | 98 | Paved parking & roofs - New Road + SW |
| * 0.019   | 98 | Paved parking & roofs - Exist         |
| 0.089     | 98 | Weighted Average                      |
| 0.089     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description              |
|-------------|------------------|------------------|----------------------|-------------------|--------------------------|
| 5.0         |                  |                  |                      |                   | Direct Entry, Minimum Tc |

**Summary for Subcatchment 15:**

Runoff = 0.70 cfs @ 12.07 hrs, Volume= 0.053 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.106   | 98 | Paved parking & roofs - New Road + SW |
| 0.106     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 16:**

Runoff = 0.28 cfs @ 12.07 hrs, Volume= 0.021 af, Depth> 5.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New Road + SW |
| 0.042     |    | 100.00% Impervious Area               |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 17:**

Runoff = 1.05 cfs @ 12.07 hrs, Volume= 0.077 af, Depth> 5.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.131   | 98 | Paved parking & roofs - New Road + SW |
| 0.030     | 80 | >75% Grass cover, Good, HSG D         |
| 0.161     | 95 | Weighted Average                      |
| 0.030     |    | 18.63% Pervious Area                  |
| 0.131     |    | 81.37% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 18:**

Runoff = 4.34 cfs @ 12.13 hrs, Volume= 0.334 af, Depth> 4.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.224   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.150   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.208   | 98 | Paved parking & roofs - Exist       |
| 0.003     | 70 | Woods, Good, HSG C                  |
| 0.359     | 77 | Woods, Good, HSG D                  |
| 0.944     | 81 | Weighted Average                    |
| 0.736     |    | 77.97% Pervious Area                |
| 0.208     |    | 22.03% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 9.5      | 150           | 0.0530        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00" |

### Summary for Subcatchment 20:

Runoff = 20.30 cfs @ 12.27 hrs, Volume= 1.944 af, Depth> 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.588   | 74 | >75% Grass cover, Good, HSG C-Exist |
| * 0.027   | 80 | >75% Grass cover, Good, HSG D - New |
| * 0.066   | 74 | >75% Grass cover, Good, HSG C-New   |
| * 0.083   | 98 | Paved parking & roofs - New Roof    |
| * 0.069   | 98 | Paved parking & roofs - Exist       |
| 6.225     | 70 | Woods, Good, HSG C                  |
| 0.198     | 77 | Woods, Good, HSG D                  |
| 7.256     | 71 | Weighted Average                    |
| 7.104     |    | 97.91% Pervious Area                |
| 0.152     |    | 2.09% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 17.6     | 65            | 0.0150        | 0.06              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"      |
| 0.6      | 90            | 0.2200        | 2.35              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps             |
| 0.7      | 440           | 0.0200        | 11.23             | 1,122.98       | <b>Channel Flow, CD</b><br>Area= 100.0 sf Perim= 32.0' r= 3.13' n= 0.040 |
| 18.9     | 595           | Total         |                   |                |  |

### Summary for Subcatchment 20A:

Runoff = 19.82 cfs @ 12.14 hrs, Volume= 1.503 af, Depth> 3.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.022   | 98 | Paved parking & roofs - New House   |
| * 0.153   | 74 | >75% Grass cover, Good, HSG C - New |
| 0.038     | 98 | Paved parking & roofs               |
| 0.429     | 98 | Paved parking & roofs               |
| * 0.016   | 98 | Walkways, Impervious                |
| 0.166     | 89 | Gravel roads, HSG C                 |
| 0.339     | 61 | >75% Grass cover, Good, HSG B       |
| 1.777     | 74 | >75% Grass cover, Good, HSG C       |
| 0.618     | 58 | Meadow, non-grazed, HSG B           |
| 0.071     | 71 | Meadow, non-grazed, HSG C           |
| 0.016     | 55 | Woods, Good, HSG B                  |
| 1.583     | 70 | Woods, Good, HSG C                  |
| 0.040     | 77 | Woods, Good, HSG D                  |
| 5.268     | 73 | Weighted Average                    |
| 4.763     |    | 90.41% Pervious Area                |
| 0.505     |    | 9.59% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 5.4      | 85            | 0.0700        | 0.26              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 3.5      | 330           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps   |
| 0.7      | 350           | 0.0100        | 8.97              | 1,345.05       | <b>Channel Flow, CD</b><br>Area= 150.0 sf Perim= 40.0' r= 3.75'<br>n= 0.040 Winding stream, pools & shoals |
| 9.6      | 765           | Total         |                   |                |  |

### Summary for Subcatchment 20B:

Runoff = 5.92 cfs @ 12.22 hrs, Volume= 0.537 af, Depth> 3.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.074   | 98 | Paved parking & roofs - New House |
| * 0.081   | 98 | Paved parking & roofs - Existing  |
| 0.185     | 55 | Woods, Good, HSG B                |
| 0.052     | 70 | Woods, Good, HSG C                |
| 1.000     | 77 | Woods, Good, HSG D                |
| 0.293     | 80 | >75% Grass cover, Good, HSG D     |
| 1.685     | 77 | Weighted Average                  |
| 1.530     |    | 90.80% Pervious Area              |
| 0.155     |    | 9.20% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 15.4        | 90               | 0.0400           | 0.10                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"     |
| 0.6         | 80               | 0.1700           | 2.06                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps            |
| 0.2         | 120              | 0.0250           | 10.26                | 615.46            | <b>Channel Flow, DE</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31' n= 0.040 |
| 16.2        | 290              | Total            |                      |                   |   |

**Summary for Subcatchment 20C:**

Runoff = 33.52 cfs @ 12.45 hrs, Volume= 4.008 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.179   | 98 | Paved parking & roofs - Exist     |
| * 0.654   | 98 | Paved parking & roofs - New Roof  |
| * 0.491   | 80 | >75% Grass cover, Good, HSG D-NEW |
| 0.222     | 61 | >75% Grass cover, Good, HSG B     |
| 0.465     | 74 | >75% Grass cover, Good, HSG C     |
| 1.265     | 80 | >75% Grass cover, Good, HSG D     |
| 0.578     | 71 | Meadow, non-grazed, HSG C         |
| 1.196     | 78 | Meadow, non-grazed, HSG D         |
| 1.896     | 55 | Woods, Good, HSG B                |
| 3.522     | 70 | Woods, Good, HSG C                |
| 3.687     | 77 | Woods, Good, HSG D                |
| 14.155    | 73 | Weighted Average                  |
| 13.322    |    | 94.12% Pervious Area              |
| 0.833     |    | 5.88% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 25.0        | 150              | 0.0333           | 0.10                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                                       |
| 6.1         | 310              | 0.0290           | 0.85                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps  |
| 0.8         | 482              | 0.0380           | 10.18                | 407.20            | <b>Channel Flow, CD</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67'<br>n= 0.040 Winding stream, pools & shoals |
| 31.9        | 942              | Total            |                      |                   |   |

**Summary for Subcatchment 21:**

Runoff = 4.87 cfs @ 12.15 hrs, Volume= 0.385 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"



| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.537     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.043   | 98 | Paved parking & roofs - New Road + SW |
| * 0.265   | 98 | Paved parking & roofs - Exist         |
| 0.300     | 70 | Woods, Good, HSG C                    |
| 1.145     | 79 | Weighted Average                      |
| 0.837     |    | 73.10% Pervious Area                  |
| 0.308     |    | 26.90% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 9.6      | 145           | 0.0480        | 0.25              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"              |
| 0.3      | 50            | 0.0400        | 3.00              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps |
| 0.9      | 250           | 0.0520        | 4.63              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps            |
| 10.8     | 445           | Total         |                   |                |   |

### Summary for Subcatchment 21B:

Runoff = 3.94 cfs @ 12.26 hrs, Volume= 0.384 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| * 0.060   | 98 | Paved parking & roofs - New House |
| 0.191     | 80 | >75% Grass cover, Good, HSG D     |
| 0.893     | 77 | Woods, Good, HSG D                |
| 1.144     | 79 | Weighted Average                  |
| 1.084     |    | 94.76% Pervious Area              |
| 0.060     |    | 5.24% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 18.9     | 110           | 0.0360        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 0.3      | 50            | 0.2800        | 2.65              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 19.2     | 160           | Total         |                   |                |   |

### Summary for Subcatchment 21C:

Runoff = 9.19 cfs @ 12.18 hrs, Volume= 0.780 af, Depth> 4.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.576     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.015   | 98 | Paved parking & roofs - Road + SW  |
| * 0.119   | 98 | Paved parking & roofs - New Houses |
| 1.608     | 77 | Woods, Good, HSG D                 |
| 2.318     | 79 | Weighted Average                   |
| 2.184     |    | 94.22% Pervious Area               |
| 0.134     |    | 5.78% Impervious Area              |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 5.0      | 60            | 0.0420        | 0.20              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                |
| 7.4      | 40            | 0.0500        | 0.09              |                | <b>Sheet Flow, BC</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"     |
| 0.2      | 30            | 0.3000        | 2.74              |                | <b>Shallow Concentrated Flow, CD</b><br>Woodland Kv= 5.0 fps            |
| 0.5      | 240           | 0.0250        | 8.26              | 330.28         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67' n= 0.040 |
| 13.1     | 370           | Total         |                   |                |   |

### Summary for Subcatchment 22:

Runoff = 1.88 cfs @ 12.14 hrs, Volume= 0.144 af, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| 0.092     | 74 | >75% Grass cover, Good, HSG C         |
| * 0.108   | 98 | Paved parking & roofs - New Road + SW |
| 0.044     | 77 | Woods, Good, HSG D                    |
| 0.194     | 70 | Woods, Good, HSG C                    |
| 0.438     | 78 | Weighted Average                      |
| 0.330     |    | 75.34% Pervious Area                  |
| 0.108     |    | 24.66% Impervious Area                |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description  |
|----------|---------------|---------------|-------------------|----------------|--|
| 8.7      | 150           | 0.0660        | 0.29              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"   |
| 0.9      | 230           | 0.0480        | 4.45              |                | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps |
| 9.6      | 380           | Total         |                   |                |  |

**Summary for Subcatchment 22B:**

Runoff = 1.65 cfs @ 12.07 hrs, Volume= 0.118 af, Depth> 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.042   | 98 | Paved parking & roofs - New House  |
| * 0.131   | 98 | Paved parking & roofs - Roads + SW |
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| 0.018     | 74 | >75% Grass cover, Good, HSG C      |
| 0.261     | 92 | Weighted Average                   |
| 0.088     |    | 33.72% Pervious Area               |
| 0.173     |    | 66.28% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 22C:**

Runoff = 2.53 cfs @ 12.07 hrs, Volume= 0.175 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.258     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.071   | 98 | Paved parking & roofs - New Houses |
| * 0.099   | 98 | Paved parking & roofs - Road + SW  |
| 0.428     | 87 | Weighted Average                   |
| 0.258     |    | 60.28% Pervious Area               |
| 0.170     |    | 39.72% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23B:**

Runoff = 4.91 cfs @ 12.07 hrs, Volume= 0.340 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| * 0.177   | 98 | Paved parking & roofs - New House  |
| * 0.272   | 98 | Paved parking & roofs - Roads + SW |
| 0.051     | 80 | >75% Grass cover, Good, HSG D      |
| 0.332     | 74 | >75% Grass cover, Good, HSG C      |
| 0.832     | 87 | Weighted Average                   |
| 0.383     |    | 46.03% Pervious Area               |
| 0.449     |    | 53.97% Impervious Area             |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 23C:**

Runoff = 0.85 cfs @ 12.07 hrs, Volume= 0.061 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.026     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.105   | 98 | Paved parking & roofs - Road + SW |
| 0.131     | 94 | Weighted Average                  |
| 0.026     |    | 19.85% Pervious Area              |
| 0.105     |    | 80.15% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description              |
|----------|---------------|---------------|-------------------|----------------|--------------------------|
| 5.0      |               |               |                   |                | Direct Entry, Minimum Tc |

**Summary for Subcatchment 24B:**

Runoff = 0.74 cfs @ 12.07 hrs, Volume= 0.050 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.070     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.027   | 98 | Paved parking & roofs - Road + SW  |
| * 0.014   | 98 | Paved parking & roofs - New Houses |
| 0.018     | 77 | Woods, Good, HSG D                 |
| 0.129     | 85 | Weighted Average                   |
| 0.088     |    | 68.22% Pervious Area               |
| 0.041     |    | 31.78% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 24C:**

Runoff = 5.43 cfs @ 12.07 hrs, Volume= 0.368 af, Depth> 4.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.353     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.136   | 98 | Paved parking & roofs - Road + SW  |
| * 0.135   | 98 | Paved parking & roofs - New Houses |
| 0.046     | 55 | Woods, Good, HSG B                 |
| 0.037     | 70 | Woods, Good, HSG C                 |
| 0.281     | 77 | Woods, Good, HSG D                 |
| 0.988     | 83 | Weighted Average                   |
| 0.717     |    | 72.57% Pervious Area               |
| 0.271     |    | 27.43% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25B:**

Runoff = 1.79 cfs @ 12.07 hrs, Volume= 0.129 af, Depth> 5.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                           |
|-----------|----|---------------------------------------|
| * 0.059   | 98 | Paved parking & roofs - New House     |
| * 0.144   | 98 | Paved parking & roofs - New Road + SW |
| 0.077     | 80 | >75% Grass cover, Good, HSG D         |
| 0.280     | 93 | Weighted Average                      |
| 0.077     |    | 27.50% Pervious Area                  |
| 0.203     |    | 72.50% Impervious Area                |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 5.0         |                  |                  |                      |                   | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 25C:**

Runoff = 0.61 cfs @ 12.07 hrs, Volume= 0.044 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                       |
|-----------|----|-----------------------------------|
| 0.023     | 80 | >75% Grass cover, Good, HSG D     |
| * 0.071   | 98 | Paved parking & roofs - Road + SW |
| 0.094     | 94 | Weighted Average                  |
| 0.023     |    | 24.47% Pervious Area              |
| 0.071     |    | 75.53% Impervious Area            |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------|
| 5.0      |               |               |                   |                | <b>Direct Entry, Minimum Tc</b> |

**Summary for Subcatchment 30:**

Runoff = 6.70 cfs @ 12.38 hrs, Volume= 0.760 af, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| 1.881     | 77 | Woods, Good, HSG D                  |
| * 0.104   | 98 | New Houses                          |
| * 0.346   | 80 | >75% Grass cover, Good, HSG D - New |
| 2.331     | 78 | Weighted Average                    |
| 2.227     |    | 95.54% Pervious Area                |
| 0.104     |    | 4.46% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--|
| 23.2     | 150           | 0.0400        | 0.11              |                | <b>Sheet Flow, AB</b>                      |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.00" |
| 4.5      | 155           | 0.0130        | 0.57              |                | <b>Shallow Concentrated Flow, BC</b>       |
|          |               |               |                   |                | Woodland Kv= 5.0 fps                       |
| 27.7     | 305           | Total         |                   |                |  |

**Summary for Subcatchment 40:**

Runoff = 12.89 cfs @ 12.11 hrs, Volume= 0.963 af, Depth> 4.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 1.280     | 98 | Paved parking & roofs         |
| 0.104     | 39 | >75% Grass cover, Good, HSG A |
| 0.109     | 74 | >75% Grass cover, Good, HSG C |
| 0.818     | 71 | Meadow, non-grazed, HSG C     |
| 0.214     | 78 | Meadow, non-grazed, HSG D     |
| 2.525     | 84 | Weighted Average              |
| 1.245     |    | 49.31% Pervious Area          |
| 1.280     |    | 50.69% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 7.7      | 150           | 0.0660        | 0.32              |                | <b>Sheet Flow, AB</b><br>Range n= 0.130 P2= 3.00"   |
| 0.5      | 440           | 0.0750        | 14.94             | 239.03         | <b>Channel Flow, CD</b><br>Area= 16.0 sf Perim= 12.0' r= 1.33'<br>n= 0.033 Earth, grassed & winding |
| 8.2      | 590           | Total         |                   |                |   |

**Summary for Subcatchment 50:**

Runoff = 43.83 cfs @ 12.39 hrs, Volume= 5.083 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 3.437   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 0.768   | 98 | Paved parking & roofs - New Houses       |
| * 1.542   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.126   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.015     | 77 | Woods, Good, HSG D                       |
| 0.466     | 70 | Woods, Good, HSG C                       |
| 14.432    | 81 | Weighted Average                         |
| 11.416    |    | 79.10% Pervious Area                     |
| 3.016     |    | 20.90% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

### Summary for Subcatchment 50A: Including Phase 2

Runoff = 47.50 cfs @ 12.38 hrs, Volume= 5.601 af, Depth> 4.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                              |
|-----------|----|--|
| * 1.724   | 98 | Paved parking & roofs - Existing         |
| * 1.170   | 89 | Gravel roads, HSG C - Existing           |
| * 1.474   | 74 | >75% Grass cover, Good, HSG C - Existing |
| * 0.577   | 71 | Meadow, non-grazed, HSG C - Existing     |
| * 0.186   | 78 | Meadow, non-grazed, HSG D - Existing     |
| * 0.524   | 98 | Water Surface - Pond                     |
| * 2.860   | 98 | Paved parking & roofs - Phase 2          |
| * 0.438   | 98 | Paved parking & roofs - New Houses       |
| * 0.898   | 80 | >75% Grass cover, Good, HSG D - New      |
| * 0.071   | 74 | >75% Grass cover, Good, HSG C - New      |
| 3.975     | 77 | Woods, Good, HSG D                       |
| 0.535     | 70 | Woods, Good, HSG C                       |
| 14.432    | 85 | Weighted Average                         |
| 8.886     |    | 61.57% Pervious Area                     |
| 5.546     |    | 38.43% Impervious Area                   |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 25.1     | 150           | 0.0330        | 0.10              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |
| 3.5      | 375           | 0.1280        | 1.79              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps        |
| 28.6     | 525           | Total         |                   |                |   |

### Summary for Subcatchment 51:

Runoff = 24.37 cfs @ 12.09 hrs, Volume= 1.755 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.725     | 74 | >75% Grass cover, Good, HSG C      |
| 1.605     | 80 | >75% Grass cover, Good, HSG D      |
| * 0.871   | 98 | Paved parking & roofs - New Houses |
| * 1.095   | 98 | Paved parking & roofs - Road + SW  |
| 4.296     | 87 | Weighted Average                   |
| 2.330     |    | 54.24% Pervious Area               |
| 1.966     |    | 45.76% Impervious Area             |



| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 3.0         | 35               | 0.0500           | 0.19                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 0.6         | 180              | 0.0700           | 5.37                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Paved Kv= 20.3 fps                           |
| 2.9         | 1,575            | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 6.5         | 1,790            | Total            |                      |                   |  |

**Summary for Subcatchment 52:**

Runoff = 16.45 cfs @ 12.12 hrs, Volume= 1.257 af, Depth> 4.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                        |
|-----------|----|------------------------------------|
| 0.174     | 71 | Meadow, non-grazed, HSG C          |
| 0.056     | 74 | >75% Grass cover, Good, HSG C      |
| * 0.641   | 98 | Paved parking & roofs - New Houses |
| * 0.739   | 98 | Paved parking & roofs - Road + SW  |
| 1.469     | 80 | >75% Grass cover, Good, HSG D      |
| 3.079     | 87 | Weighted Average                   |
| 1.699     |    | 55.18% Pervious Area               |
| 1.380     |    | 44.82% Impervious Area             |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description  |
|-------------|------------------|------------------|----------------------|-------------------|--|
| 5.6         | 90               | 0.0700           | 0.27                 |                   | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"                             |
| 1.2         | 135              | 0.0150           | 1.84                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                |
| 1.6         | 860              | 0.0200           | 9.11                 | 16.09             | <b>Pipe Channel, CD</b><br>18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38'<br>n= 0.012 |
| 8.4         | 1,085            | Total            |                      |                   |  |

**Summary for Subcatchment 60: Main Street**

Runoff = 9.10 cfs @ 12.15 hrs, Volume= 0.715 af, Depth> 3.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                     |
|-----------|----|---------------------------------|
| 0.418     | 98 | Paved parking & roofs           |
| 0.938     | 70 | Woods, Good, HSG C              |
| 0.196     | 98 | Paved parking & roofs           |
| 0.688     | 69 | 50-75% Grass cover, Fair, HSG B |
| 2.240     | 77 | Weighted Average                |
| 1.626     |    | 72.59% Pervious Area            |
| 0.614     |    | 27.41% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 6.7      | 85            | 0.0400        | 0.21              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 4.0      | 378           | 0.0160        | 1.58              | 0.21           | <b>Trap/Vee/Rect Channel Flow, BC</b><br>Bot.W=1.00' D=0.10' Z= 3.0 ' Top.W=1.60'<br>n= 0.022 Earth, clean & straight |
| 10.7     | 463           | Total         |                   |                |   |

### Summary for Subcatchment 70:

Runoff = 5.14 cfs @ 12.26 hrs, Volume= 0.489 af, Depth> 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                         |
|-----------|----|-------------------------------------|
| * 0.121   | 98 | Paved parking & roofs-New Road + SW |
| * 0.052   | 98 | Paved parking & roofs - Exist.      |
| 0.048     | 61 | >75% Grass cover, Good, HSG B       |
| 1.548     | 70 | Woods, Good, HSG C                  |
| 1.769     | 72 | Weighted Average                    |
| 1.596     |    | 90.22% Pervious Area                |
| 0.173     |    | 9.78% Impervious Area               |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 16.6     | 150           | 0.0930        | 0.15              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                                       |
| 1.7      | 170           | 0.1100        | 1.66              |                | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps  |
| 0.2      | 79            | 0.0130        | 7.40              | 443.81         | <b>Channel Flow, CD</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.040 Winding stream, pools & shoals |
| 18.5     | 399           | Total         |                   |                |   |

**Summary for Subcatchment 80:**

Runoff = 0.46 cfs @ 12.22 hrs, Volume= 0.041 af, Depth> 2.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| * 0.020   | 98 | Paved parking & roofs - Exist |
| 0.051     | 61 | >75% Grass cover, Good, HSG B |
| 0.157     | 55 | Woods, Good, HSG B            |
| 0.228     | 60 | Weighted Average              |
| 0.208     |    | 91.23% Pervious Area          |
| 0.020     |    | 8.77% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 15.0     | 106           | 0.0600        | 0.12              |                | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00" |

**Summary for Subcatchment OS1:**

Runoff = 34.98 cfs @ 12.59 hrs, Volume= 4.788 af, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.159     | 98 | Paved parking & roofs         |
| 1.167     | 98 | Paved parking & roofs         |
| 1.048     | 98 | Paved parking & roofs         |
| 0.051     | 98 | Water Surface                 |
| 0.057     | 98 | Water Surface                 |
| * 0.002   | 98 | Walkway, Impervious           |
| * 0.041   | 98 | Walkway, Impervious           |
| 0.900     | 39 | >75% Grass cover, Good, HSG A |
| 3.053     | 61 | >75% Grass cover, Good, HSG B |
| 5.742     | 74 | >75% Grass cover, Good, HSG C |
| 0.077     | 58 | Meadow, non-grazed, HSG B     |
| 0.329     | 71 | Meadow, non-grazed, HSG C     |
| 0.694     | 30 | Woods, Good, HSG A            |
| 1.195     | 55 | Woods, Good, HSG B            |
| 4.085     | 70 | Woods, Good, HSG C            |
| 18.600    | 70 | Weighted Average              |
| 16.075    |    | 86.42% Pervious Area          |
| 2.525     |    | 13.58% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description   |
|-------------|------------------|------------------|----------------------|-------------------|---|
| 27.4        | 150              | 0.0266           | 0.09                 |                   | <b>Sheet Flow, AB</b><br>Woods: Light underbrush n= 0.400 P2= 3.00"                               |
| 4.5         | 250              | 0.0345           | 0.93                 |                   | <b>Shallow Concentrated Flow, BC</b><br>Woodland Kv= 5.0 fps                                      |
| 1.2         | 196              | 0.0306           | 2.62                 |                   | <b>Shallow Concentrated Flow, CD</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.6         | 80               | 0.0125           | 2.27                 |                   | <b>Shallow Concentrated Flow, DE</b><br>Paved Kv= 20.3 fps  |
| 3.6         | 320              | 0.0219           | 1.48                 |                   | <b>Shallow Concentrated Flow, EF</b><br>Nearly Bare & Untilled Kv= 10.0 fps                       |
| 0.2         | 36               | 0.0208           | 2.93                 |                   | <b>Shallow Concentrated Flow, FG</b><br>Paved Kv= 20.3 fps  |
| 0.3         | 60               | 0.0500           | 3.35                 |                   | <b>Shallow Concentrated Flow, GH</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.3         | 70               | 0.0429           | 4.20                 |                   | <b>Shallow Concentrated Flow, HI</b><br>Paved Kv= 20.3 fps  |
| 0.6         | 148              | 0.0777           | 4.18                 |                   | <b>Shallow Concentrated Flow, IJ</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 3.4         | 310              | 0.0935           | 1.53                 |                   | <b>Shallow Concentrated Flow, JK</b><br>Woodland Kv= 5.0 fps                                      |
| 0.2         | 130              | 0.0231           | 13.15                | 788.81            | <b>Channel Flow, KL</b><br>Area= 60.0 sf Perim= 26.0' r= 2.31'<br>n= 0.030 Earth, clean & winding |
| 42.3        | 1,750            | Total            |                      |                   |   |

**Summary for Subcatchment OS2:**

Runoff = 50.00 cfs @ 12.19 hrs, Volume= 4.219 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 100-yr Rainfall=6.70"

| Area (ac) | CN | Description                   |
|-----------|----|-------------------------------|
| 0.751     | 98 | Paved parking & roofs         |
| 1.187     | 98 | Paved parking & roofs         |
| 0.404     | 98 | Paved parking & roofs         |
| 0.080     | 98 | Water Surface                 |
| 0.039     | 98 | Water Surface                 |
| 0.001     | 98 | Water Surface                 |
| * 0.026   | 98 | Walkways, Impervious          |
| * 0.007   | 98 | Walkways, Impervious          |
| 0.289     | 74 | Farmsteads, HSG B             |
| 0.233     | 82 | Farmsteads, HSG C             |
| 1.691     | 61 | >75% Grass cover, Good, HSG B |
| 4.263     | 74 | >75% Grass cover, Good, HSG C |
| 0.871     | 80 | >75% Grass cover, Good, HSG D |
| 0.437     | 58 | Meadow, non-grazed, HSG B     |
| 0.026     | 71 | Meadow, non-grazed, HSG C     |
| 2.871     | 55 | Woods, Good, HSG B            |
| 2.044     | 70 | Woods, Good, HSG C            |
| 0.030     | 77 | Woods, Good, HSG D            |
| 15.250    | 72 | Weighted Average              |
| 12.755    |    | 83.64% Pervious Area          |
| 2.495     |    | 16.36% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description   |
|----------|---------------|---------------|-------------------|----------------|---|
| 10.5     | 150           | 0.0407        | 0.24              |                | <b>Sheet Flow, AB</b><br>Grass: Short n= 0.150 P2= 3.00"  |
| 1.1      | 170           | 0.0294        | 2.57              |                | <b>Shallow Concentrated Flow, BC</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.1      | 30            | 0.0333        | 3.70              |                | <b>Shallow Concentrated Flow, CD</b><br>Paved Kv= 20.3 fps  |
| 1.2      | 300           | 0.0767        | 4.15              |                | <b>Shallow Concentrated Flow, DE</b><br>Grassed Waterway Kv= 15.0 fps                             |
| 0.5      | 400           | 0.0375        | 13.48             | 539.35         | <b>Channel Flow, DE</b><br>Area= 40.0 sf Perim= 24.0' r= 1.67'<br>n= 0.030 Earth, clean & winding |
| 13.4     | 1,050         | Total         |                   |                |   |

### Summary for Reach R1: 2C

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 3.09" for 100-yr event  
 Inflow = 34.06 cfs @ 12.68 hrs, Volume= 4.788 af  
 Outflow = 34.00 cfs @ 12.70 hrs, Volume= 4.783 af, Atten= 0%, Lag= 1.3 min

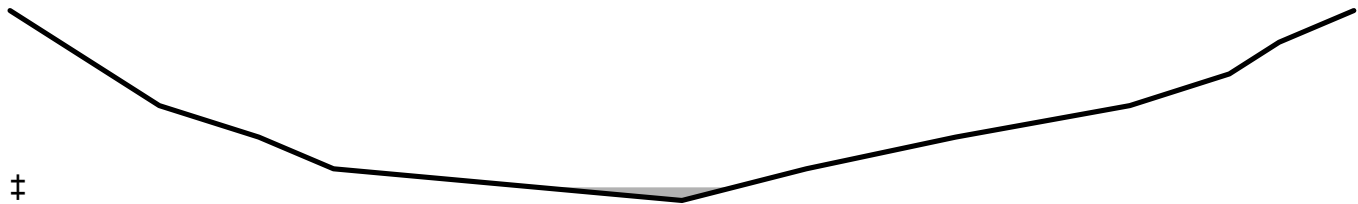
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 5.16 fps, Min. Travel Time= 0.8 min  
 Avg. Velocity = 2.85 fps, Avg. Travel Time= 1.4 min

Peak Storage= 1,583 cf @ 12.69 hrs  
 Average Depth at Peak Storage= 0.83'  
 Bank-Full Depth= 12.00' Flow Area= 828.0 sf, Capacity= 29,251.95 cfs

Custom cross-section, Length= 240.0' Slope= 0.0625 '/' (104 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 100.00', Outlet Invert= 85.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -54.00           | 100.00              | 0.00                 |
| -50.00           | 98.00               | 2.00                 |
| -46.00           | 96.00               | 4.00                 |
| -42.00           | 94.00               | 6.00                 |
| -34.00           | 92.00               | 8.00                 |
| -28.00           | 90.00               | 10.00                |
| 0.00             | 88.00               | 12.00                |
| 10.00            | 90.00               | 10.00                |
| 22.00            | 92.00               | 8.00                 |
| 36.00            | 94.00               | 6.00                 |
| 44.00            | 96.00               | 4.00                 |
| 48.00            | 98.00               | 2.00                 |
| 54.00            | 100.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 38.0                | 38.3             | 9,120                   | 351.27             |
| 4.00            | 132.0               | 56.8             | 31,680                  | 2,151.94           |
| 6.00            | 266.0               | 79.1             | 63,840                  | 5,542.97           |
| 8.00            | 434.0               | 91.9             | 104,160                 | 11,348.66          |
| 10.00           | 622.0               | 100.8            | 149,280                 | 19,433.27          |
| 12.00           | 828.0               | 111.6            | 198,720                 | 29,251.95          |

### Summary for Reach R10: Stream

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 3.40" for 100-yr event  
 Inflow = 33.53 cfs @ 12.45 hrs, Volume= 4.008 af  
 Outflow = 33.31 cfs @ 12.49 hrs, Volume= 3.999 af, Atten= 1%, Lag= 2.6 min

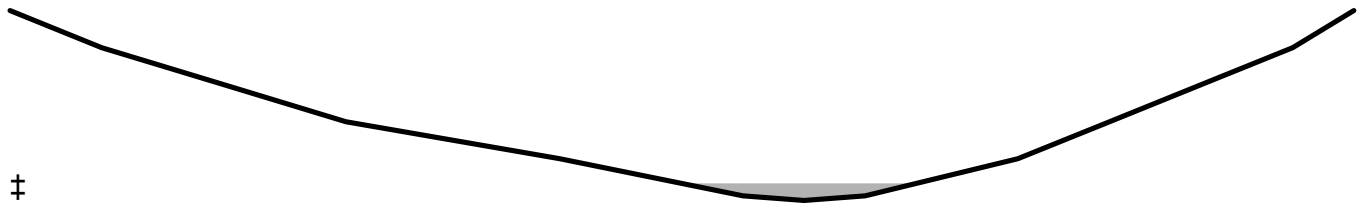
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.76 fps, Min. Travel Time= 1.4 min  
 Avg. Velocity= 1.68 fps, Avg. Travel Time= 3.2 min

Peak Storage= 2,893 cf @ 12.47 hrs  
 Average Depth at Peak Storage= 0.92'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,695.16 cfs

Custom cross-section, Length= 325.0' Slope= 0.0215 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 91.00', Outlet Invert= 84.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 325                     | 1.36               |
| 2.25            | 39.0                | 30.4             | 12,676                  | 251.23             |
| 4.25            | 119.0               | 50.8             | 38,675                  | 1,143.69           |
| 6.25            | 233.0               | 65.4             | 75,725                  | 2,962.82           |
| 8.25            | 375.0               | 80.0             | 121,875                 | 5,727.13           |
| 10.25           | 541.0               | 90.8             | 175,825                 | 9,695.16           |

### Summary for Reach R20: STREAM

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 3.37" for 100-yr event  
 Inflow = 48.46 cfs @ 12.29 hrs, Volume= 4.752 af  
 Outflow = 48.33 cfs @ 12.31 hrs, Volume= 4.748 af, Atten= 0%, Lag= 1.2 min

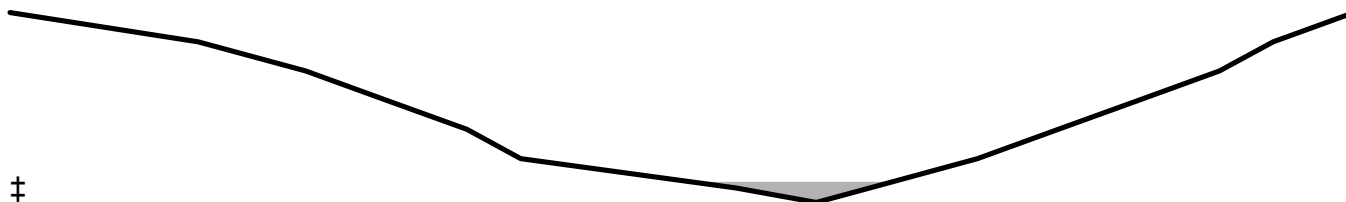
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.74 fps, Min. Travel Time= 0.6 min  
 Avg. Velocity= 2.26 fps, Avg. Travel Time= 1.3 min

Peak Storage= 1,842 cf @ 12.30 hrs  
 Average Depth at Peak Storage= 1.42'  
 Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 14,699.46 cfs

Custom cross-section, Length= 180.0' Slope= 0.0278 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 88.00', Outlet Invert= 83.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 900                     | 19.24              |
| 3.00            | 49.0                | 34.6             | 8,820                   | 382.78             |
| 5.00            | 127.0               | 45.4             | 22,860                  | 1,561.76           |
| 7.00            | 227.0               | 58.0             | 40,860                  | 3,489.69           |
| 9.00            | 351.0               | 70.7             | 63,180                  | 6,326.40           |
| 11.00           | 499.0               | 83.4             | 89,820                  | 10,183.56          |
| 13.00           | 679.0               | 103.9            | 122,220                 | 14,699.46          |

### Summary for Reach R21: STREAM

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 3.32" for 100-yr event  
 Inflow = 43.19 cfs @ 12.27 hrs, Volume= 4.219 af  
 Outflow = 43.01 cfs @ 12.30 hrs, Volume= 4.215 af, Atten= 0%, Lag= 1.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 5.31 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 2.66 fps, Avg. Travel Time= 1.6 min



Peak Storage= 2,032 cf @ 12.28 hrs

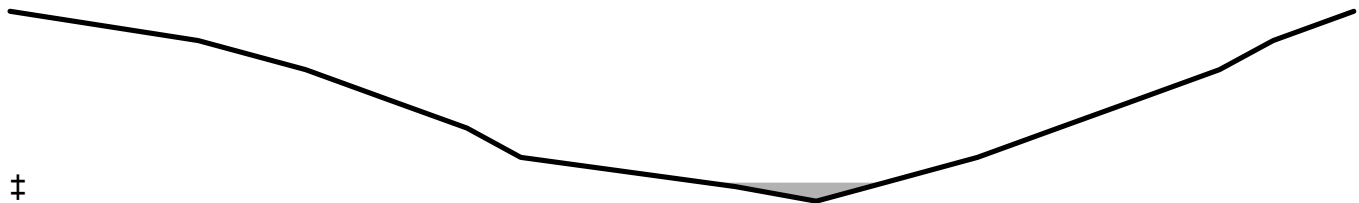
Average Depth at Peak Storage= 1.27'

Bank-Full Depth= 13.00' Flow Area= 679.0 sf, Capacity= 17,639.35 cfs

Custom cross-section, Length= 250.0' Slope= 0.0400 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 101.00', Outlet Invert= 91.00'



±

| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -60.00           | 108.00              | 0.00                 |
| -46.00           | 106.00              | 2.00                 |
| -38.00           | 104.00              | 4.00                 |
| -32.00           | 102.00              | 6.00                 |
| -26.00           | 100.00              | 8.00                 |
| -22.00           | 98.00               | 10.00                |
| -6.00            | 96.00               | 12.00                |
| 0.00             | 95.00               | 13.00                |
| 4.00             | 96.00               | 12.00                |
| 12.00            | 98.00               | 10.00                |
| 18.00            | 100.00              | 8.00                 |
| 24.00            | 102.00              | 6.00                 |
| 30.00            | 104.00              | 4.00                 |
| 34.00            | 106.00              | 2.00                 |
| 40.00            | 108.00              | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 5.0                 | 10.2             | 1,250                   | 23.09              |
| 3.00            | 49.0                | 34.6             | 12,250                  | 459.33             |
| 5.00            | 127.0               | 45.4             | 31,750                  | 1,874.11           |
| 7.00            | 227.0               | 58.0             | 56,750                  | 4,187.63           |
| 9.00            | 351.0               | 70.7             | 87,750                  | 7,591.68           |
| 11.00           | 499.0               | 83.4             | 124,750                 | 12,220.27          |
| 13.00           | 679.0               | 103.9            | 169,750                 | 17,639.35          |

### Summary for Reach R3: STREAM

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 3.16" for 100-yr event

Inflow = 37.62 cfs @ 12.62 hrs, Volume= 6.286 af

Outflow = 37.59 cfs @ 12.65 hrs, Volume= 6.277 af, Atten= 0%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 4.05 fps, Min. Travel Time= 1.2 min

Avg. Velocity = 2.23 fps, Avg. Travel Time= 2.1 min

Peak Storage= 2,602 cf @ 12.63 hrs

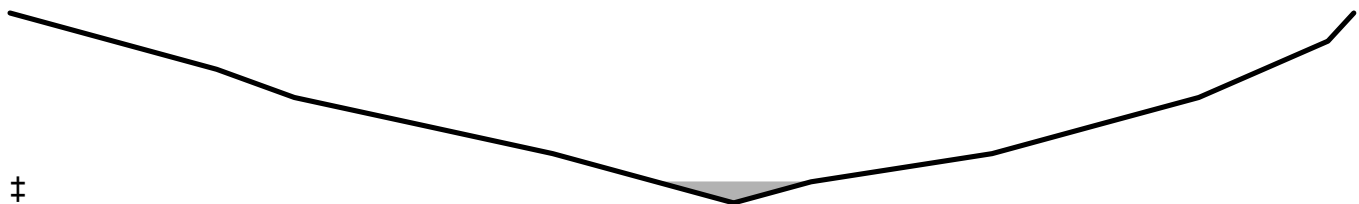
Average Depth at Peak Storage= 1.52'

Bank-Full Depth= 13.50' Flow Area= 787.0 sf, Capacity= 14,679.38 cfs

Custom cross-section, Length= 280.0' Slope= 0.0179 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 85.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -56.00           | 96.00               | 0.00                 |
| -48.00           | 94.00               | 2.00                 |
| -40.00           | 92.00               | 4.00                 |
| -34.00           | 90.00               | 6.00                 |
| -24.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 82.50               | 13.50                |
| 6.00             | 84.00               | 12.00                |
| 20.00            | 86.00               | 10.00                |
| 28.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 41.00            | 92.00               | 4.00                 |
| 46.00            | 94.00               | 2.00                 |
| 48.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.50            | 9.0                 | 12.4             | 2,520                   | 36.14              |
| 3.50            | 55.0                | 34.8             | 15,400                  | 370.77             |
| 5.50            | 141.0               | 53.2             | 39,480                  | 1,340.54           |
| 7.50            | 263.0               | 71.6             | 73,640                  | 3,106.91           |
| 9.50            | 414.0               | 83.4             | 115,920                 | 5,982.85           |
| 11.50           | 589.0               | 97.0             | 164,920                 | 9,733.01           |
| 13.50           | 787.0               | 108.1            | 220,360                 | 14,679.38          |

**Summary for Reach R30: (new Reach)**

Inflow Area = 3.363 ac, 6.30% Impervious, Inflow Depth > 3.72" for 100-yr event  
Inflow = 5.95 cfs @ 12.75 hrs, Volume= 1.043 af  
Outflow = 5.67 cfs @ 13.27 hrs, Volume= 1.013 af, Atten= 5%, Lag= 31.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.62 fps, Min. Travel Time= 18.1 min  
Avg. Velocity = 0.27 fps, Avg. Travel Time= 41.8 min

Peak Storage= 6,148 cf @ 12.97 hrs  
Average Depth at Peak Storage= 0.08'  
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 513.72 cfs

100.00' x 1.00' deep channel, n= 0.040  
Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
Length= 670.0' Slope= 0.0082 ' '  
Inlet Invert= 82.50', Outlet Invert= 77.00'

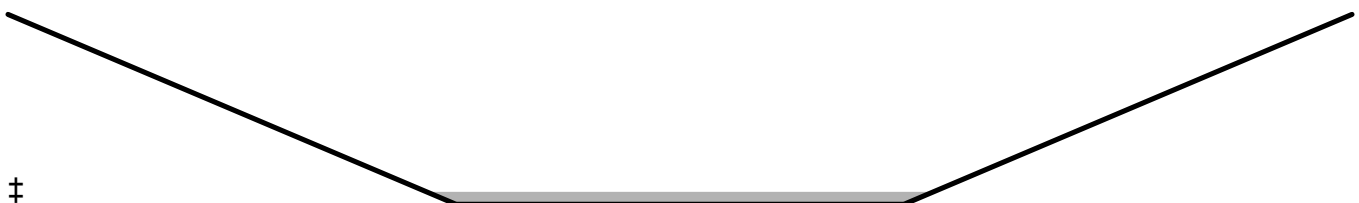
**Summary for Reach R31: (new Reach)**

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 3.59" for 100-yr event  
Inflow = 4.97 cfs @ 12.70 hrs, Volume= 0.723 af  
Outflow = 4.88 cfs @ 12.93 hrs, Volume= 0.713 af, Atten= 2%, Lag= 13.6 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 0.70 fps, Min. Travel Time= 8.4 min  
Avg. Velocity = 0.30 fps, Avg. Travel Time= 19.6 min

Peak Storage= 2,453 cf @ 12.79 hrs  
Average Depth at Peak Storage= 0.07'  
Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 677.70 cfs

100.00' x 1.00' deep channel, n= 0.040  
Side Slope Z-value= 100.0 ' ' Top Width= 300.00'  
Length= 350.0' Slope= 0.0143 ' '  
Inlet Invert= 87.50', Outlet Invert= 82.50'



**Summary for Reach R32: (new Reach)**

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 4.25" for 100-yr event  
 Inflow = 4.34 cfs @ 12.13 hrs, Volume= 0.334 af  
 Outflow = 3.55 cfs @ 12.36 hrs, Volume= 0.331 af, Atten= 18%, Lag= 13.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 0.68 fps, Min. Travel Time= 8.6 min  
 Avg. Velocity = 0.27 fps, Avg. Travel Time= 21.8 min

Peak Storage= 1,844 cf @ 12.21 hrs  
 Average Depth at Peak Storage= 0.05'  
 Bank-Full Depth= 1.00' Flow Area= 200.0 sf, Capacity= 784.49 cfs

100.00' x 1.00' deep channel, n= 0.040  
 Side Slope Z-value= 100.0 ' Top Width= 300.00'  
 Length= 350.0' Slope= 0.0191 '  
 Inlet Invert= 89.20', Outlet Invert= 82.50'

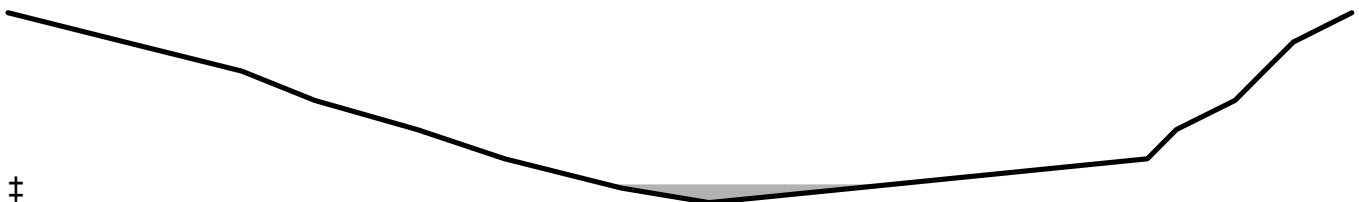
**Summary for Reach R4: STREAM**

Inflow Area = 18.079 ac, 14.99% Impervious, Inflow Depth > 3.41" for 100-yr event  
 Inflow = 52.16 cfs @ 12.30 hrs, Volume= 5.132 af  
 Outflow = 51.98 cfs @ 12.32 hrs, Volume= 5.128 af, Atten= 0%, Lag= 1.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.20 fps, Min. Travel Time= 0.7 min  
 Avg. Velocity = 1.92 fps, Avg. Travel Time= 1.5 min

Peak Storage= 2,109 cf @ 12.31 hrs  
 Average Depth at Peak Storage= 1.25'  
 Bank-Full Depth= 13.00' Flow Area= 734.0 sf, Capacity= 16,078.55 cfs

Custom cross-section, Length= 170.0' Slope= 0.0235 ' (106 Elevation Intervals)  
 Constant n= 0.040  
 Inlet Invert= 84.00', Outlet Invert= 80.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -48.00           | 96.00               | 0.00                 |
| -40.00           | 94.00               | 2.00                 |
| -32.00           | 92.00               | 4.00                 |
| -27.00           | 90.00               | 6.00                 |
| -20.00           | 88.00               | 8.00                 |
| -14.00           | 86.00               | 10.00                |
| -6.00            | 84.00               | 12.00                |
| 0.00             | 83.00               | 13.00                |
| 10.00            | 84.00               | 12.00                |
| 30.00            | 86.00               | 10.00                |
| 32.00            | 88.00               | 8.00                 |
| 36.00            | 90.00               | 6.00                 |
| 38.00            | 92.00               | 4.00                 |
| 40.00            | 94.00               | 2.00                 |
| 44.00            | 96.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 1.00            | 8.0                 | 16.1             | 1,360                   | 28.56              |
| 3.00            | 68.0                | 44.5             | 11,560                  | 514.25             |
| 5.00            | 164.0               | 53.6             | 27,880                  | 1,968.90           |
| 7.00            | 279.0               | 65.4             | 47,430                  | 4,182.71           |
| 9.00            | 412.0               | 73.6             | 70,040                  | 7,402.04           |
| 11.00           | 562.0               | 84.7             | 95,540                  | 11,310.93          |
| 13.00           | 734.0               | 97.4             | 124,780                 | 16,078.55          |

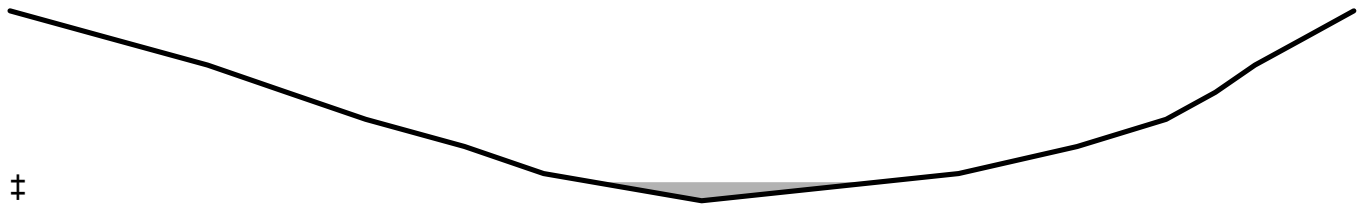
### Summary for Reach R5: STREAM

Inflow Area = 41.947 ac, 13.68% Impervious, Inflow Depth > 3.26" for 100-yr event  
 Inflow = 84.16 cfs @ 12.37 hrs, Volume= 11.405 af  
 Outflow = 83.95 cfs @ 12.40 hrs, Volume= 11.389 af, Atten= 0%, Lag= 1.8 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.30 fps, Min. Travel Time= 1.1 min  
 Avg. Velocity = 2.14 fps, Avg. Travel Time= 2.3 min

Peak Storage= 5,669 cf @ 12.38 hrs  
 Average Depth at Peak Storage= 1.36'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 26,019.95 cfs

Custom cross-section, Length= 290.0' Slope= 0.0224 '/' (106 Elevation Intervals)  
 Constant n= 0.040 Winding stream, pools & shoals  
 Inlet Invert= 80.00', Outlet Invert= 73.50'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 12,180                  | 232.85             |
| 4.00            | 146.0               | 62.6             | 42,340                  | 1,427.89           |
| 6.00            | 289.0               | 82.0             | 83,810                  | 3,721.59           |
| 8.00            | 464.0               | 95.7             | 134,560                 | 7,394.69           |
| 10.00           | 664.0               | 108.4            | 192,560                 | 12,365.06          |
| 12.00           | 891.0               | 124.0            | 258,390                 | 18,456.53          |
| 14.00           | 1,148.0             | 139.5            | 332,920                 | 26,019.95          |

### Summary for Reach R6: (new Reach)

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 3.48" for 100-yr event  
 Inflow = 37.60 cfs @ 12.46 hrs, Volume= 4.779 af  
 Outflow = 37.34 cfs @ 12.53 hrs, Volume= 4.762 af, Atten= 1%, Lag= 4.1 min

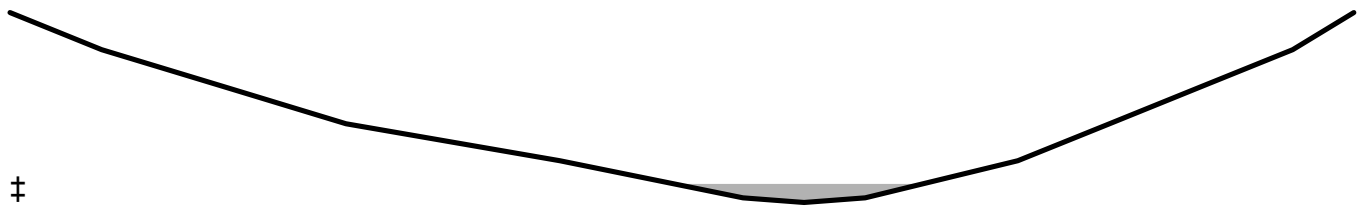
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 3.71 fps, Min. Travel Time= 2.4 min  
 Avg. Velocity = 1.60 fps, Avg. Travel Time= 5.5 min

Peak Storage= 5,293 cf @ 12.49 hrs  
 Average Depth at Peak Storage= 1.00'  
 Bank-Full Depth= 10.25' Flow Area= 541.0 sf, Capacity= 9,117.34 cfs

Custom cross-section, Length= 525.0' Slope= 0.0190 '/' (103 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 84.00', Outlet Invert= 74.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -52.00           | 92.00               | 0.00                 |
| -46.00           | 90.00               | 2.00                 |
| -38.00           | 88.00               | 4.00                 |
| -30.00           | 86.00               | 6.00                 |
| -16.00           | 84.00               | 8.00                 |
| -4.00            | 82.00               | 10.00                |
| 0.00             | 81.75               | 10.25                |
| 4.00             | 82.00               | 10.00                |
| 14.00            | 84.00               | 8.00                 |
| 20.00            | 86.00               | 6.00                 |
| 26.00            | 88.00               | 4.00                 |
| 32.00            | 90.00               | 2.00                 |
| 36.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 0.25            | 1.0                 | 8.0              | 525                     | 1.28               |
| 2.25            | 39.0                | 30.4             | 20,476                  | 236.25             |
| 4.25            | 119.0               | 50.8             | 62,475                  | 1,075.52           |
| 6.25            | 233.0               | 65.4             | 122,325                 | 2,786.24           |
| 8.25            | 375.0               | 80.0             | 196,875                 | 5,385.80           |
| 10.25           | 541.0               | 90.8             | 284,025                 | 9,117.34           |

### Summary for Reach R7: STREAM

Inflow Area = 58.420 ac, 11.48% Impervious, Inflow Depth > 3.32" for 100-yr event  
 Inflow = 119.15 cfs @ 12.45 hrs, Volume= 16.152 af  
 Outflow = 118.91 cfs @ 12.46 hrs, Volume= 16.142 af, Atten= 0%, Lag= 0.8 min

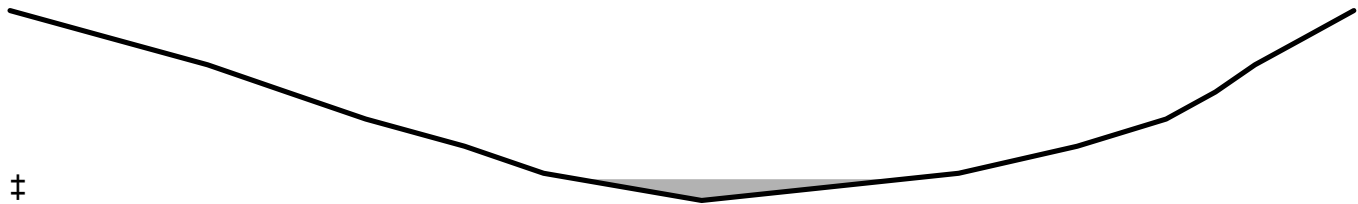
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Max. Velocity= 4.62 fps, Min. Travel Time= 0.5 min  
 Avg. Velocity= 2.28 fps, Avg. Travel Time= 1.0 min

Peak Storage= 3,482 cf @ 12.45 hrs  
 Average Depth at Peak Storage= 1.57'  
 Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 25,473.05 cfs

Custom cross-section, Length= 135.0' Slope= 0.0215 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 73.50', Outlet Invert= 70.60'



‡

| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,670                   | 227.96             |
| 4.00            | 146.0               | 62.6             | 19,710                  | 1,397.88           |
| 6.00            | 289.0               | 82.0             | 39,015                  | 3,643.37           |
| 8.00            | 464.0               | 95.7             | 62,640                  | 7,239.27           |
| 10.00           | 664.0               | 108.4            | 89,640                  | 12,105.16          |
| 12.00           | 891.0               | 124.0            | 120,285                 | 18,068.60          |
| 14.00           | 1,148.0             | 139.5            | 154,980                 | 25,473.05          |

### Summary for Reach R8: STREAM

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 3.32" for 100-yr event  
 Inflow = 132.58 cfs @ 12.51 hrs, Volume= 18.591 af  
 Outflow = 132.33 cfs @ 12.53 hrs, Volume= 18.571 af, Atten= 0%, Lag= 1.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.43 fps, Min. Travel Time= 0.8 min

Avg. Velocity= 1.28 fps, Avg. Travel Time= 1.6 min



Peak Storage= 6,535 cf @ 12.52 hrs

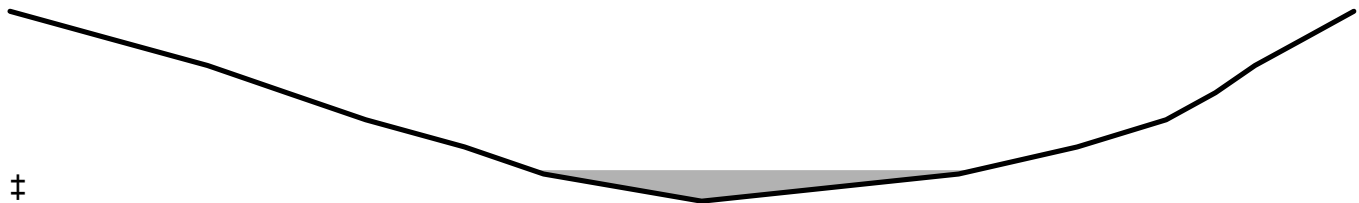
Average Depth at Peak Storage= 2.29'

Bank-Full Depth= 14.00' Flow Area= 1,148.0 sf, Capacity= 10,034.32 cfs

Custom cross-section, Length= 120.0' Slope= 0.0033 '/' (106 Elevation Intervals)

Constant n= 0.040

Inlet Invert= 69.40', Outlet Invert= 69.00'



| Offset<br>(feet) | Elevation<br>(feet) | Chan.Depth<br>(feet) |
|------------------|---------------------|----------------------|
| -70.00           | 92.00               | 0.00                 |
| -60.00           | 90.00               | 2.00                 |
| -50.00           | 88.00               | 4.00                 |
| -42.00           | 86.00               | 6.00                 |
| -34.00           | 84.00               | 8.00                 |
| -24.00           | 82.00               | 10.00                |
| -16.00           | 80.00               | 12.00                |
| 0.00             | 78.00               | 14.00                |
| 26.00            | 80.00               | 12.00                |
| 38.00            | 82.00               | 10.00                |
| 47.00            | 84.00               | 8.00                 |
| 52.00            | 86.00               | 6.00                 |
| 56.00            | 88.00               | 4.00                 |
| 61.00            | 90.00               | 2.00                 |
| 66.00            | 92.00               | 0.00                 |

| Depth<br>(feet) | End Area<br>(sq-ft) | Perim.<br>(feet) | Storage<br>(cubic-feet) | Discharge<br>(cfs) |
|-----------------|---------------------|------------------|-------------------------|--------------------|
| 0.00            | 0.0                 | 0.0              | 0                       | 0.00               |
| 2.00            | 42.0                | 42.2             | 5,040                   | 89.80              |
| 4.00            | 146.0               | 62.6             | 17,520                  | 550.65             |
| 6.00            | 289.0               | 82.0             | 34,680                  | 1,435.19           |
| 8.00            | 464.0               | 95.7             | 55,680                  | 2,851.69           |
| 10.00           | 664.0               | 108.4            | 79,680                  | 4,768.46           |
| 12.00           | 891.0               | 124.0            | 106,920                 | 7,117.57           |
| 14.00           | 1,148.0             | 139.5            | 137,760                 | 10,034.32          |

### Summary for Pond 1P: Phase2 POND W/OCS

Inflow Area = 14.432 ac, 38.43% Impervious, Inflow Depth > 4.66" for 100-yr event

Inflow = 47.50 cfs @ 12.38 hrs, Volume= 5.601 af

Outflow = 3.28 cfs @ 15.58 hrs, Volume= 2.034 af, Atten= 93%, Lag= 192.1 min

Primary = 3.28 cfs @ 15.58 hrs, Volume= 2.034 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 83.97' @ 15.58 hrs Surf.Area= 68,570 sf Storage= 175,386 cf

Plug-Flow detention time= 283.5 min calculated for 2.034 af (36% of inflow)

Center-of-Mass det. time= 181.5 min ( 965.4 - 783.9 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 81.00' | 718,507 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 81.00               | 49,980               | 0                         | 0                         |
| 82.00               | 55,620               | 52,800                    | 52,800                    |
| 84.00               | 68,740               | 124,360                   | 177,160                   |
| 86.00               | 85,942               | 154,682                   | 331,842                   |
| 88.00               | 97,175               | 183,117                   | 514,959                   |
| 90.00               | 106,373              | 203,548                   | 718,507                   |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 82.00' | <b>8.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 82.77' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #5     | Device 1 | 84.20' | <b>4.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)<br>0.5' Crest Height  |
| #6     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=3.28 cfs @ 15.58 hrs HW=83.97' (Free Discharge)

- 1=Culvert (Passes 3.28 cfs of 10.57 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 0.70 cfs @ 8.07 fps)
- 3=Orifice/Grate (Orifice Controls 2.15 cfs @ 6.17 fps)
- 4=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.90 fps)
- 5=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)
- 6=Sharp-Crested Rectangular Weir ( Controls 0.00 cfs)

### Summary for Pond C1: AMANDA'S WAY

Inflow Area = 18.600 ac, 13.58% Impervious, Inflow Depth > 3.09" for 100-yr event  
 Inflow = 34.98 cfs @ 12.59 hrs, Volume= 4.788 af  
 Outflow = 34.06 cfs @ 12.68 hrs, Volume= 4.788 af, Atten= 3%, Lag= 5.0 min  
 Primary = 34.06 cfs @ 12.68 hrs, Volume= 4.788 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 108.08' @ 12.68 hrs Surf.Area= 1,987 sf Storage= 2,805 cf

Plug-Flow detention time= 0.5 min calculated for 4.788 af (100% of inflow)  
 Center-of-Mass det. time= 0.5 min ( 824.8 - 824.3 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 103.50' | 38,020 cf     | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 103.50              | 10                   | 0                         | 0                         |
| 106.00              | 331                  | 426                       | 426                       |
| 108.00              | 1,889                | 2,220                     | 2,646                     |
| 110.00              | 4,295                | 6,184                     | 8,830                     |
| 112.00              | 7,099                | 11,394                    | 20,224                    |
| 114.00              | 10,697               | 17,796                    | 38,020                    |

| Device | Routing | Invert  | Outlet Devices  |
|--------|---------|---------|---|
| #1     | Primary | 103.50' | <b>30.0" Round Culvert</b><br>L= 75.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 103.50' / 100.00' S= 0.0467 ' S= 0.0467 ' Cc= 0.900<br>n= 0.025 Corrugated metal, Flow Area= 4.91 sf |

**Primary OutFlow** Max=34.00 cfs @ 12.68 hrs HW=108.07' (Free Discharge)

↑**1=Culvert** (Inlet Controls 34.00 cfs @ 6.93 fps)

### Summary for Pond C2: AMANDA'S WAY

Inflow Area = 15.250 ac, 16.36% Impervious, Inflow Depth > 3.32" for 100-yr event  
 Inflow = 50.00 cfs @ 12.19 hrs, Volume= 4.219 af  
 Outflow = 43.19 cfs @ 12.27 hrs, Volume= 4.219 af, Atten= 14%, Lag= 4.9 min  
 Primary = 43.19 cfs @ 12.27 hrs, Volume= 4.219 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2  
 Peak Elev= 111.61' @ 12.27 hrs Surf.Area= 3,054 sf Storage= 5,127 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 0.5 min ( 798.7 - 798.2 )

| Volume | Invert  | Avail.Storage | Storage Description  |
|--------|---------|---------------|--|
| #1     | 105.00' | 6,414 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 105.00              | 10                   | 0                         | 0                         |
| 108.00              | 200                  | 315                       | 315                       |
| 110.00              | 1,196                | 1,396                     | 1,711                     |
| 112.00              | 3,507                | 4,703                     | 6,414                     |

| Device | Routing | Invert  | Outlet Devices   |
|--------|---------|---------|--|
| #1     | Primary | 105.00' | <b>30.0" Round Culvert</b><br>L= 63.0' CPP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 105.00' / 103.00' S= 0.0317 ' S= 0.0317 ' Cc= 0.900<br>n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf |

**Primary OutFlow** Max=43.01 cfs @ 12.27 hrs HW=111.56' (Free Discharge)

↑1=Culvert (Inlet Controls 43.01 cfs @ 8.76 fps)

### Summary for Pond C3: Stream Crossing #1

Inflow Area = 67.259 ac, 10.82% Impervious, Inflow Depth > 3.32" for 100-yr event  
 Inflow = 136.97 cfs @ 12.42 hrs, Volume= 18.614 af  
 Outflow = 132.58 cfs @ 12.51 hrs, Volume= 18.591 af, Atten= 3%, Lag= 5.6 min  
 Primary = 132.58 cfs @ 12.51 hrs, Volume= 18.591 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 76.73' @ 12.51 hrs Surf.Area= 16,761 sf Storage= 31,190 cf

Plug-Flow detention time= 3.0 min calculated for 18.529 af (100% of inflow)  
 Center-of-Mass det. time= 2.5 min ( 815.4 - 812.9 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 70.00' | 121,182 cf    | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 70.00               | 10                   | 0                         | 0                         |
| 72.00               | 395                  | 405                       | 405                       |
| 74.00               | 3,864                | 4,259                     | 4,664                     |
| 76.00               | 12,171               | 16,035                    | 20,699                    |
| 78.00               | 24,830               | 37,001                    | 57,700                    |
| 80.00               | 38,652               | 63,482                    | 121,182                   |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 72.00' | <b>72.0" W x 48.0" H Box Culvert</b><br>L= 65.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 72.00' / 71.90' S= 0.0015 ' S= 0.0015 ' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 24.00 sf |

**Primary OutFlow** Max=132.38 cfs @ 12.51 hrs HW=76.72' (Free Discharge)

↑1=Culvert (Barrel Controls 132.38 cfs @ 6.23 fps)

### Summary for Pond C4: Stream Crossing #3

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 3.37" for 100-yr event  
 Inflow = 48.48 cfs @ 12.28 hrs, Volume= 4.752 af  
 Outflow = 48.46 cfs @ 12.29 hrs, Volume= 4.752 af, Atten= 0%, Lag= 0.6 min  
 Primary = 48.46 cfs @ 12.29 hrs, Volume= 4.752 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 93.15' @ 12.29 hrs Surf.Area= 726 sf Storage= 648 cf

Plug-Flow detention time= 0.1 min calculated for 4.736 af (100% of inflow)  
 Center-of-Mass det. time= 0.1 min ( 799.3 - 799.2 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 5,935 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 30                   | 0                         | 0                         |
| 92.00               | 220                  | 125                       | 125                       |
| 93.00               | 625                  | 423                       | 548                       |
| 94.00               | 1,304                | 965                       | 1,512                     |
| 95.00               | 2,150                | 1,727                     | 3,239                     |
| 96.00               | 3,242                | 2,696                     | 5,935                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 90.78' | <b>60.0" W x 24.0" H Box Culvert</b><br>L= 75.0' RCP, mitered to conform to fill, Ke= 0.700<br>Inlet / Outlet Invert= 90.78' / 88.52' S= 0.0301 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 10.00 sf |

**Primary OutFlow** Max=48.33 cfs @ 12.29 hrs HW=93.14' (Free Discharge)

↑**1=Culvert** (Inlet Controls 48.33 cfs @ 4.83 fps)

### Summary for Pond C5: Stream Crossing #2

Inflow Area = 14.155 ac, 5.88% Impervious, Inflow Depth > 3.40" for 100-yr event  
 Inflow = 33.52 cfs @ 12.45 hrs, Volume= 4.008 af  
 Outflow = 33.53 cfs @ 12.45 hrs, Volume= 4.008 af, Atten= 0%, Lag= 0.0 min  
 Primary = 33.53 cfs @ 12.45 hrs, Volume= 4.008 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 94.26' @ 12.45 hrs Surf.Area= 101 sf Storage= 17 cf

Plug-Flow detention time= 0.0 min calculated for 4.008 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 810.9 - 810.9 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 94.00' | 8,050 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 94.00               | 25                   | 0                         | 0                         |
| 95.00               | 312                  | 169                       | 169                       |
| 96.00               | 1,535                | 924                       | 1,092                     |
| 97.00               | 3,670                | 2,603                     | 3,695                     |
| 98.00               | 5,041                | 4,356                     | 8,050                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 93.07' | <b>96.0" W x 24.0" H Box Culvert</b><br>L= 80.0' RCP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.07' / 91.71' S= 0.0170 '/' Cc= 0.900<br>n= 0.025 Stream, clean & straight, Flow Area= 16.00 sf |

**Primary OutFlow** Max=33.52 cfs @ 12.45 hrs HW=94.26' (Free Discharge)

↑**1=Culvert** (Inlet Controls 33.52 cfs @ 3.51 fps)

### Summary for Pond C6: New Culvert

Inflow Area = 0.944 ac, 22.03% Impervious, Inflow Depth > 4.25" for 100-yr event  
 Inflow = 4.34 cfs @ 12.13 hrs, Volume= 0.334 af  
 Outflow = 4.34 cfs @ 12.13 hrs, Volume= 0.334 af, Atten= 0%, Lag= 0.0 min  
 Primary = 4.34 cfs @ 12.13 hrs, Volume= 0.334 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.02' @ 12.13 hrs Surf.Area= 127 sf Storage= 2 cf

Plug-Flow detention time= 0.0 min calculated for 0.334 af (100% of inflow)  
 Center-of-Mass det. time= 0.0 min ( 777.7 - 777.7 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 91.00' | 2,175 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 91.00               | 112                  | 0                         | 0                         |
| 92.00               | 892                  | 502                       | 502                       |
| 93.00               | 2,453                | 1,673                     | 2,175                     |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 89.50' | <b>15.0" Round Culvert</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 89.50' / 89.20' S= 0.0060 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.41 cfs @ 12.13 hrs HW=91.02' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.41 cfs @ 3.59 fps)

### Summary for Pond C7: New Culvert

Inflow Area = 2.419 ac, 0.17% Impervious, Inflow Depth > 3.59" for 100-yr event  
 Inflow = 5.36 cfs @ 12.57 hrs, Volume= 0.723 af  
 Outflow = 4.97 cfs @ 12.70 hrs, Volume= 0.723 af, Atten= 7%, Lag= 8.0 min  
 Primary = 4.97 cfs @ 12.70 hrs, Volume= 0.723 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.76' @ 12.70 hrs Surf.Area= 1,824 sf Storage= 986 cf

Plug-Flow detention time= 1.5 min calculated for 0.721 af (100% of inflow)  
 Center-of-Mass det. time= 1.4 min ( 815.8 - 814.4 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 90.00' | 5,179 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 90.00               | 10                   | 0                         | 0                         |
| 91.00               | 324                  | 167                       | 167                       |
| 92.00               | 2,291                | 1,308                     | 1,475                     |
| 93.00               | 5,117                | 3,704                     | 5,179                     |

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 90.00' | <b>15.0" Round Culvert</b><br>L= 75.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 90.00' / 87.50' S= 0.0333 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.23 sf |

**Primary OutFlow** Max=4.97 cfs @ 12.70 hrs HW=91.76' (Free Discharge)

↑**1=Culvert** (Inlet Controls 4.97 cfs @ 4.05 fps)

### Summary for Pond CB12: CB 12

Inflow Area = 7.439 ac, 46.36% Impervious, Inflow Depth > 4.91" for 100-yr event  
 Inflow = 42.45 cfs @ 12.09 hrs, Volume= 3.042 af  
 Outflow = 42.45 cfs @ 12.09 hrs, Volume= 3.042 af, Atten= 0%, Lag= 0.0 min  
 Primary = 42.45 cfs @ 12.09 hrs, Volume= 3.042 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 97.74' @ 12.09 hrs

Flood Elev= 100.72'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 92.50' | <b>30.0" Round Culvert</b><br>L= 946.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 92.50' / 85.03' S= 0.0079 '/' Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=41.31 cfs @ 12.09 hrs HW=97.39' (Free Discharge)

↑**1=Culvert** (Barrel Controls 41.31 cfs @ 8.42 fps)

### Summary for Pond CB42A: CB 42A

Inflow Area = 3.143 ac, 47.18% Impervious, Inflow Depth > 4.91" for 100-yr event  
 Inflow = 18.50 cfs @ 12.07 hrs, Volume= 1.286 af  
 Outflow = 18.50 cfs @ 12.07 hrs, Volume= 1.286 af, Atten= 0%, Lag= 0.0 min  
 Primary = 18.50 cfs @ 12.07 hrs, Volume= 1.286 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 99.36' @ 12.07 hrs

Flood Elev= 101.94'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 96.83' | <b>24.0" Round Culvert</b><br>L= 280.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 96.83' / 95.33' S= 0.0054 '/ Cc= 0.900<br>n= 0.012, Flow Area= 3.14 sf |

**Primary OutFlow** Max=17.83 cfs @ 12.07 hrs HW=99.27' (Free Discharge)

↑**1=Culvert** (Barrel Controls 17.83 cfs @ 5.92 fps)

### Summary for Pond CB43: CB 43

Inflow Area = 1.502 ac, 57.66% Impervious, Inflow Depth > 5.10" for 100-yr event  
Inflow = 9.09 cfs @ 12.07 hrs, Volume= 0.638 af  
Outflow = 9.09 cfs @ 12.07 hrs, Volume= 0.638 af, Atten= 0%, Lag= 0.0 min  
Primary = 9.09 cfs @ 12.07 hrs, Volume= 0.638 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 101.51' @ 12.07 hrs

Flood Elev= 102.69'

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 98.91' | <b>18.0" Round Culvert</b><br>L= 395.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.91' / 96.94' S= 0.0050 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |

**Primary OutFlow** Max=8.75 cfs @ 12.07 hrs HW=101.36' (Free Discharge)

↑**1=Culvert** (Barrel Controls 8.75 cfs @ 4.95 fps)

### Summary for Pond DMH1: DMH1

Inflow Area = 10.518 ac, 45.91% Impervious, Inflow Depth > 4.90" for 100-yr event  
Inflow = 58.36 cfs @ 12.09 hrs, Volume= 4.299 af  
Outflow = 58.36 cfs @ 12.09 hrs, Volume= 4.299 af, Atten= 0%, Lag= 0.0 min  
Primary = 58.36 cfs @ 12.09 hrs, Volume= 4.299 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 92.27' @ 12.09 hrs

Flood Elev= 102.51'

| Device | Routing | Invert | Outlet Devices   |
|--------|---------|--------|--|
| #1     | Primary | 84.93' | <b>30.0" Round Culvert</b><br>L= 55.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 84.93' / 84.00' S= 0.0169 '/ Cc= 0.900<br>n= 0.012, Flow Area= 4.91 sf |

**Primary OutFlow** Max=57.54 cfs @ 12.09 hrs HW=92.11' (Free Discharge)

↑**1=Culvert** (Inlet Controls 57.54 cfs @ 11.72 fps)



**Summary for Pond P1: EXISTING POND W/OCS**

Inflow Area = 24.950 ac, 31.44% Impervious, Inflow Depth > 4.51" for 100-yr event  
 Inflow = 79.65 cfs @ 12.11 hrs, Volume= 9.382 af  
 Outflow = 12.13 cfs @ 13.37 hrs, Volume= 4.717 af, Atten= 85%, Lag= 75.8 min  
 Primary = 12.13 cfs @ 13.37 hrs, Volume= 4.717 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 85.07' @ 13.37 hrs Surf.Area= 77,956 sf Storage= 255,753 cf

Plug-Flow detention time= 220.9 min calculated for 4.716 af (50% of inflow)  
 Center-of-Mass det. time= 135.6 min ( 914.0 - 778.3 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 81.00'               | 718,507 cf                | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 81.00               | 49,980               | 0                         | 0  |
| 82.00               | 55,620               | 52,800                    | 52,800   |
| 84.00               | 68,740               | 124,360                   | 177,160  |
| 86.00               | 85,942               | 154,682                   | 331,842  |
| 88.00               | 97,175               | 183,117                   | 514,959  |
| 90.00               | 106,373              | 203,548                   | 718,507  |

| Device | Routing  | Invert | Outlet Devices   |
|--------|----------|--------|--|
| #1     | Primary  | 81.00' | <b>18.0" Round Culvert</b><br>L= 305.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 81.00' / 79.00' S= 0.0066 ' / ' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf |
| #2     | Device 1 | 81.00' | <b>4.0" Vert. Orifice/Grate</b> C= 0.600   |
| #3     | Device 1 | 81.75' | <b>6.0" Vert. Orifice/Grate</b> C= 0.600   |
| #4     | Device 1 | 84.20' | <b>4.0' long x 0.40' rise Sharp-Crested Rectangular Weir</b><br>2 End Contraction(s)   |
| #5     | Device 1 | 84.60' | <b>6.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)   |

**Primary OutFlow** Max=12.13 cfs @ 13.37 hrs HW=85.07' (Free Discharge)

- 1=Culvert (Barrel Controls 12.13 cfs @ 6.86 fps)
- 2=Orifice/Grate (Passes < 0.83 cfs potential flow)
- 3=Orifice/Grate (Passes < 1.66 cfs potential flow)
- 4=Sharp-Crested Rectangular Weir (Passes < 6.28 cfs potential flow)
- 5=Sharp-Crested Rectangular Weir (Passes < 6.25 cfs potential flow)

**Summary for Pond POI 1: PROPERTY BOUNDARY**

Inflow Area = 17.126 ac, 10.85% Impervious, Inflow Depth > 3.70" for 100-yr event  
 Inflow = 26.97 cfs @ 12.78 hrs, Volume= 5.278 af  
 Primary = 26.97 cfs @ 12.78 hrs, Volume= 5.278 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2: POI**

Inflow Area = 69.028 ac, 10.79% Impervious, Inflow Depth > 3.31" for 100-yr event  
Inflow = 135.39 cfs @ 12.53 hrs, Volume= 19.060 af  
Primary = 135.39 cfs @ 12.53 hrs, Volume= 19.060 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2A: PROPERTY BOUNDARY**

Inflow Area = 23.868 ac, 12.69% Impervious, Inflow Depth > 3.16" for 100-yr event  
Inflow = 37.62 cfs @ 12.62 hrs, Volume= 6.286 af  
Primary = 37.62 cfs @ 12.62 hrs, Volume= 6.286 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2B: PROPERTY BOUNDARY**

Inflow Area = 16.935 ac, 15.65% Impervious, Inflow Depth > 3.36" for 100-yr event  
Inflow = 48.33 cfs @ 12.31 hrs, Volume= 4.748 af  
Primary = 48.33 cfs @ 12.31 hrs, Volume= 4.748 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 2C: PROPERTY BOUNDARY**

Inflow Area = 16.473 ac, 5.87% Impervious, Inflow Depth > 3.48" for 100-yr event  
Inflow = 37.60 cfs @ 12.46 hrs, Volume= 4.779 af  
Primary = 37.60 cfs @ 12.46 hrs, Volume= 4.779 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 3: PROPERTY BOUNDARY**

Inflow Area = 27.281 ac, 29.14% Impervious, Inflow Depth > 2.41" for 100-yr event  
Inflow = 14.68 cfs @ 12.85 hrs, Volume= 5.477 af  
Primary = 14.68 cfs @ 12.85 hrs, Volume= 5.477 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 4: PROPERTY BOUNDARY**

Inflow Area = 2.525 ac, 50.69% Impervious, Inflow Depth > 4.57" for 100-yr event  
Inflow = 12.89 cfs @ 12.11 hrs, Volume= 0.963 af  
Primary = 12.89 cfs @ 12.11 hrs, Volume= 0.963 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 5: POI**

Inflow Area = 0.228 ac, 8.77% Impervious, Inflow Depth > 2.18" for 100-yr event  
 Inflow = 0.46 cfs @ 12.22 hrs, Volume= 0.041 af  
 Primary = 0.46 cfs @ 12.22 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond POI 6: POI**

Inflow Area = 2.240 ac, 27.41% Impervious, Inflow Depth > 3.83" for 100-yr event  
 Inflow = 9.10 cfs @ 12.15 hrs, Volume= 0.715 af  
 Primary = 9.10 cfs @ 12.15 hrs, Volume= 0.715 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Pond UD1: UD Filter**

Inflow Area = 0.953 ac, 66.53% Impervious, Inflow Depth > 5.41" for 100-yr event  
 Inflow = 5.95 cfs @ 12.07 hrs, Volume= 0.430 af  
 Outflow = 5.68 cfs @ 12.10 hrs, Volume= 0.365 af, Atten= 5%, Lag= 1.8 min  
 Primary = 5.68 cfs @ 12.10 hrs, Volume= 0.365 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 85.09' @ 12.10 hrs Surf.Area= 3,054 sf Storage= 3,563 cf

Plug-Flow detention time= 86.0 min calculated for 0.365 af (85% of inflow)  
 Center-of-Mass det. time= 40.7 min ( 786.9 - 746.1 )

| Volume | Invert | Avail.Storage | Storage Description  |
|--------|--------|---------------|--|
| #1     | 83.50' | 7,878 cf      | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |

| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 83.50               | 1,679                | 0                         | 0                         |
| 84.00               | 2,032                | 928                       | 928                       |
| 85.00               | 2,724                | 2,378                     | 3,306                     |
| 86.00               | 6,421                | 4,573                     | 7,878                     |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 84.80' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=5.65 cfs @ 12.10 hrs HW=85.09' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 5.65 cfs @ 1.31 fps)

**Summary for Pond UD2: UD Filter**

Inflow Area = 1.522 ac, 33.05% Impervious, Inflow Depth > 4.79" for 100-yr event  
 Inflow = 8.45 cfs @ 12.10 hrs, Volume= 0.608 af  
 Outflow = 7.56 cfs @ 12.14 hrs, Volume= 0.540 af, Atten= 10%, Lag= 2.7 min  
 Primary = 7.56 cfs @ 12.14 hrs, Volume= 0.540 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 81.45' @ 12.14 hrs Surf.Area= 6,129 sf Storage= 4,568 cf

Plug-Flow detention time= 64.8 min calculated for 0.538 af (89% of inflow)  
 Center-of-Mass det. time= 29.5 min ( 793.4 - 763.9 )

| Volume              | Invert               | Avail.Storage             | Storage Description  |
|---------------------|----------------------|---------------------------|--|
| #1                  | 80.00'               | 9,035 cf                  | <b>Custom Stage Data (Prismatic)</b> Listed below (Recalc) |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Inc.Store<br>(cubic-feet) | Cum.Store<br>(cubic-feet)                                  |
| 80.00               | 2,061                | 0                         | 0  |
| 81.00               | 3,000                | 2,531                     | 2,531  |
| 82.00               | 10,008               | 6,504                     | 9,035  |

| Device | Routing | Invert | Outlet Devices  |
|--------|---------|--------|---|
| #1     | Primary | 81.10' | <b>15.0' long x 6.0' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50 3.00 3.50 4.00 4.50 5.00 5.50<br>Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65<br>2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83 |

**Primary OutFlow** Max=7.48 cfs @ 12.14 hrs HW=81.44' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 7.48 cfs @ 1.45 fps)

## **ATTACHMENT G**

### **Maintenance of Common Facilities or Property**

***(Omitted)***



Stantec Consulting Services Inc.  
482 Payne Road Scarborough Court, Scarborough ME 04074-8929

July 30, 2018

Ms. Carla Nixon, Town Planner  
Town of Cumberland  
290 Tuttle Road  
Cumberland, Maine 04021

**Subject: Village Green  
4th Amended Subdivision Submission  
Phase 4 Property  
Letter of Response #2 to Planning Staff Review Comments**

Dear Ms. Nixon:

On behalf of Village Green Cumberland LLC and George and Constance Russell, our office has received and reviewed your Pre-Review Planning Comments sent via email on May 23, 2018 for the above referenced project. For ease of reference, we have repeated the comments in *italics* followed by our responses in **bold**.

Comment 1:

*Where is the landscaping plan?*

Response:

The accompanying plan provides a landscape layout of trees along the proposed Brackett Lane.

Comment 2:

*On plan sheet C-10.1 which road section applies?*

Response:

The proposed road section will follow both typical sections identified as the "Typical Roadway Section Private Drive – with and without curb". These sections show a consistent Section of 3.5" of Hot Bituminous Asphalt pavement, 3" aggregate base course, MaineDOT Type A and 12" aggregate Subbase course, MaineDOT Type D. A portion of the private drive will contain an open ditch section and a portion will contain a curbed section that will aid with directing road runoff to several catch basins and a closed pipe drainage system that will connect to the existing drainage system in Bradbury Way. The Bradbury Way system ultimately connects to the overall development drainage system that discharges into the wetpond. Stantec has provided various informational evidence to the MaineDEP regarding the pond, as contained in the attached correspondence, that



Ms. Carla Nixon  
July 30, 2018  
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we now provide to the Town for your records. We believe we have adequately shown that the existing wetpond is sufficiently sized to provide the flood control and water quality treatment functions for the additional area from the Russell site, to achieve compliance with the MaineDEP Chapter 500 regulations.

Comment 3:

*Is there to be a sidewalk? Width? Esplanade? Street lighting?*

**Response:**

Consistent with the existing private drives of Reid Lane and Baxter Lane, which serve 6 and 4 houses respectively there will be no sidewalk for the proposed Brackett Lane private drive. There is no street lighting proposed either.

Comment 4:

*Is there a new hydrant for this phase? Has the Fire Chief ok'd the plan?*

**Response:**

Also similar to Reid Lane and Baxter Lane, there is no fire hydrant proposed for the Brackett Lane private drive. There is an existing fire hydrant in front of Lot 57 along Bradbury Drive, near the proposed Brackett Lane intersection. We will communicate with the Fire Department to finalize their acceptance of these proposed conditions.

Comment 5:

*Are there to be sprinklers in the homes? If so, show note on plan.*

**Response:**

The homes are not intended to have a sprinkler system. We are not aware that this is a requirement and we have been informed that other homes in the development are not supplied with residential sprinkler systems.

Comment 6:

*Add note re: plan must be recorded within 90 days of pb approval or void.*



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**Response:**

A note indicating the requirement for recording of the Amended Subdivision Plan has been added to the drawing as Note 19 within the General Notes.

**Comment 7:**

*In the PWD letter there is a reference to six lots. Why is this?*

**Response:**

There had been an earlier concept plan that included a layout for 6 residential lots at the time of an initial inquiry to PWD. That was later revised to 4 lots.

**Comment 8:**

*In the stormwater mgmt. report on p. 12-2 there is a reference to this being the "last" phase of the village green dev which includes three phases of dev. This is phase 4. Phase 1 was the first phase of houses, Phase 3 was the senior housing apartments, Phase 2 will be the Public Works land and this is phase 4, as I understand it. Please make sure the stormwater report clearly addresses the development as it has and will be constructed.*

**Response:**

We apologize for the minor confusion within the report text, as the intent was to simply update the original development Stormwater Management Report narrative for the current proposal that adds the four new lots on the Russell property. We are aware that the Town will pursue additional activity on the Public Works land in the future and as we understand it the stormwater management systems in place have been designed and constructed to handle future stormwater conditions. We have shown in the accompanying information sent to the MaineDEP that the existing wetpond can satisfactorily accept stormwater runoff from the proposed private drive and 4 new houses lots to achieve compliance with the MaineDEP Chapter 500 Stormwater Management Regulations.

**Comment 9:**

*Still need right, title or interest evidence.*





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July 30, 2018  
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**Response:**

The accompanying Deed and Memorandum of Purchase and Sale Agreement is provided for the Town's records.

**Comment 10:**

*Still need MDEP approval.*

**Response:**

We continue to await the MaineDEP's final review and permit issuance and will provide an update to their status as soon as possible.

If you have any questions with regards to the information submitted, please contact our office.

Sincerely,

**STANTEC CONSULTING SERVICES INC.**

Stephen R. Bushey, P.E.  
Associate  
Phone: 207-887-3478  
Fax: 207-887-3376  
stephen.bushey@stantec.com

Attachments: MaineDEP Correspondence (LOR 2 & LOR 3)  
Revised Plan & Profile Sheet  
Phase 4 Landscape Plan  
4<sup>th</sup> Amended Subdivision Plan

c: Nathan Bateman

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## ATTACHMENTS

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Stantec Consulting Services Inc.  
482 Payne Road Scarborough Court, Scarborough ME 04074-8929

June 21, 2018

**Ms. Christine Woodruff**

Maine Department of Environmental Protection  
312 Canco Road  
Portland, Maine 04103

**Subject: Russell Property Subdivision  
MaineDEP #L-25376-L3-A-N/L-25376-TE-B-N/L-25376-L6-C-N  
Co-Applicant's: Village Green Cumberland, LLC and George & Constance Russell  
Letter of Response #2**

Dear Christine:

Our office has prepared the following supplemental material for the Site Location of Development Permit Application as requested at our recent meeting on June 12, 2018. For ease of review, we have included the title headings for the Site Location of Development Permit Application and an explanation of the material submitted. As discussed, we understand that you will accept previously submitted material for the original Village Green project.

### **Section 1 – Project Description**

Previously submitted.

### **Section 2 – Title, Right or Interest**

The proposed project to add four new residential lots and one existing residential dwelling/ lot to the Village Green Subdivision will be undertaken on existing Lots 1B on Tax Assessor's Map 10 in the Town of Cumberland. The Russell parcel is 5.72± acres in size and is owned by George and Constance Russell per CCRD Book 16675, Page 235. A copy of the property deed for Lot 1B is included in Attachment A.

The existing Russell residence will also become accessed from a new driveway and their access (by easement) from Amanda's Way will be discontinued. This land division and amendment to the Village Green development was previously approved by the Town of Cumberland by an Amended Contract Zoning Agreement earlier this year recorded at CCRD Book 33894, Page 280. This is included in Attachment A.

The accompanying Memorandum of Purchase and Sale Agreement between the parties serve as evidence of title, right or interest is included in Attachment A.

In addition, the accompanying General Declaration of Covenants and Restrictions for the Village Green Development (CCRD Book 29298, page 73) will apply to the four proposed lots. The association voted in favor of adding the four lots, and once the subdivision is approved by the Town, the Declaration will be amended to include the new lots.

### **Section 3 – Financial Capacity**

Please see the accompanying letter from Norway Savings Bank included in Attachment B as evidence of the applicant's financial capacity to complete the project.



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Page 2

#### **Section 4 – Technical Ability**

The applicant and its consultants have the technical ability to develop the project in a manner consistent with State environmental standards, including applicable provisions of the Site Law. Stantec is the primary consultant involved with the civil/site design and site permitting of the project and has assembled the materials in this application. The following firms are acting as consultants to the project:

| <b>Firm</b>  | <b>Services</b>          | <b>Contact</b>                                     |
|--|--------------------------|--|
| Stantec<br>482 Payne Road<br>Scarborough, ME 04074<br>207.883.3355             | Civil Site Engineering   | Stephen Bushey, P.E.<br>stephen.bushey@stantec.com |
| Titcomb Associates<br>133 Gray Road<br>Falmouth, ME 04105<br>207.797.9199      | Surveyor                 | Nick Elliston, PLS<br>nelliston@titcombsurvey.com  |
| Albert Frick Associates<br>95A County Road<br>Gorham, ME 04038<br>207.839.5563 | Environmental Consultant | Chris Coppi  |

Resumes of Steve Bushey, P.E. as well as the other consultants retained for the project can also be provided upon request.

#### **Section 5 – Noise**

The proposed project is a “development producing a minor noise impact”. Because the project is solely residential, the MaineDEP Regulations do not require a full noise study. The project is located adjacent similar housing developments. These developments emit regular and continuous operational noise. The noise generated by the proposed project is anticipated to be minor in nature and consistent with applicable municipal ordinances and zoning. The noise generated during construction of the project generally will be limited to normal working hours 7:00 AM to 7:00 PM. The noise associated with the development will be limited to noise generated by traffic, pedestrians, and mechanical equipment, etc. The noise generation will be compatible with the surrounding area and is considered insignificant development producing a minor noise impact.

#### **Section 6 – Visual Quality & Scenic Character**

The project is subject to the provisions of the existing Contract Zone Agreement adopted by the Town of Cumberland for the entire Village Green project, which includes strict standards for the development as well as provisions for public access and maintenance of the public open space areas.

The layout of the Russell property has been designed to preserve the open space area along the southeast side of the project that abuts directly to the “Town Forest” and trail system. Per the approved Contract Zone agreement, the following buffers shall be maintained:



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- a. A 75 foot wide buffer between the project boundary line that abuts the Cumberland Common residential lots and the proposed new residential Lots 60 and 61 as shown on the Amended Subdivision plan and Site plan. Of the 75 foot wide buffer, 50 feet shall remain natural and undisturbed and 25 feet shall be vegetated.
- b. A 40 foot wide setback along the boundary line of the Phase 4 property that abuts the Town civic lot, behind proposed residential lots 59 and 60 as shown on the Amended Subdivision plan.

A minimum 25' grading and clearing setback will be maintained to the tributaries within the existing natural swales except at the crossing point.

### **Section 7 – Wildlife & Fisheries**

The Maine Inland Fisheries & Wildlife and the US Fish & Wildlife was contacted for the original Village Green project. It was found that no threatened or endangered species were known to occur in the project area. A copy of this correspondence is included in Attachment C to this submission.

### **Section 8 – Historic Sites**

The Maine Historic Preservation Office was contacted for the original Village Green project. It was found that no historic properties were known to occur in the project area. A copy of this correspondence is included in Attachment D to this submission.

### **Section 9 – Unusual Natural Areas**

The Maine Natural Areas Program was contacted for the original Village Green project. It was found that no Rare and Exemplary features were known to occur in the project area. A copy of this correspondence is included in Attachment E to this submission.

### **Section 10 – Buffers**

Upon our investigation of the site conditions with you on June 15, 2018, we have updated the plan to maintain a minimum 25-foot access road setback from the drainage tributaries located within the existing swales located within the Russell Property. The proposed lots have been designed to maintain a 75' setback from the tributary limits within the swales.

### **Section 11 – Soils**

A Class A Soil Survey was conducted by Albert Frick Associates Inc. over the Russell Property. A copy of the soil survey information is contained in Attachment F.

### **Section 12 – Stormwater Management**

The project has been designed in accordance with the Site Location of Development Act and Stormwater Law (Chapter 500), which requires water quality treatment for **90%** of new impervious areas and **75%** of new developed areas.<sup>1</sup>

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<sup>1</sup> See reference to Chapter 500 Table 1 of Part 4.C.2.a.iii. The primary treatment for the four new house lots on the Russell property will be roof line drip edges. A closed drainage system will collect runoff from the access drive, driveways and parts of the front yards and convey runoff to the existing development wet pond.



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The design employs one wet pond, two underdrained soil filter basins, and roofline drip edge filters to achieve stormwater quality treatment standards. All BMPs were designed in accordance with the latest version of the Maine Department of Environmental Protection BMPs Technical Design Manual.

The proposed design provides for treatment of 93.9% of new impervious areas within the Russell Property and 75.6% of new developed areas within the Russell Property. Water quality computations are provided in Attachment G.

The following is a summary of the Post Development Peak discharges considering the Russell Property 4 lot proposal, at the various Points of interest:

| <b>2018.06.21 Post-Development Peak Runoff Flow Rates</b> |                    |                |                |
|---|--------------------|----------------|----------------|
| <b>Peak Discharge (cfs)</b>                               |                    |                |                |
|   | <b>2-Year</b>      | <b>10-Year</b> | <b>25-Year</b> |
| POI #1  | 5.78               | 14.41          | 19.31          |
| POI #2  | 27.10 <sup>2</sup> | 73.05          | 97.08          |
| POI #2A   | 7.40               | 20.88          | 27.85          |
| POI #2B   | 11.20              | 29.44          | 38.10          |
| POI #2C   | 8.22               | 20.79          | 27.35          |
| POI #3  | 2.41               | 5.49           | 7.02           |
| POI #4  | 4.10               | 8.08           | 10.00          |
| POI #5  | 0.04               | 0.20           | 0.29           |
| POI #6  | 2.29               | 5.27           | 6.78           |

A comparison of the predevelopment peak flow rates to the post development peak flow rates at the identified points of interest is a means to determine the effect that the proposed development will have on downstream properties and channels. The pre and post development peak rates of runoff for the 2-year, 10-year, and 25-year storm events at the identified points of interest is presented below.

| <b>2018.06.21 Comparison of Pre-Development and Post-Development Peak Flow Rates</b> |               |             |                |             |                |             |
|--|---------------|-------------|----------------|-------------|----------------|-------------|
| <b>Peak Discharge (cfs)</b>  |               |             |                |             |                |             |
| <b>Point of Interest</b>   | <b>2-Year</b> |             | <b>10-Year</b> |             | <b>25-Year</b> |             |
|  | <b>Pre</b>    | <b>Post</b> | <b>Pre</b>     | <b>Post</b> | <b>Pre</b>     | <b>Post</b> |
| POI #1   | 6.59          | 5.78        | 16.04          | 14.41       | 20.93          | 19.31       |
| POI #2   | 32.02         | 27.10       | 84.10          | 73.05       | 108.56         | 97.08       |
| POI #2A  | 7.39          | 7.40        | 20.90          | 20.88       | 27.90          | 27.85       |
| POI #2B  | 12.29         | 11.20       | 31.99          | 29.44       | 42.04          | 38.10       |
| POI #2C  | 11.73         | 8.22        | 29.18          | 20.79       | 38.26          | 27.35       |
| POI #3   | 2.87          | 2.41        | 6.61           | 5.49        | 8.51           | 7.02        |
| POI #4   | 13.79         | 4.10        | 27.75          | 8.08        | 34.52          | 10.00       |
| POI #5   | 0.06          | 0.04        | 0.26           | 0.20        | 0.38           | 0.29        |
| POI #6   | 2.75          | 2.29        | 5.89           | 5.27        | 7.44           | 6.78        |

<sup>2</sup> The HydroCAD calculations have been rerun for the inclusion of the four lots on the Russell property and the development of the Private drive to access those lots. The calculations reflect adjustments to Subarea 20C from the previously approved analysis and the addition of a new subarea 26C that covers that portion of the new private drive and driveways that will drain to a new closed drainage system for conveyance to the wetpond 1 for water quality treatment purposes and flood control. The findings are that there is no significant change in peak discharge at all Points of Interest.



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As indicated by the above table, post development peak rates of runoff for the design storm events are expected to be below the predevelopment peak flow rates at all identified points of interest except POI 2A for the 2 year storm which we consider insignificant.

#### Maintenance of Common Facilities

The four additional lots will become part of the Homeowners Association and the Declaration of Covenants and Restrictions will apply (refer to document in Attachment A).

**Section 13 – Urban Impaired Stream** – Not applicable.

#### **Section 14 – Basic Standards Submission (Erosion & Sedimentation Control)**

The proposed plan and profile sheet includes erosion control measures to be implemented during the course of construction. The applicant intends to use the same contractor, A.H. Grover and Sons to complete the private drive and basic infrastructure work. All details and written narrative supporting the original basic standards submission remains applicable to the current work.

#### **Section 15 – Groundwater**

The proposed project does not involve any onsite subsurface wastewater disposal systems nor new onsite wells for water supply. The Portland Water District has provided the accompanying letter in Attachment H as evidence of their ability to provide public water and wastewater systems to serve the new lots. Thus, no impacts to the existing groundwater regime in the site vicinity is anticipated.

#### **Section 16 – Water Supply**

The proposed project does not involve any onsite subsurface wastewater disposal systems nor new onsite wells for water supply. The Portland Water District has provided the accompanying letter in Attachment H as evidence of their ability to provide public water and wastewater systems to serve the new lots.

#### **Section 17 – Wastewater Disposal**

The proposed project does not involve any onsite subsurface wastewater disposal systems nor new onsite wells for water supply. The Portland Water District has provided the accompanying letter in Attachment H as evidence of their ability to provide public water and wastewater systems to serve the new lots.

#### **Section 18 – Solid Waste**

The majority of the project site is undeveloped forest land. The following volumes of solid waste associated with the construction of the access roads and lot development have been estimated:

#### Access Roads and Utility Infrastructure Improvements:

- 200 cubic yards of stumps and grubblings



Ms. Christine Woodruff  
June 21, 2018  
Page 6

#### Lot Development

- 200 cubic yards of stumps and grubblings
- 25 cubic yards of construction debris
- 9 cubic yards per month of solid waste

The computations included in Attachment I provide a detailed breakdown of the anticipated solid waste generation for this project.

#### Section 19 – Flooding

The project site has been depicted graphically on a portion of the FEMA Flood Insurance Rate Map which was previously supplied as Figure 7 in the original application. As shown on this figure, the project site is located entirely outside the defined areas of 100-year flood.

A stormwater management analysis has been conducted for predevelopment and post-development conditions for the 2, 10, 25 and 100-year storm events. The amended stormwater management analysis contained in Section 12 of this application shows the proposed development and 4 additional house lots will not result in any downstream flooding.

**Sections 20-25:** Not applicable to the application.

#### Summary:

We have provided the supplemental information related to the proposal to add four residential lots to the Village Green Subdivision. In addition, we have updated the site plan based on the findings and discussions from the June 15, 2018 site visit. This letter includes a Permit by Rule Application for the tributary crossing, as we discussed. As a result, the overall wetland impact subject to the In-Lieu fee will be 734 SF which translates to a calculated fee amount of \$3,156.20.

For ease of review, a list of attachments are as follows:

| Attachment | Section Reference                                  | Description  |
|------------|--|--|
| A          | Title, Right or Interest                           | Deed and Access Easement<br>Memorandum of Purchase & Sale Agreement<br>General Declaration of Covenants & Restrictions |
| B          | Financial Capacity                                 | Letter from Norway Savings   |
| C          | Wildlife & Fisheries                               | Maine Inland Fisheries & Wildlife;<br>US Fish & Wildlife Correspondence  |
| D          | Historic Sites                                     | Maine Historic Preservation Correspondence   |
| E          | Unusual Natural Areas                              | Maine Natural Areas Program Correspondence   |
| F          | Soils  | Class A Soil Survey Prepared by Albert Frick Associates Inc.   |
| G          | Stormwater Management                              | Water Quality Computations   |
| H          | Groundwater<br>Water Supply<br>Wastewater Disposal | PWD Correspondence   |
| I          | Solid Waste  | Solid Waste Computations   |
| J          | Permit by Rule Application                         |  |





Ms. Christine Woodruff  
June 21, 2018  
Page 7

We trust this information satisfies your current informational needs and will allow you to process and approve the application. We are seeking to appear before the Cumberland Planning Board at their July 17, 2018 meeting. To be placed on their agenda they will need confirmation from your office as to your acceptance and approval of the application no later than June 29<sup>th</sup>, thus we respectfully request that you contact the Town Planner, Carla Nixon, (207-829-2206), as soon as possible to indicate your status on the review. We understand that the permit order may require some additional time for drafting and signatures, however your communication to the Town Planner would be critical to allow us to appear before the Planning Board in July.

If you have any questions with regards to the information submitted, please contact our office.

Sincerely,

**STANTEC CONSULTING SERVICES INC.**

Stephen R. Bushey, P.E.  
Associate  
Phone: 207-887-3478  
stephen.bushey@stantec.com

Attachments: See List Above  
Updated Site Plan

c: Nathan Bateman

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## **ATTACHMENT A**

---

**Deed and Access Easement  
Memorandum of Purchase & Sale Agreement  
General Declaration of Covenants & Restrictions**

0065155

BK 16675 PG 235

STATUTORY WARRANTY DEED

MAINE REAL ESTATE TAX PAID

I, MARY A. LALUMIERE, of Cumberland, in the County of Cumberland and State of Maine,

For Consideration Paid, GRANT with WARRANTY COVENANTS TO:

GEORGE L. RUSSELL and CONSTANCE BISCHOF RUSSELL, whose mailing address is 144 Haskell Road, North Yarmouth, Maine 04097, as JOINT TENANTS

A certain lot or parcel of land situated in the Town of Cumberland, County of Cumberland and State of Maine and being Lot 2 as shown on "Amended Plan - Plan for a Private Way" by SYTDesign Consultants dated June 2001, as revised July 6, 2001 and recorded at Cumberland County Registry of Deeds in Plan Book 201, Page 327, containing 5.66 acres, as it may be amended to include a portion of the private way.

Also conveying herewith in common with others a right-of-way easement over Amanda's Way as shown on said Plan for all purposes of ingress and egress by pedestrians or vehicles and for the installation and maintenance of any and all utility lines, pipes, conduits and their appurtenant facilities, and said right-of-way area may be improved for any such purposes.

This conveyance is subject to and benefited by a certain Declaration of Maintenance of Private Way dated April 5, 2001 and recorded at the Cumberland County Registry of Deeds in Book 16175, Page 260, which Declaration erroneously stated the Plan was dated September 2000.

Being a portion of the premises conveyed to Grantor herein and Paul R. Lalumiere, Jr. by deed of Sandra S. Snow dated June 25, 1975 and recorded at the Cumberland County Registry of Deeds in Book 3702, Page 336. Reference is made to a deed from the said Paul R. Lalumiere, Jr. to Grantor herein dated December 31, 1987 and recorded at said Registry of Deeds in Book 8189, Page 178. Grantor has resided on said premises since 1975.

BK16675 PG236

This conveyance is made SUBJECT to the current real estate taxes to the Town of Cumberland subject to proration at the closing, which the Grantees herein by their acceptance of this deed hereby assume and agree to pay.

WITNESS my hand this 20 day of Aug., 2001.

L. H.

Mary A. Lalumiere  
Mary A. Lalumiere

STATE OF MAINE  
CUMBERLAND, SS.

Aug. 20, 2001

Then personally appeared the above-named MARY A. LALUMIERE and acknowledged the foregoing instrument to be her free act and deed.

Before me,

L. H.  
Attorney at Law/Notary Public

RECEIVED  
RECORDED REGISTRY OF DEEDS

2001 AUG 27 PM 2:19

CUMBERLAND COUNTY

John B O'Brien



**AMENDED AND RESTATED**  
**CONTRACT ZONING AGREEMENT**  
**BY AND BETWEEN THE TOWN OF CUMBERLAND**  
**AND**  
**VILLAGE GREEN CUMBERLAND, LLC**  
  
**RELATING TO PHASE 1 and PHASE 4 OF THE**  
**VILLAGE GREEN REVITALIZATION MASTER PLAN**

This Amended and Restated Contract Zoning Agreement is entered into this 22<sup>nd</sup> day of March, 2017 by and between the **Town of Cumberland**, a Municipal Corporation (the “**Town**”), and **Village Green Cumberland, LLC**, a Maine Limited Liability Company with a business address of PO Box 3572, Portland, ME 04104-3571, its nominee or assigns (the “**Developer**”), pursuant to the Conditional and Contract rezoning provisions set forth in 30-A M.R.S.A. Section 4352 (the “**Act**”) and Section 315-79 of the Cumberland Code, as amended (the “**Code**”).

WHEREAS, the Town and Developer entered into a Contract Zoning Agreement dated April 11, 2011, which is recorded at the Cumberland County Registry of Deeds in Book 28735, Page 158 (the “**Original Agreement**”); and

WHEREAS, the Town conveyed to the Developer the property subject to the Original Agreement, a 40.7 +/- acre parcel of unimproved real estate located between Drowne Road and Wyman Way, identified on the Town of Cumberland Tax Assessor map as Map U10, Lot 7B (the “**Original Property**”), by virtue of a Deed dated January 18, 2012, recorded in the Cumberland County Registry of Deeds in Book 29285, Page 284; and

WHEREAS, the Developer has begun developing the Original Property into a 59 lot residential subdivision, subject to the terms and conditions set forth in the Original Agreement and a subdivision plan as approved by the Cumberland Planning Board on January 17, 2012, recorded in the Cumberland County Registry of Deeds in Plan Book 212, Page 18; and

WHEREAS, the Developer intends to expand the residential subdivision of the Original Property, subject to the terms and conditions set forth herein, to include additional residential lots on a 5.66 +/- parcel of real estate adjoining the Original Property, identified on the Town of Cumberland Tax Assessor map as Map U10, Lot 1B (the “**Phase 4 Property**”), which property is currently owned by George and Constance Russell by virtue of a Deed dated August 20, 2001, recorded in the Cumberland County Registry of Deeds in Book 16675, Page 235; and

WHEREAS, the Town and the Developer desire to amend and restate the Original Agreement in its entirety;

NOW THEREFORE, the Original Agreement is hereby amended and restated in its entirety, as follows, it being understood that this Amended and Restated Contract Zoning

Agreement supersedes and replaces the Original Agreement, which shall be of no further force and effect:

WHEREAS, the property subject to this Amended and Restated Contract Zoning Agreement consists of two separate parcels, the Original Property, a 40.7 +/- acre parcel of real estate located between Drowne Road and Wyman Way, identified on the Town's Tax Assessor map as MAP U10, Lot 7B, and the Phase 4 Property, a 5.66 +/- acre parcel of real estate located adjacent to the northern boundary of the Original Property, identified on the Town's Tax Assessor map as Map U10, Lot 1B, both properties consisting of 46.36 +/- acres total as more particularly shown on Exhibit A attached hereto (together hereinafter referred to as the "**Property**"); and

WHEREAS, the Original Property is located in the Village Mixed-Use Zone (VMUZ) District (the "**V-MUZ District**") located in Section 315-18 of the Cumberland Code; and

WHEREAS, the Phase 4 Property is located in the Rural Residential 1 (RR1) Zoning District (the "**RR1 Zoning District**") located in Section 315-6 of the Cumberland Code; and

WHEREAS, the Town desires to sell the property to generate tax revenue and stimulate further economic development in the town center as recommended by the 2009 Comprehensive Plan.

WHEREAS, the Developer has submitted an application for subdivision approval to the Cumberland Planning Board, in accordance with the subdivision plan attached hereto as Exhibit E; and

WHEREAS, in order for the Project to be financially feasible for the construction and sale of residential dwelling units while meeting all applicable codes, certain Amendments with respect to dimensional, design and certain other performance standards of the Cumberland Zoning Ordinance are required; and

WHEREAS, on May 23, 2016, the Cumberland Town Council approved the execution of this Amended and Restated Contract Zoning Agreement, subject to later compliance with the Subdivision and Site Plan Standards as set forth in Chapter 250 and Chapter 229, respectively, of the Cumberland Code, provided such provisions are not in conflict with the Act;

NOW THEREFORE, pursuant to the provisions of 30-A.M.R.S.A. § 4352(8) and Section 315-79 of the Code, as amended, the Cumberland Town Council hereby finds that this Amended and Restated Contract Zoning Agreement:

- A) is consistent with the Comprehensive Plan duly adopted by the Town of Cumberland on November 9, 2009; and
- B) establishes a contract zone area consistent with the existing and permitted uses in the original zone of the area involved; and

- C) only includes conditions and restrictions which relate to the physical development and future operation of the proposed development; and
- D) imposes those conditions and restrictions which are necessary and appropriate for the protection of the public health, safety and general welfare of the Town.

In furtherance of these common goals, the parties agree as follows:

I. **Establishment of the Contract Zone:**

The Town hereby agrees that the Property as described herein shall be a contract zone (the “**Contract Zone**”) pursuant to the provisions of 30-A.M.R.S.A. § 4352(8) and Section 315-79 of the Cumberland Code. This Agreement shall create an overlay zone. Except as expressly modified or otherwise stated herein, the Property shall be subject to the requirements of the V-MUZ District, as the same may be amended from time to time, together with all applicable lot requirements and general requirements, not modified herein.

II. **Permitted Uses Within the Contract Zone:**

The development permitted within the Contract Zone established herein shall be as follows:

A. All uses currently authorized either as permitted uses or special exceptions in the V-MUZ District, or as specifically authorized herein.

B. Up to four additional residential dwelling units may be constructed on the Phase 4 Property, not including the existing residential dwelling unit that currently exists on the Phase 4 Property and is currently occupied by the property owners George and Constance Russell.

III. **Restrictions and Certain Design Standards Within the Contract Zone:**

All restrictions as currently set forth in Section 315-79 of the Cumberland Code, except as modified herein and as appears on Exhibit C, attached hereto and made a part hereof.

IV. **Performance Standards Within the Contract Zone:**

The following performance standards shall apply to the Contract Zone (Phase 1 and Phase 4 of the VGRMP) as follows:

- A. The Recreation Facilities and Open Space Impact Fee Ordinance of the Town of Cumberland shall be waived in accordance with Article Section 137-10, Waiver of Impact Fee subject to the following provisions:
  - 137-6 Payment of Fees shall be modified as follows: the Developer shall submit to the Town a list of specific public



improvements with corresponding values for said improvements to be provided by each Phase of the approved Village Green Revitalization Master Plan (VGRMP). The public improvements shall include construction of a roadway from the existing terminus of Wyman Way, crossing the Property and connecting with Drowne Road. All public improvements provided in lieu of the impact fee for each Phase of the approved VGRMP shall be completed prior to the final release of bonds or letter of credit(s) required to secure all public improvements for each Development Phase. Performance guarantees, including Letters of Credit and bonds, shall include the value of the in lieu payments attributed to Public Improvements, even where the Public Improvements are to be located upon future Phases which may or may not be constructed.

- The public improvements provided for each Phase of the approved VGRMP will, at a minimum, equal the value of the impact fee(s) otherwise due as provided in 137-11 Calculation of Fee.
- All public improvements to be located within the adjacent “Civic Lot” (Map U10-A, Lot 13) provided by the Developer as part of this Agreement shall be in accordance with a Site Plan approved in advance by the Town.
- Certain areas within the parcel purchased from the Town (Map U10, Lot 7B) by the Developer shall be subject to an easement which allows for public use and recreation (see Exhibit D Plan of Open Space/Recreational Easements). The value of these easements for the purposes of 137-11 Calculation of Fees (Land for Public Use) shall be based on the total purchase price paid for said parcel, divided by the total acreage of the parcel multiplied by the acreage finally included within the easement area(s). Provided, however, that the Developer shall not be credited for any easements or improvements that are required by law or ordinance of residential subdivisions approved by the Town. The financial guarantees, including Letters of Credit, posted by the Developer to assure the construction of qualifying public improvements in phases future to Phase 1, may be required to be maintained in applicable portion by the Town until the Town and Developer have mutually determined an agreed plan for the future phases.

- B. The Town of Cumberland’s Growth Management Ordinance is hereby amended to include the following additional exemption within Section 118-6 of this ordinance:

**118-6(E)** Lots included within the Phase 1 and Phase 4 subdivision of the approved Village Green Revitalization Plan.

- C. The improvements to be constructed within Phase 1 and Phase 4 of the development shall be constructed in a manner to take advantage of emerging energy conservation techniques and technologies, consistent with the standards set forth in Exhibit F hereto.

Subject to the terms herein, the Cumberland Planning Board shall have review authority under the applicable provisions of the Cumberland Subdivision, Site Plan and Zoning Ordinances to impose conditions of approval pursuant to said Ordinances relating to the development and construction.

V. **Miscellaneous Provisions:**

- A. **Survival Clause:** The terms and conditions of this Agreement shall run with the land and be binding upon and shall inure to the benefit of the respective successors, heirs and assigns of the parties hereto except as specifically set forth herein. This Agreement shall not be assignable without the prior approval of the Cumberland Town Council, provided, however, that the Developer may assign this Agreement without such approval to a corporate entity or limited liability company solely owned and organized by the Developer for the purpose of developing the Project. A true copy of this Agreement shall be recorded in the Cumberland County Registry of Deeds.

VI. **Further Assurances:** In order to effectively and properly implement this Agreement, the parties agree to negotiate in good faith the terms and conditions of such further instruments and agreements as may be reasonably necessary from time to time to give effect to this Agreement.

VII. **Maine Agreement:** This contract is a Maine Agreement, entered into in the State of Maine and shall be governed by and enforced in accordance with the laws of the State of Maine.

VIII. **Binding Covenants:** The above stated restrictions, provisions, and conditions are an essential part of this contract and shall run with the subject premises, shall bind the interest therein, and any party in possession or occupancy of said property or any part thereof, and shall inure to the benefit of and be enforceable by the Town, by and through its duly authorized representatives. This Agreement may not be amended except by mutual written agreement by the parties.

IX. **Severability:** In the event any one or more clauses of this Agreement shall be held to be void or unenforceable for any reason by any court of competent jurisdiction, such clause or clauses shall be deemed to be severable and of no force or effect in such jurisdiction, and the remainder of this Agreement shall be deemed to be valid and in full force and effect, and

the terms of this Agreement shall be equitably adjusted if possible so as to compensate the appropriate party for any consideration lost because of the elimination of such clause or clauses.

X. **Enforcement:** The Town shall also have the ability to enforce any breach of this Agreement or any other violation of the Zoning Ordinance through the provisions of 30-A M.R.S.A § 4452.

IN WITNESS WHEREOF, the parties have hereunto caused this Agreement to be executed as of the day and year first above written.

WITNESS:

Town of Cumberland

Eliza A. Pouth

By:

William R. Shane  
William R. Shane  
Its Town Manager

WITNESS:

Village Green Cumberland, LLC

\_\_\_\_\_

By:

David H. Bateman  
David H. Bateman  
Its Manager

State of Maine

County of Cumberland, ss.

March 22, 2017

Personally appeared the above-named William R. Shane, Town Manager of the Town of Cumberland and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of the Town of Cumberland and subscribed and swore to the same.

SEAL

TAMARA P. O'DONNELL  
Notary Public, Maine  
My Commission Expires  
November 14, 2021

Tamara P. O'Donnell  
Notary Public/Attorney-at-Law  
Print Name: Tamara P. O'Donnell

State of Maine

County of Cumberland, ss.

\_\_\_\_\_, 2017

Personally appeared the above-named David H. Bateman, Manager of Village Green Cumberland, LLC and acknowledged the foregoing to be his free act and deed in his said capacity, and the free act and deed of Village Green Cumberland, LLC.

\_\_\_\_\_  
Notary Public/Attorney-at-Law  
Print Name: \_\_\_\_\_

IN WITNESS WHEREOF, the parties have hereunto caused this Agreement to be executed as of the day and year first above written.

WITNESS:

Town of Cumberland

\_\_\_\_\_

By:

\_\_\_\_\_  
William R. Shane  
Its Town Manager

WITNESS:

Village Green Cumberland, LLC

\_\_\_\_\_

By:

\_\_\_\_\_  
~~David H. Bateman~~ *Nathan H. Bateman*  
Its Manager

State of Maine

County of Cumberland, ss.

\_\_\_\_\_, 2017

Personally appeared the above-named William R. Shane, Town Manager of the Town of Cumberland and acknowledged the foregoing instrument to be his free act and deed and the free act and deed of the Town of Cumberland and subscribed and swore to the same.

\_\_\_\_\_  
Notary Public/Attorney-at-Law  
Print Name: *Elura Webber*

State of Maine

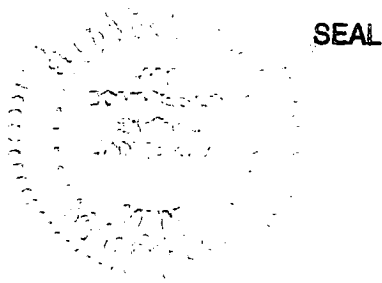
County of Cumberland, ss.

*March 23*, 2017

Personally appeared the above-named <sup>*Nathan*</sup>~~David H. Bateman~~, Manager of Village Green Cumberland, LLC and acknowledged the foregoing to be his free act and deed in his said capacity, and the free act and deed of Village Green Cumberland, LLC.

**ELURA R. WEBBER**  
NOTARY PUBLIC  
State of Maine  
My Commission Expires  
January 18, 2024

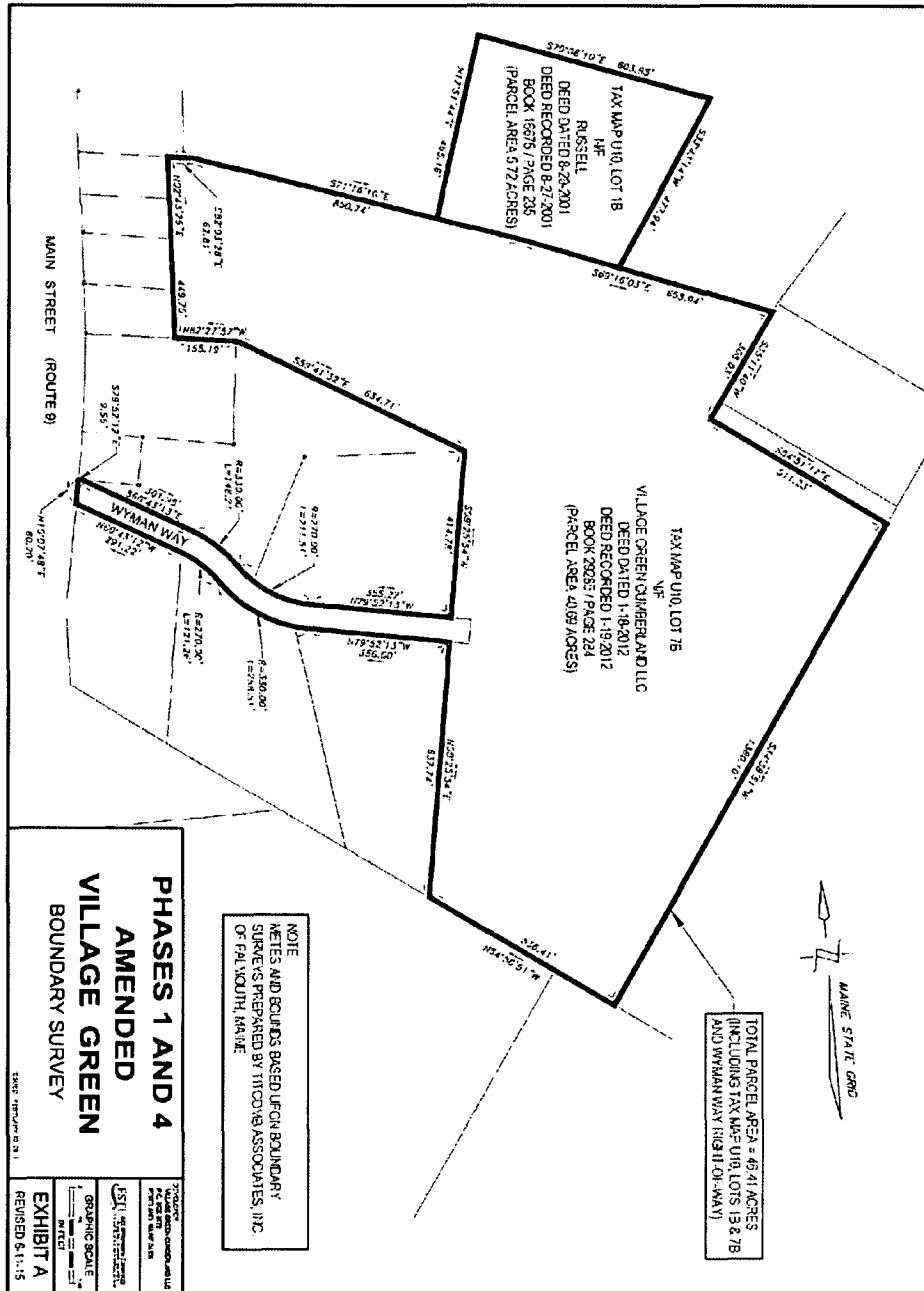
\_\_\_\_\_  
Notary Public/Attorney-at-Law  
Print Name: *Elura Webber*



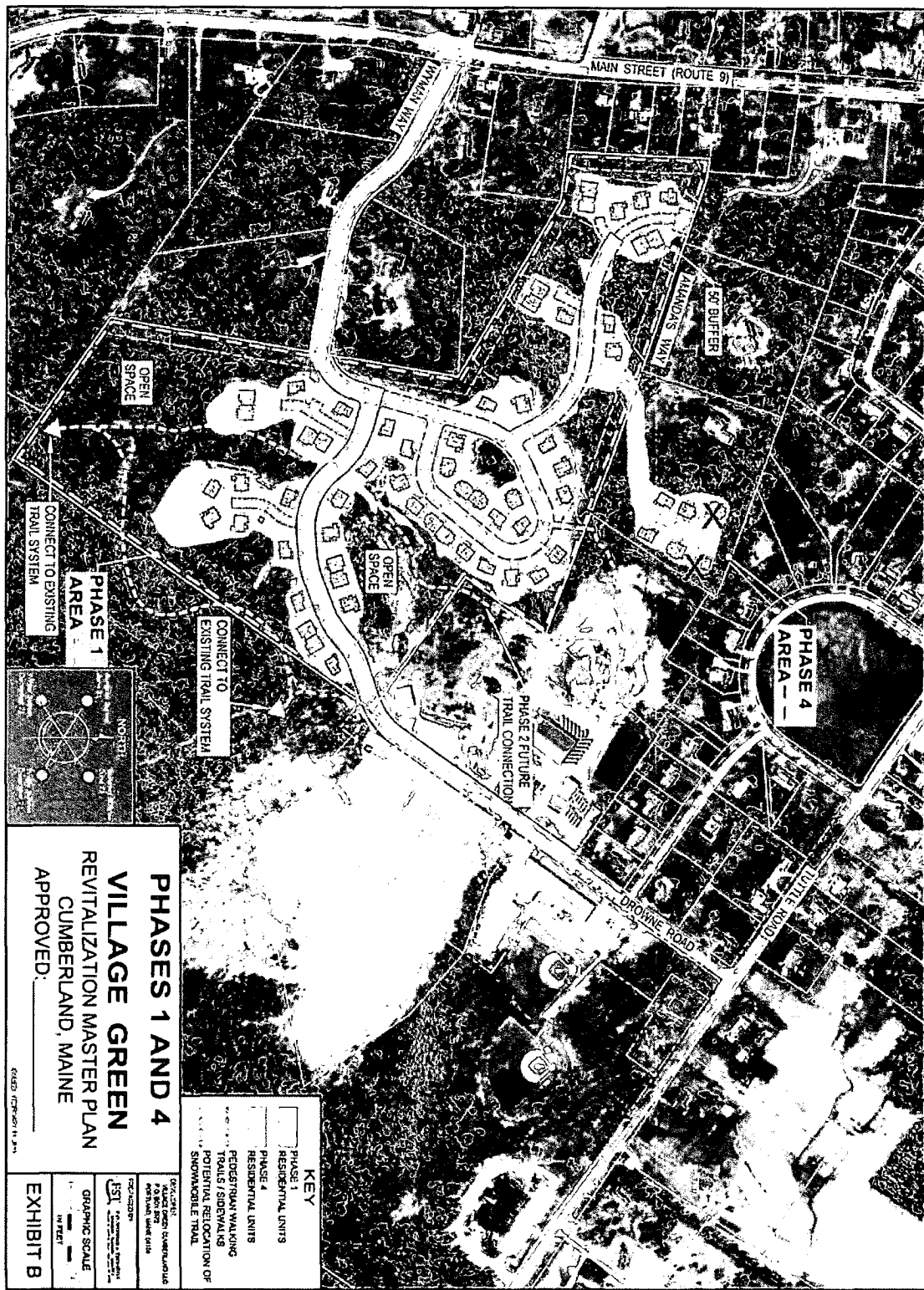
**EXHIBITS**

|                           |  |
|---------------------------|--|
| <b><u>Exhibit A</u></b>   | Survey of the Property   |
| <b><u>Exhibit B</u></b>   | Approved Village Green Revitalization Master Plan (VGRMP)<br>Phase 1 and Phase 4 |
| <b><u>Exhibit C</u></b>   | Summary of Zoning Amendments   |
| <b><u>Exhibit D</u></b>   | Plan of Open Space/Recreational Easement(s)                                      |
| <b><u>Exhibit E</u></b>   | Proposed Subdivision Plan  |
| <b><u>Exhibit F</u></b>   | Energy Conservation Standards  |
| <b><u>Exhibit F-1</u></b> | Street Lighting  |

# **EXHIBIT A**



**EXHIBIT B**





**EXHIBIT C**  
Summary of Zoning Amendments

A) The following minimum lot frontages shall be required on a Private Drive within the Contract Zone (Phase I and Phase 4 of the Village Green Revitalization Master Plan, VGRMP) as follows:

| Use  | Min. Lot Frontage |
|--|-------------------|
| Detached Single Family Residential Structure | 15'               |
| Attached Single Family Residential Structure | 15'               |
| Duplex Residential Structure                 | 50'               |

Maximum Number of Residential Units Accessed from Private Drive = 6

B) The following minimum setbacks within the V-MUZ District shall be modified for all structures within the Contract Zone (Phase I and Phase 4 of the VGRMP) as follows:

| Structure Type  | Front | Side   |
|---|-------|--------|
| Detached Single Family Residential Structure and Garage                 | 15' * |        |
| Attached Single Family Residential Structure and Garage                 | 15' * | 10' ** |
| Duplex Residential Structure and Garage                                 | 15' * |        |
| Driveways   | 0'    | 8' **  |
| Note: See additional buffer and setback requirements in Section F below |       |        |

\* Setback between face of garage and sidewalk shall be minimum distance of 20'

\*\* Side setback reduced to 0' along common sideline between attached residential structures and garages

C) All public roads within the Contract Zone (Phase I and Phase 4 of the VGRMP), including the full extent of Wyman Way connecting to Main Street, shall be designed in accordance with the residential sub-collector roadway standards as contained in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code, as modified by Section 315-18, the V-MUZ District, of the Cumberland Code, and as further modified below:

| Standard  | Public Road        |
|---|--------------------|
| Grass Esplanade   | 6' *<br>(one side) |
| Paved Sidewalk  | 6'<br>(one side)   |
| Min. Tangent Length Between Curves of Reverse Alignment | 0'                 |
| Min. Distance Between Street Intersections on Same Side | 100'               |
| Min. Distance Between Street Intersections on           | 200'               |

|   |                           |
|---|---------------------------|
| Opposite Side                             |                           |
| Min. Pavement Radii at Intersections      | 25'                       |
| Min. K Factor, Crest Vertical Curve       | 15                        |
| Min. K Factor, Sag Vertical Curve         | 20                        |
| MPH Design Speed                          | 25                        |
| Min. Property Line Radius at Intersection | 15'                       |
| Dead End Turn Around                      | Cul-de-Sac<br>Per 8.2.D.3 |
| Right-of-Way Width                        | 50'                       |
| Minimum Centerline Radius                 | 100'                      |
| Minimum Angle of Street Intersection      | 71 degrees                |
| Minimum Pavement Radii at Intersection    | 25'                       |
| Aggregate Subbase Course: Sand            | 0"                        |

\* Reduce esplanade width to 0' along portion of Wyman Way extending between Parcel 1 (Tax Map U10, Lot 7B) – Former Doane Parcel and Main Street (Route 9).

D) All private roads within the Contract Zone (Phase 1 and Phase 4 of the VGRMP) shall be designed in accordance with the private roadway standards as contained in Article VI and Table 2 of Chapter 250, Subdivision of Land, of the Cumberland Code, as modified by Section 315-18, the V-MUZ District, of the Cumberland Code, and as further modified below:

| Standard  | Private Road                  |
|---|-------------------------------|
| Grass Esplanade   | 4'<br>(one side)              |
| Paved Sidewalk  | 5'<br>(one side)              |
| Min. Tangent Length Between Curves of Reverse Alignment | 0'                            |
| Min. Distance Between Street Intersections on Same Side | 100'                          |
| Dead End Turn Around                                    | Tee Turn Around<br>25' Length |

E) The following roadway standards shall apply to private drives within the Contract Zone (Phase 1 and Phase 4 of the VGRMP):

| Standard  | Private Drive |
|---|---------------|
| Right-of-Way Width                                | 30'           |
| Roadway Pavement Width                            | 18'           |
| Grass Esplanade                                   | N/A           |
| Paved Sidewalk                                    | N/A           |
| Max. Dead End Road Length                         | 675'          |
| Min. Roadway Centerline Grade<br>(1.0% preferred) | 1.0%          |
| Max. Roadway Centerline Grade                     | 10%           |
| Min. Centerline Radius<br>(100' Preferred)        | 100'          |

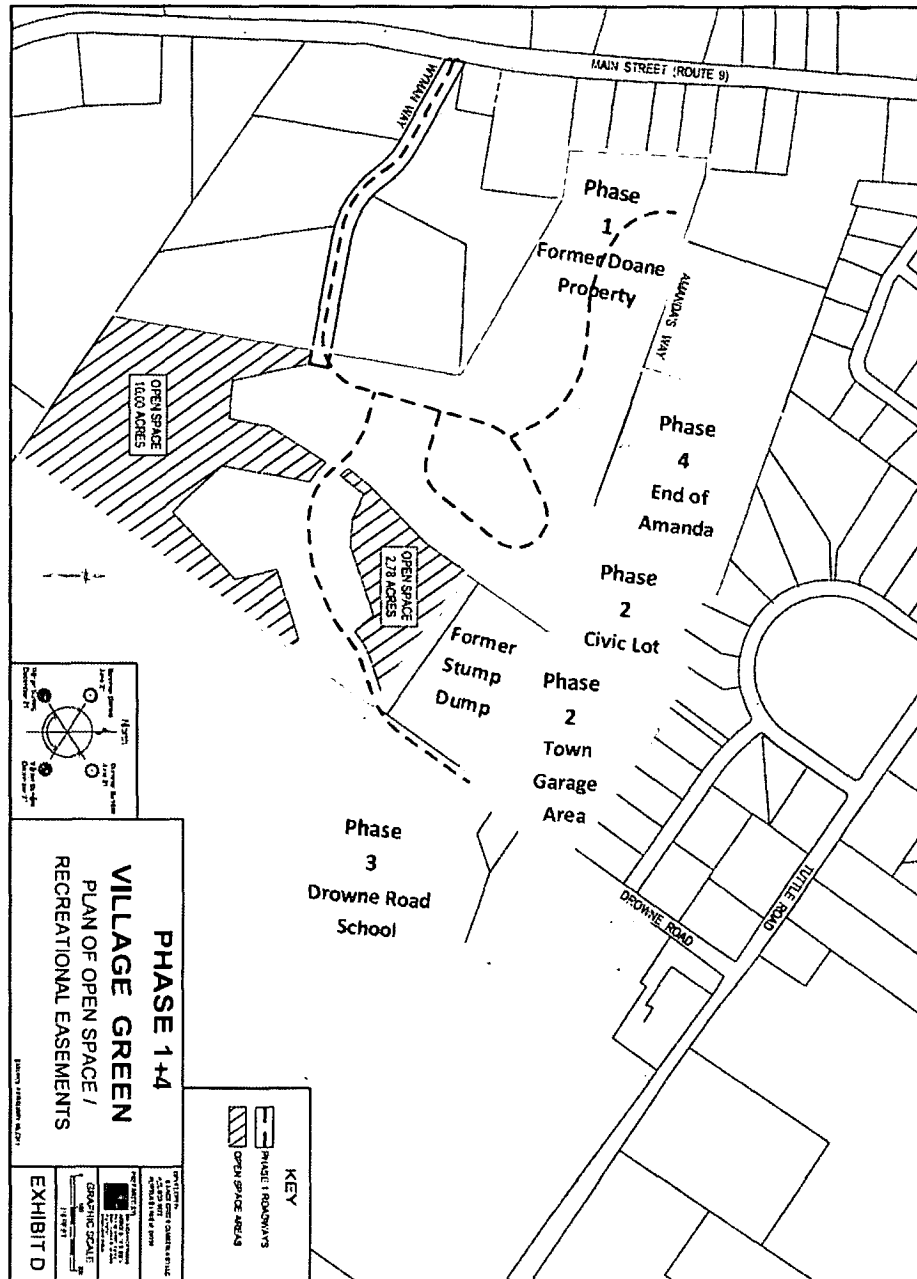
|   |             |
|---|-------------|
| Min. Tangent Length Between Curves of Reverse Alignment     | 0'          |
| Min. Angle of Street Intersections (90° Preferred)          | 75°         |
| Min. Distance Between Street Intersections on Same Side     | 100'        |
| Min. Distance Between Street Intersections on Opposite Side | 100'        |
| Min. Pavement Radii at Intersections                        | 10'         |
| Min. Pavement Crown   | ¼" per foot |
| Min. Slope of Gravel Shoulder                               | ½" per foot |
| Min. K Factor, Crest Vertical Curve                         | 15          |
| Min. K Factor, Sag Vertical Curve                           | 20          |
| MPH Design Speed  | 25          |
| Max. Grade within 75' of Intersection                       | 3%          |
| Min. Property Line Radius at Intersection                   | 0'          |
| Dead End Turn Around  | N/A         |

F) The following design standards shall apply to the Contract Zone (Phase I and Phase 4 of the VGRMP) as follows:

1. The portion of public roadway along the existing Wyman Way right-of-way shall conform to the existing right-of-way dimensions and geometry, which shall include the ability of the roadway not to be centered within the existing right-of-way.
2. The drainage system for public and private roadways shall consist of closed drainage to the extent practicable; however, shallow under-drained swales may be used alongside roadways where no sidewalk is proposed. Where sidewalks are proposed, they shall be constructed with curb and access to the closed drain system through catch basin inlets, for example.
3. Parking and garage doors facing towards the public right-of-way are permissible provided the garages are architecturally designed to not be the principal element of the structure. Parking and garage doors facing towards private roads and private drives are permissible.
4. No minimum wooded buffer strip is required to be maintained along existing public streets as referenced in Section 7.9 of the Subdivision Ordinance.
5. Curbing at roadways to be either bituminous or slip form concrete.
6. A minimum 50' buffer shall be maintained along the exterior of the VGRMP parcel (excluding Wyman Way right-of-way and the Phase 4 Property) and abutting residential development. The 50' buffer shall not be required to adjacent land owned by the Town.

7. For the residential lots proposed to be built on the Phase 4 Property (Lots 2, 3, 4 and 5 as shown on Exhibit E) the following buffers shall be maintained:
  - a. A 75 foot wide buffer between the project boundary line that abuts the Cumberland Common residential lots and the proposed new residential Lots 3 and 4 as shown on Exhibit E. Of the 75 foot wide buffer, 50 feet shall remain natural and undisturbed, and 25 feet shall be vegetated.
  - b. A 40 foot wide setback along the boundary line of the Phase 4 Property that abuts the Town Civic Lot, behind proposed residential Lots 2 and 3, as shown on Exhibit E.
8. Upon completion of construction providing access to Phase 4 via Bradbury Way as shown on Exhibit E, no access to the VGRMP Property, including, but not limited to, the Phase 1 and Phase 4 Property, shall be permitted from Amanda's Way. Current access from Amanda's Way shall be discontinued and landscaping shall be installed along the Phase 4 property boundary to prevent future access to and from Amanda's Way. The Developer shall add proposed landscaping features to the subdivision plan and submit to the Planning Board for review and approval.

**EXHIBIT D**





**EXHIBIT F****CHAPTER 4****RESIDENTIAL ENERGY EFFICIENCY****SECTION 401  
GENERAL**

**401.1 Scope.** This chapter applies to residential buildings.

**401.2 Compliance.** Projects shall comply with Sections 401, 402.4, 402.5, and 403.1, 403.2.2, 403.2.3, and 403.3 through 403.9 (referred to as the mandatory provisions) and either:

1. Sections 402.1 through 402.3, 403.2.1 and 404.1 (prescriptive); or
2. Section 405 (performance).

**401.3 Certificate.** A permanent certificate shall be posted on or in the electrical distribution panel. The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant *R*-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace wall and/or floor) and ducts outside conditioned spaces; *U*-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies

of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater," "electric furnace" or "baseboard electric heater," as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

**SECTION 402  
BUILDING THERMAL ENVELOPE****402.1 General (Prescriptive).**

**402.1.1 Insulation and fenestration criteria.** The building thermal envelope shall meet the requirements of Table 402.1.1 based on the climate zone specified in Chapter 3.

**402.1.2 *R*-value computation.** Insulation material used in layers, such as framing cavity insulation and insulating sheathing, shall be summed to compute the component *R*-value. The manufacturer's settled *R*-value shall be used for blown insulation. Computed *R*-values shall not include an *R*-value for other building materials or air films.

**TABLE 402.1.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT\***

| CLIMATE ZONE    | FENESTRATION U-FACTOR <sup>b</sup> | SKYLIGHT <sup>b</sup> U-FACTOR | GLAZED FENESTRATION SHGC <sup>a,c</sup> | CEILING R-VALUE | WOOD FRAME WALL R-VALUE | MASS WALL R-VALUE <sup>d</sup> | FLOOR R-VALUE   | BASEMENT <sup>e</sup> WALL R-VALUE | SLAB <sup>f</sup> R-VALUE & DEPTH | CRAWL SPACE <sup>g</sup> WALL R-VALUE |
|-----------------|------------------------------------|--------------------------------|---|-----------------|-------------------------|--------------------------------|-----------------|------------------------------------|-----------------------------------|---------------------------------------|
| 1               | 1.2                                | 0.75                           | 0.30                                    | 30              | 13                      | 3/4                            | 13              | 0                                  | 0                                 | 0                                     |
| 2               | 0.65 <sup>h</sup>                  | 0.75                           | 0.30                                    | 30              | 13                      | 4/6                            | 13              | 0                                  | 0                                 | 0                                     |
| 3               | 0.50 <sup>h</sup>                  | 0.65                           | 0.30                                    | 30              | 13                      | 5/8                            | 19              | 5/13 <sup>i</sup>                  | 0                                 | 5/13                                  |
| 4 except Marine | 0.35                               | 0.60                           | NR                                      | 38              | 13                      | 5/10                           | 19              | 10/13                              | 10, 2 ft                          | 10/13                                 |
| 5 and Marine 4  | 0.35                               | 0.60                           | NR                                      | 38              | 20 or 13+5 <sup>h</sup> | 13/17                          | 30 <sup>j</sup> | 10/13                              | 10, 2 ft                          | 10/13                                 |
| 6               | 0.35                               | 0.60                           | NR                                      | 49              | 20 or 13+5 <sup>h</sup> | 15/19                          | 30 <sup>j</sup> | 15/19                              | 10, 4 ft                          | 10/13                                 |
| 7 and 8         | 0.35                               | 0.60                           | NR                                      | 49              | 21                      | 19/21                          | 38 <sup>j</sup> | 15/19                              | 10, 4 ft                          | 10/13                                 |

For SI: 1 foot = 304.8 mm.

- R*-values are minimums. *U*-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 × 6 framing cavity such that the *R*-value is reduced by R-1 or more shall be marked with the compressed batt *R*-value in addition to the full thickness *R*-value.
- The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- R-5 shall be added to the required slab edge *R*-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.
- There are no SHGC requirements in the Marine Zone.
- Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
- The second *R*-value applies when more than half the insulation is on the interior of the mass wall.
- For impact rated fenestration complying with Section R301.2.1.2 of the *International Residential Code* or Section 1608.1.2 of the *International Building Code*, the maximum *U*-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

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TABLE 402.1.3  
EQUIVALENT U-FACTORS<sup>a</sup>

| CLIMATE ZONE    | FENESTRATION U-FACTOR | SKYLIGHT U-FACTOR | CEILING U-FACTOR | FRAME WALL U-FACTOR | MASS WALL U-FACTOR <sup>b</sup> | FLOOR U-FACTOR | BASEMENT WALL U-FACTOR | CRAWL SPACE WALL U-FACTOR <sup>c</sup> |
|-----------------|-----------------------|-------------------|------------------|---------------------|---------------------------------|----------------|------------------------|--|
| 1               | 1.20                  | 0.75              | 0.035            | 0.082               | 0.197                           | 0.064          | 0.360                  | 0.477                                  |
| 2               | 0.65                  | 0.75              | 0.035            | 0.082               | 0.165                           | 0.064          | 0.360                  | 0.477                                  |
| 3               | 0.50                  | 0.65              | 0.035            | 0.082               | 0.141                           | 0.047          | 0.091 <sup>c</sup>     | 0.136                                  |
| 4 except Marine | 0.35                  | 0.60              | 0.030            | 0.082               | 0.141                           | 0.047          | 0.059                  | 0.065                                  |
| 5 and Marine 4  | 0.35                  | 0.60              | 0.030            | 0.057               | 0.082                           | 0.033          | 0.059                  | 0.065                                  |
| 6               | 0.35                  | 0.60              | 0.026            | 0.057               | 0.060                           | 0.033          | 0.050                  | 0.065                                  |
| 7 and 8         | 0.35                  | 0.60              | 0.026            | 0.057               | 0.057                           | 0.028          | 0.050                  | 0.065                                  |

a. Nonfenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall U-factor in Marine Zone 4 and Zones 5 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.1.

**402.1.3 U-factor alternative.** An assembly with a U-factor equal to or less than that specified in Table 402.1.3 shall be permitted as an alternative to the R-value in Table 402.1.1.

**402.1.4 Total UA alternative.** If the total building thermal envelope UA (sum of U-factor times assembly area) is less than or equal to the total UA resulting from using the U-factors in Table 402.1.3 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table 402.1.1. The UA calculation shall be done using a method consistent with the ASHRAE *Handbook of Fundamentals* and shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

#### 402.2 Specific insulation requirements (Prescriptive).

**402.2.1 Ceilings with attic spaces.** When Section 402.1.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly, R-38 shall be deemed to satisfy the requirement for R-49 wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.2.2 Ceilings without attic spaces.** Where Section 402.1.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-30. This reduction of insulation from the requirements of Sec-

tion 402.1.1 shall be limited to 500 square feet (46 m<sup>2</sup>) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.2.3 Access hatches and doors.** Access doors from conditioned spaces to unconditioned spaces (e.g., attics and crawl spaces) shall be weatherstripped and insulated to a level equivalent to the insulation on the surrounding surfaces. Access shall be provided to all equipment that prevents damaging or compressing the insulation. A wood framed or equivalent baffle or retainer is required to be provided when loose fill insulation is installed, the purpose of which is to prevent the loose fill insulation from spilling into the living space when the attic access is opened, and to provide a permanent means of maintaining the installed R-value of the loose fill insulation.

**402.2.4 Mass walls.** Mass walls for the purposes of this chapter shall be considered above-grade walls of concrete block, concrete, insulated concrete form (ICF), masonry cavity, brick (other than brick veneer), earth (adobe, compressed earth block, rammed earth) and solid timber/logs.

**402.2.5 Steel-frame ceilings, walls, and floors.** Steel-frame ceilings, walls and floors shall meet the insulation requirements of Table 402.2.5 or shall meet the U-factor requirements in Table 402.1.3. The calculation of the U-factor for a steel-frame envelope assembly shall use a series-parallel path calculation method.

**Exception:** In Climate Zones 1 and 2, the continuous insulation requirements in Table 402.2.5 shall be permitted to be reduced to R-3 for steel frame wall assemblies with studs spaced at 24 inches (610 mm) on center.



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TABLE 402.2.5  
STEEL-FRAME CEILING, WALL AND FLOOR INSULATION  
(R-VALUE)

| WOOD FRAME<br>R-VALUE<br>REQUIREMENT    | COLD-FORMED STEEL<br>EQUIVALENT R-VALUE <sup>a</sup>   |
|---|--|
| <b>Steel Truss Ceilings<sup>b</sup></b> |  |
| R-30                                    | R-38 or R-30 + 3 or R-26 + 5                           |
| R-38                                    | R-49 or R-38 + 3                                       |
| R-49                                    | R-38 + 5   |
| <b>Steel Joist Ceilings<sup>b</sup></b> |  |
| R-30                                    | R-38 in 2 x 4 or 2 x 6 or 2 x 8<br>R-49 in any framing |
| R-38                                    | R-49 in 2 x 4 or 2 x 6 or 2 x 8 or 2 x 10              |
| <b>Steel-Framed Wall</b>                |  |
| R-13                                    | R-13 + 5 or R-15 + 4 or R-21 + 3 or R-0 + 10           |
| R-19                                    | R-13 + 9 or R-19 + 8 or R-25 + 7                       |
| R-21                                    | R-13 + 10 or R-19 + 9 or R-25 + 8                      |
| <b>Steel Joist Floor</b>                |  |
| R-13                                    | R-19 in 2 x 6<br>R-19 + 6 in 2 x 8 or 2 x 10           |
| R-19                                    | R-19 + 6 in 2 x 6<br>R-19 + 12 in 2 x 8 or 2 x 10      |

a. Cavity insulation R-value is listed first, followed by continuous insulation R-value.

b. Insulation exceeding the height of the framing shall cover the framing.

**402.2.6 Floors.** Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

**402.2.7 Basement walls.** Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections 402.1.1 and 402.2.6.

**402.2.8 Slab-on-grade floors.** Slab-on-grade floors with a floor surface less than 12 inches (305 mm) below grade shall be insulated in accordance with Table 402.1.1. The insulation shall extend downward from the top of the slab on the outside or inside of the foundation wall. Insulation located below grade shall be extended the distance provided in Table 402.1.1 by any combination of vertical insulation, insulation extending under the slab or insulation extending out from the building. Insulation extending away from the building shall be protected by pavement or by a minimum of 10 inches (254 mm) of soil. The top edge of the insulation installed between the exterior wall and the edge of the interior slab shall be permitted to be cut at a 45-degree (0.79 rad) angle away from the exterior wall. Slab-edge insulation is not required in jurisdictions designated by the code official as having a very heavy termite infestation.

**402.2.9 Crawl space walls.** As an alternative to insulating floors over crawl spaces, crawl space walls shall be permitted to be insulated when the crawl space is not vented to the outside. Crawl space wall insulation shall be permanently fastened to the wall and extend downward from the floor to the finished grade level and then vertically and/or horizon-

tally for at least an additional 24 inches (610 mm). Exposed earth in unvented crawl space foundations shall be covered with a continuous Class I vapor retarder in accordance with the *International Building Code*. All joints of the vapor retarder shall overlap by 6 inches (153 mm) and be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (153 mm) up the stem wall and shall be attached to the stem wall.

**402.2.10 Masonry veneer.** Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

**402.2.11 Thermally isolated sunroom insulation.** The minimum ceiling insulation R-values shall be R-19 in Zones 1 through 4 and R-24 in Zones 5 through 8. The minimum wall R-value shall be R-13 in all zones. New wall(s) separating a sunroom from conditioned space shall meet the building thermal envelope requirements.

#### 402.3 Fenestration. (Prescriptive).

**402.3.1 U-factor.** An area-weighted average of fenestration products shall be permitted to satisfy the U-factor requirements.

**402.3.2 Glazed fenestration SHGC.** An area-weighted average of fenestration products more than 50 percent glazed shall be permitted to satisfy the SHGC requirements.

**402.3.3 Glazed fenestration exemption.** Up to 15 square feet (1.4 m<sup>2</sup>) of glazed fenestration per dwelling unit shall be permitted to be exempt from U-factor and SHGC requirements in Section 402.1.1. This exemption shall not apply to the U-factor alternative approach in Section 402.1.3 and the Total UA alternative in Section 402.1.4.

**402.3.4 Opaque door exemption.** One side-hinged opaque door assembly up to 24 square feet (2.22 m<sup>2</sup>) in area is exempted from the U-factor requirement in Section 402.1.1. This exemption shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**402.3.5 Thermally isolated sunroom U-factor.** For Zones 4 through 8, the maximum fenestration U-factor shall be 0.50 and the maximum skylight U-factor shall be 0.75. New windows and doors separating the sunroom from conditioned space shall meet the building thermal envelope requirements.

**402.3.6 Replacement fenestration.** Where some or all of an existing fenestration unit is replaced with a new fenestration product, including sash and glazing, the replacement fenestration unit shall meet the applicable requirements for U-factor and SHGC in Table 402.1.1.

#### 402.4 Air leakage (Mandatory).

**402.4.1 Building thermal envelope.** The building thermal envelope shall be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weatherstripped or otherwise sealed with an air barrier material, suitable film or solid material:

1. All joints, seams and penetrations.

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2. Site-built windows, doors and skylights.
3. Openings between window and door assemblies and their respective jambs and framing.
4. Utility penetrations.
5. Dropped ceilings or chases adjacent to the thermal envelope.
6. Knee walls.
7. Walls and ceilings separating a garage from conditioned spaces.
8. Behind tubs and showers on exterior walls.
9. Common walls between dwelling units.
10. Attic access openings.
11. Rim joist junction.
12. Other sources of infiltration.

**402.4.2 Air sealing and insulation.** Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section 402.4.2.1 or 402.4.2.2:

**402.4.2.1 Testing option.** Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than seven air changes per hour (ACH) when tested with a blower door at a pressure of 50 pascals (1 psf). Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation and combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed, including exhaust, intake, makeup air, backdraft and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

**402.4.2.2 Visual inspection option.** Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table 402.4.2, applicable to the method of construction, are field verified. Where required by the *code official*, an *approved* party independent from the installer of the insulation shall inspect the air barrier and insulation.

**402.4.3 Fireplaces.** New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

**402.4.4 Fenestration air leakage.** Windows, skylights and sliding glass doors shall have an air infiltration rate of no

more than 0.3 cfm per square foot (1.5 L/s/m<sup>2</sup>), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m<sup>2</sup>), when tested according to NFRC 400 or AAMA/WDMA/CSA 101/1.5.2/A440 by an accredited, independent laboratory and *listed* and *labeled* by the manufacturer.

**Exceptions:** Site-built windows, skylights and doors.

**402.4.5 Recessed lighting.** Recessed luminaires installed in the *building thermal envelope* shall be sealed to limit air leakage between conditioned and unconditioned spaces. All recessed luminaires shall be IC-rated and *labeled* as meeting ASTM E 283 when tested at 1.57 psf (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the *conditioned space* to the ceiling cavity. All recessed luminaires shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling covering.

**402.5 Maximum fenestration U-factor and SHGC (Mandatory).** The area-weighted average maximum fenestration U-factor permitted using trade-offs from Section 402.1.4 or 405 shall be 0.48 in Zones 4 and 5 and 0.40 in Zones 6 through 8 for vertical fenestration, and 0.75 in Zones 4 through 8 for skylights. The area-weighted average maximum fenestration SHGC permitted using trade-offs from Section 405 in Zones 1 through 3 shall be 0.50.

## SECTION 403 SYSTEMS

**403.1 Controls (Mandatory).** At least one thermostat shall be provided for each separate heating and cooling system.

**403.1.1 Programmable thermostat.** Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

**403.1.2 Heat pump supplementary heat (Mandatory).** Heat pumps having supplementary electric-resistance heat shall have controls that, except during defrost, prevent supplemental heat operation when the heat pump compressor can meet the heating load.

### 403.2 Ducts.

**403.2.1 Insulation (Prescriptive).** Supply ducts in attics shall be insulated to a minimum of R-8. All other ducts shall be insulated to a minimum of R-6.

**Exception:** Ducts or portions thereof located completely inside the *building thermal envelope*.

**403.2.2 Sealing (Mandatory).** All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed.

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Joints and seams shall comply with Section M1601.4.1 of the *International Residential Code*.

Duct tightness shall be verified by either of the following:

1. Postconstruction test: Leakage to outdoors shall be less than or equal to 8 cfm (226.5 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* or a total leakage less than or equal to 12 cfm (12 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 6 cfm (169.9 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area* when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 ft<sup>2</sup> (9.29 m<sup>2</sup>) of *conditioned floor area*.

**Exceptions:** Duct tightness test is not required if the air handler and all ducts are located within *conditioned space*.

TABLE 402.4.2  
AIR BARRIER AND INSULATION INSPECTION COMPONENT CRITERIA

| COMPONENT  | CRITERIA  |
|--|---|
| Air barrier and thermal barrier                            | Exterior thermal envelope insulation for framed walls is installed in substantial contact and continuous alignment with building envelope air barrier.<br>Breaks or joints in the air barrier are filled or repaired.<br>Air-permeable insulation is not used as a sealing material.<br>Air-permeable insulation is inside of an air barrier. |
| Ceiling/attic  | Air barrier in any dropped ceiling/soffit is substantially aligned with insulation and any gaps are sealed.<br>Attic access (except unvented attic), knee wall door, or drop down stair is sealed.  |
| Walls  | Corners and headers are insulated.<br>Junction of foundation and sill plate is sealed.  |
| Windows and doors  | Space between window/door jambs and framing is sealed.  |
| Rim joists   | Rim joists are insulated and include an air barrier.  |
| Floors<br>(including above-garage and cantilevered floors) | Insulation is installed to maintain permanent contact with underside of subfloor decking.<br>Air barrier is installed at any exposed edge of insulation.  |
| Crawl space walls  | Insulation is permanently attached to walls.<br>Exposed earth in unvented crawl spaces is covered with Class I vapor retarder with overlapping joints taped.  |
| Shafts, penetrations                                       | Duct shafts, utility penetrations, knee walls and flue shafts opening to exterior or unconditioned space are sealed.  |
| Narrow cavities  | Batts in narrow cavities are cut to fit, or narrow cavities are filled by sprayed/blown insulation.   |
| Garage separation  | Air sealing is provided between the garage and conditioned spaces.  |
| Recessed lighting  | Recessed light fixtures are air tight, IC rated, and sealed to drywall.<br>Exception—fixtures in conditioned space.   |
| Plumbing and wiring  | Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.   |
| Shower/tub on exterior wall                                | Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.   |
| Electrical/phone box on exterior walls                     | Air barrier extends behind boxes or air sealed-type boxes are installed.  |
| Common wall  | Air barrier is installed in common wall between dwelling units.   |
| HVAC register boots  | HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.   |
| Fireplace  | Fireplace walls include an air barrier.   |

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**403.2.3 Building cavities (Mandatory).** Building framing cavities shall not be used as supply ducts.

**403.3 Mechanical system piping insulation (Mandatory).** Mechanical system piping capable of carrying fluids above 105°F (41°C) or below 55°F (13°C) shall be insulated to a minimum of R-3.

**403.4 Circulating hot water systems (Mandatory).** All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot-water circulating pump when the system is not in use.

**403.5 Mechanical ventilation (Mandatory).** Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

**403.6 Equipment sizing (Mandatory).** Heating and cooling equipment shall be sized in accordance with Section M1401.3 of the *International Residential Code*.

**403.7 Systems serving multiple dwelling units (Mandatory).** Systems serving multiple dwelling units shall comply with Sections 503 and 504 in lieu of Section 403.

**403.8 Snow melt system controls (Mandatory).** Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F, and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F.

**403.9 Pools (Mandatory).** Pools shall be provided with energy-conserving measures in accordance with Sections 403.9.1 through 403.9.3.

**403.9.1 Pool heaters.** All pool heaters shall be equipped with a readily accessible on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or LPG shall not have continuously burning pilot lights.

**403.9.2 Time switches.** Time switches that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on swimming pool heaters and pumps.

**Exceptions:**

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

**403.9.3 Pool covers.** Heated pools shall be equipped with a vapor-retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12.

**Exception:** Pools deriving over 60 percent of the energy for heating from site-recovered energy or solar energy source.

## SECTION 404

## ELECTRICAL POWER AND LIGHTING SYSTEMS

**404.1 Lighting equipment.** A minimum of 50 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps.

## SECTION 405

SIMULATED PERFORMANCE ALTERNATIVE  
(Performance)

**405.1 Scope.** This section establishes criteria for compliance using simulated energy performance analysis. Such analysis shall include heating, cooling, and service water heating energy only.

**405.2 Mandatory requirements.** Compliance with this section requires that the mandatory provisions identified in Section 401.2 be met. All supply and return ducts not completely inside the *building thermal envelope* shall be insulated to a minimum of R-6.

**405.3 Performance-based compliance.** Compliance based on simulated energy performance requires that a proposed residence (*proposed design*) be shown to have an annual energy cost that is less than or equal to the annual energy cost of the *standard reference design*. Energy prices shall be taken from a source approved by the *code official*, such as the Department of Energy, Energy Information Administration's *State Energy Price and Expenditure Report*. *Code officials* shall be permitted to require time-of-use pricing in energy cost calculations.

**Exception:** The energy use based on source energy expressed in Btu or Btu per square foot of *conditioned floor area* shall be permitted to be substituted for the energy cost. The source energy multiplier for electricity shall be 3.16. The source energy multiplier for fuels other than electricity shall be 1.1.

## 405.4 Documentation.

**405.4.1 Compliance software tools.** Documentation verifying that the methods and accuracy of the compliance software tools conform to the provisions of this section shall be provided to the *code official*.

**405.4.2 Compliance report.** Compliance software tools shall generate a report that documents that the *proposed design* complies with Section 405.3. The compliance documentation shall include the following information:

1. Address or other identification of the residence;
2. An inspection checklist documenting the building component characteristics of the *proposed design* as listed in Table 405.5.2(1). The inspection checklist shall show results for both the *standard reference design* and the *proposed design*, and shall document all inputs entered by the user necessary to reproduce the results;
3. Name of individual completing the compliance report; and

## RESIDENTIAL ENERGY EFFICIENCY

## 4. Name and version of the compliance software tool.

**Exception:** Multiple orientations. When an otherwise identical building model is offered in multiple orientations, compliance for any orientation shall be permitted by documenting that the building meets the performance requirements in each of the four cardinal (north, east, south and west) orientations.

**405.4.3 Additional documentation.** The *code official* shall be permitted to require the following documents:

1. Documentation of the building component characteristics of the *standard reference design*.
2. A certification signed by the builder providing the building component characteristics of the *proposed design* as given in Table 405.5.2(1).
3. Documentation of the actual values used in the software calculations for the *proposed design*.

**405.5 Calculation procedure.**

**405.5.1 General.** Except as specified by this section, the *standard reference design* and *proposed design* shall be configured and analyzed using identical methods and techniques.

**405.5.2 Residence specifications.** The *standard reference design* and *proposed design* shall be configured and analyzed as specified by Table 405.5.2(1). Table 405.5.2(1) shall include by reference all notes contained in Table 402.1.1.

**405.6 Calculation software tools.**

**405.6.1 Minimum capabilities.** Calculation procedures used to comply with this section shall be software tools capable of calculating the annual energy consumption of all building elements that differ between the *standard reference design* and the *proposed design* and shall include the following capabilities:

1. Computer generation of the *standard reference design* using only the input for the *proposed design*. The calculation procedure shall not allow the user to directly modify the building component characteristics of the *standard reference design*.
2. Calculation of whole-building (as a single zone) sizing for the heating and cooling equipment in the *standard reference design* residence in accordance with Section M1401.3 of the *International Residential Code*.
3. Calculations that account for the effects of indoor and outdoor temperatures and part-load ratios on the performance of heating, ventilating and air-conditioning equipment based on climate and equipment sizing.
4. Printed *code official* inspection checklist listing each of the *proposed design* component characteristics from Table 405.5.2(1) determined by the analysis to provide compliance, along with their respective performance ratings (e.g., *R*-value, *U*-factor, SHGC, HSPF, APUE, SEER, EF, etc.).

**405.6.2 Specific approval.** Performance analysis tools meeting the applicable sections of Section 405 shall be permitted to be *approved*. Tools are permitted to be *approved* based on meeting a specified threshold for a jurisdiction. The *code official* shall be permitted to approve tools for a specified application or limited scope.

**405.6.3 Input values.** When calculations require input values not specified by Sections 402, 403, 404 and 405, those input values shall be taken from an *approved* source.

## RESIDENTIAL ENERGY EFFICIENCY

**TABLE 405.5.2(1)**  
**SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS**

| BUILDING COMPONENT             | STANDARD REFERENCE DESIGN  | PROPOSED DESIGN   |
|--------------------------------|--|---|
| Above-grade walls              | Type: mass wall if proposed wall is mass; otherwise wood frame.<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3<br>Solar absorptance = 0.75<br>Emittance = 0.90  | As proposed<br>As proposed<br>As proposed<br>As proposed<br>As proposed                                   |
| Basement and crawl space walls | Type: same as proposed<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3, with insulation layer on interior side of walls.   | As proposed<br>As proposed<br>As proposed   |
| Above-grade floors             | Type: wood frame<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3   | As proposed<br>As proposed<br>As proposed   |
| Ceilings                       | Type: wood frame<br>Gross area: same as proposed<br>U-factor: from Table 402.1.3   | As proposed<br>As proposed<br>As proposed   |
| Roofs                          | Type: composition shingle on wood sheathing<br>Gross area: same as proposed<br>Solar absorptance = 0.75<br>Emittance = 0.90  | As proposed<br>As proposed<br>As proposed<br>As proposed  |
| Attics                         | Type: vented with aperture = 1 ft <sup>2</sup> per 300 ft <sup>2</sup> ceiling area  | As proposed   |
| Foundations                    | Type: same as proposed foundation wall area above and below grade and soil characteristics: same as proposed.  | As proposed<br>As proposed  |
| Doors                          | Area: 40 ft <sup>2</sup><br>Orientation: North<br>U-factor: same as fenestration from Table 402.1.3.   | As proposed<br>As proposed<br>As proposed   |
| Glazing*                       | Total area <sup>a</sup> =<br>(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.<br>(b) 15% of the conditioned floor area; where the proposed glazing area is 15% or more of the conditioned floor area.<br>Orientation: equally distributed to four cardinal compass orientations (N, E, S & W).<br>U-factor: from Table 402.1.3<br>SHGC: From Table 402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.<br>Interior shade fraction:<br>Summer (all hours when cooling is required) = 0.70<br>Winter (all hours when heating is required) = 0.85 <sup>c</sup><br>External shading: none | As proposed<br><br><br>As proposed<br>As proposed<br>Same as standard reference design<br><br>As proposed |
| Skylights                      | None   | As proposed   |
| Thermally isolated sunrooms    | None   | As proposed   |

(continued)

## RESIDENTIAL ENERGY EFFICIENCY

TABLE 405.5.2(1)—continued  
SPECIFICATIONS FOR THE STANDARD REFERENCE DESIGN AND PROPOSED DESIGNS

| BUILDING COMPONENT                                  | STANDARD REFERENCE DESIGN   | PROPOSED DESIGN   |
|---|---|---|
| Air exchange rate                                   | Specific leakage area (SLA)* = 0.00036 assuming no energy recovery  | For residences that are not tested, the same as the standard reference design.<br>For residences without mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate <sup>f</sup> but not less than 0.35 ACH<br>For residences with mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate <sup>f</sup> combined with the mechanical ventilation rate, $f$ which shall not be less than $0.01 \times CFA + 7.5 \times (N_{br}+1)$<br>where:<br>$CFA$ = conditioned floor area<br>$N_{br}$ = number of bedrooms |
| Mechanical ventilation                              | None, except where mechanical ventilation is specified by the proposed design. In which case:<br>Annual vent fan energy use:<br>$kWh/yr = 0.03942 \times CFA + 29.565 \times (N_{br} + 1)$<br>where:<br>$CFA$ = conditioned floor area<br>$N_{br}$ = number of bedrooms   | As proposed   |
| Internal gains                                      | $IGain = 17,900 + 23.8 \times CFA + 4104 \times N_{br}$<br>(Btu/day per dwelling unit)  | Same as standard reference design   |
| Internal mass                                       | An internal mass for furniture and contents of 8 pounds per square foot of floor area.  | Same as standard reference design, plus any additional mass specifically designed as a thermal storage element <sup>g</sup> but not integral to the building envelope or structure  |
| Structural mass                                     | For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air.  | As proposed   |
|   | For masonry basement walls, as proposed, but with insulation required by Table 402.1.3 located on the interior side of the walls  | As proposed   |
|   | For other walls, for ceilings, floors, and interior walls, wood frame construction  | As proposed   |
| Heating systems <sup>h</sup>                        | As proposed<br>Capacity: sized in accordance with Section M1401.3 of the <i>International Residential Code</i>  | As proposed   |
| Cooling systems <sup>h, i</sup>                     | As proposed<br>Capacity: sized in accordance with Section M1401.3 of the <i>International Residential Code</i>  | As proposed   |
| Service H <sub>2</sub> O heating <sup>h, k, l</sup> | As proposed<br>Use: same as proposed design   | As proposed<br>$gal/day = 30 + (10 \times N_{br})$  |
| Thermal distribution systems                        | A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. Duct insulation: From Section 403.2.1. For tested duct systems, the leakage rate shall be the applicable maximum rate from Section 403.2.2. | As tested or as specified in Table 405.5.2(2) if not tested   |
| Thermostat  | Type: Manual, cooling temperature setpoint = 75°F;<br>Heating temperature setpoint = 72°F   | Same as standard reference  |

(continued)

## RESIDENTIAL ENERGY EFFICIENCY

TABLE 405.5.2(1)—continued

For SI: 1 square foot = 0.093 m<sup>2</sup>; 1 British thermal unit = 1055 J; 1 pound per square foot = 4.88 kg/m<sup>2</sup>; 1 gallon (U.S.) = 3.785 L; °C = (°F-32)/1.8; 1 degree = 0.79 rad.

- a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50 percent of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

- b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$$AF = A_s \times FA \times F$$

where:

$AF$  = Total glazing area.

$A_s$  = Standard reference design total glazing area.

$FA$  = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 × below-grade boundary wall area).

$F$  = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.36, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

- c. For fenestrations facing within 15 degrees (0.26 rad) of true south that are directly coupled to thermal storage mass, the winter interior shade fraction shall be permitted to be increased to 0.95 in the proposed design.

- d. Where leakage area ( $L$ ) is defined in accordance with Section 5.1 of ASHRAE 119 and where:

$$SLA = LCFA$$

where  $L$  and  $CFA$  are in the same units.

- e. Tested envelope leakage shall be determined and documented by an independent party approved by the code official. Hourly calculations as specified in the 2001 ASHRAE *Handbook of Fundamentals*, Chapter 26, page 26.21, Equation 40 (Sherman-Grimsrud model) or the equivalent shall be used to determine the energy loads resulting from infiltration.

- f. The combined air exchange rate for infiltration and mechanical ventilation shall be determined in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals*, page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.

- g. Thermal storage element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

- h. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

- i. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be used for the standard reference design.

- j. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.

- k. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum energy factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

TABLE 405.5.2(2)  
DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS<sup>a</sup>

| DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION                                  | FORCED AIR SYSTEMS | HYDRONIC SYSTEMS <sup>b</sup> |
|--|--------------------|-------------------------------|
| Distribution system components located in unconditioned space                    | —                  | 0.95                          |
| Untested distribution systems entirely located in conditioned space <sup>c</sup> | 0.88               | 1                             |
| "Ductless" systems <sup>d</sup>  | 1                  | —                             |

For SI: 1 cubic foot per minute = 0.47 L/s; 1 square foot = 0.093 m<sup>2</sup>; 1 pound per square inch = 6895 Pa; 1 inch water gauge = 1250 Pa.

- a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.

- b. Hydronic systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed loop piping and that do not depend on ducted, forced airflow to maintain space temperatures.

- c. Entire system in conditioned space shall mean that no component of the distribution system, including the air handler unit, is located outside of the conditioned space.

- d. Ductless systems shall be allowed to have forced airflow across a coil but shall not have any ducted airflow external to the manufacturer's air handler enclosure.



**EXHIBIT F-1**

Street lighting in Phase I shall utilize current energy-saving lighting equipment and technologies for street lighting, including LED cut-offs on all Town roads, private roads and common parking areas.

Received  
Recorded Register of Deeds  
Mar 22, 2017 11:19:19A  
Cumberland County  
Nancy A. Lane



## MEMORANDUM OF PURCHASE AND SALE AGREEMENT

Notice is hereby given of the existence of a purchase and sale agreement between Purchaser and Seller, as identified herein. The following information is provided with respect to the purchase and sale agreement, and the terms of the purchase and sale agreement are incorporated herein by reference, whether or not specifically set forth in this Memorandum.

**Sellers:**

George L. Russell  
Constance Bischoff Russell

**Buyer:**

Village Green Cumberland, LLC

**Property:**

A portion of the land located at and in the vicinity of 50 Amanda's Way, Town of Cumberland, County of Cumberland and State of Maine described in the deed of George L. Russell to Seller dated March 27, 2012 and recorded in the Cumberland County Registry of Deeds in Book 29481, Page 273 the portion to be conveyed consists of approximately 3 acres depicted on that certain Site Plan prepared by Stantec Consulting Services, Inc. (the "Plan").

**Date of P&S:**

May 24, 2018

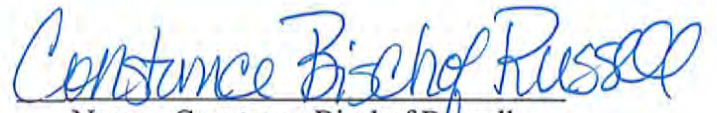
This Memorandum of Purchase and Sale Agreement is to provide record notice of the purchase and sale agreement identified herein, as the same may be amended or modified. This Memorandum does not modify or alter the terms of the purchase and sale agreement.

Dated as of this \_\_\_ day of May, 2018.

IN WITNESS WHEREOF, each of the parties hereto has signed this Agreement under seal.

SELLER:

  
Name: George L. Russell



Name: Constance Bischof Russell

PURCHASER:

VILLAGE GREEN CUMBERLAND, LLC

By: Bateman Investments, LLC

By: 

Name: Nathan H. Bateman

Title: Manager



Cumberland County  
Registry of Deeds  
Book 29298 Pg. 73  
recorded 1/25/2012  
@ 9:28 a.m.

GENERAL DECLARATION OF  
COVENANTS AND RESTRICTIONS  
VILLAGE GREEN, PHASE I  
CUMBERLAND, MAINE

JANUARY 17, 2012

GENERAL DECLARATION OF COVENANTS AND RESTRICTIONS  
VILLAGE GREEN, PHASE I  
CUMBERLAND, MAINE

THIS DECLARATION effective this 17th day of January, 2012 by VILLAGE GREEN CUMBERLAND, LLC, a Maine limited liability company (herein called "Declarant").

Article 1.     DECLARATION PURPOSES:

Section 1.1.   General Purposes: Declarant is the owner of certain real property located off Wyman Way and Drowne Road in Cumberland, Cumberland County, Maine, and desires to create therein a residential community. Declarant desires to provide for the preservation of the values and amenities in said community and desires to subject the real property described in Article 3 to the covenants, restrictions, easements, charges and liens hereinafter set forth, each and all of which is and are for the benefit of said property and each owner thereof. Among the values that Declarant desires to preserve is the scenic and recreational character of that real property. Declarant also desires to establish a homeowners association as a method for the administration, maintenance, preservation, use and enjoyment of the real property described in Article 3.

Section 1.2.   Declaration: To further the general purposes herein expressed, Declarant, for itself and its successors and assigns, hereby declares that all real property hereinafter described in Article 3, whether or not referred to in any deed of conveyance of such properties, at all times is and shall be held, transferred, sold, conveyed and occupied subject to the covenants, restrictions, easements, charges and liens (sometimes referred to as "covenants and restrictions") hereinafter set forth.

Article 2.     DEFINITIONS: The following words and terms when used in this Declaration or any supplemental declaration, and whether or not capitalized (unless the context indicates otherwise), shall have the following meanings:

"Association" shall mean the Village Green Homeowner's Association, a Maine non-profit corporation with an initial place of business in Portland, Maine.

"Board" or "Board of Directors" shall mean the duly appointed or elected Board of Directors of the Association.

"Bylaws" shall mean the duly adopted bylaws of the Association, including any amendments thereto as may be adopted from time to time.

"Common Expenses" shall mean the actual and estimated expenses of operating the Association, including any reasonable reserves, all as may be found to be necessary and appropriate by the Board of Directors pursuant to this Declaration and the Bylaws of

the Association.

“Common Properties” shall mean and refer to any real property, and improvements or portions of improvements thereon, within the properties which are not lots, and any personal property or equipment conveyed to the Association.

“Conservation Easement” shall mean any easement preserving the natural, undeveloped condition of the Open Space shown on the Subdivision Plan consistent with the Town of Cumberland’s permits and approvals.

“Design Guidelines” shall mean the Village Green Phase I Design Review Process and Design Guidelines.

“Dwelling” shall mean and refer to any residential structure or any building or any part thereof designed and intended for use and occupancy as a residence by a single family whether it is a condominium unit, a rental apartment or a single family house.

“Dwelling Accessory Building” shall mean a subordinate building, the use of which is incidental to the dwelling and customary in connection with that use.

“Enclosed Dwelling Area” shall mean that portion of a dwelling which is enclosed and customarily use for dwelling purposes, but shall not include open or shed porches, terraces, breezeways, garages, carports, sheds, decks or dwelling accessory areas if their roofline forms an integral part of the roofline of the main dwelling or if they are attached to a two story structure.

“Lot” shall mean and refer to the individual lots indicated on the Subdivision Plan (as hereinafter defined). In the event that any sidewalk, pathway or roadway encroaches, now or in the future, on any Lot, an easement for such encroachment exists.

“Owner” shall mean and refer to the record owner, whether one or more persons or entities, of the fee simple title, or that estate or interest which is most nearly equivalent to a fee simple title, to any Lot situated upon the properties, but shall not mean or refer to any mortgage holder thereof unless and until such holder has acquired title pursuant to foreclosure or any proceeding in lieu of foreclosure.

“Project Documents” shall mean, collectively:

- (1) Village Green Subdivision (approved by Town of Cumberland on September 20, 2011), the Development Conditions associated therewith and the Notice of Decision by the Cumberland Planning Board dated September 21, 2011;
- (2) Design Guidelines dated November 2011;



- (3) Maine Department of Environmental Protection Approval Order L-25376-L3-A-N, L-25376-TE-B-N, and L-25376-L6-C-N dated November 10, 2011 and recorded in the Cumberland County Registry of Deeds in Book 29153, Page 214, including the submissions therewith, which include the stormwater operations and maintenance provisions set forth in the "Inspection and Maintenance Manual For Stormwater Management System", Village Green, Cumberland, Maine, prepared by DeLuca-Hoffman Associates, Inc. dated May 2011;
- (4) Army Corps of Engineers Maine General Permit dated October 3, 2011; and
- (5) Any future Permits or Orders issued by any of the Town of Cumberland, MDEP or Army Corps.

"Project Documents Binder" shall mean the compilation of the Project Documents delivered to each Lot purchaser as part of the Purchase and Sale Agreements.

"Properties" shall mean and refer to the real estate described in Section 3.1 hereof.

"Residential Lot" shall mean all the numbered lots shown on the Subdivision Plan.

Roads And Drives - "Private Roads" are those Roads, Lanes, Drives or Ways labeled "Private Drive" or "Private R.O.W." on the Subdivision Plan. "Residential Drives" are all vehicular access drives servicing a Residential Lot, not labeled a Private Drive or Private R.O.W. Residential Drives are not shown on the Subdivision Plan.

"Single Family" shall mean one or more persons, each related to the other by blood, marriage or adoption, or a group of not more than four (4) persons not all so related, together with his or their domestic servants, maintaining a common household in a dwelling.

"Story" shall mean that portion of a dwelling included between the surface of any floor and the surface of a floor next above, or if there is no floor above, the space between the floor and the ceiling next above, but shall not include a cellar or basement.

"Structure" shall mean anything erected or constructed, the use of which requires more or less permanent location on or in the ground, or attached to something having a permanent location on or in the ground. A sign or other advertising device, attached or projecting, shall be construed to be a separate structure.

"Subdivision Plan" shall mean, collectively, that subdivision plan entitled "Amended Final Subdivision Plan Village Green Cumberland", and plan entitled "Amended Stream Buffer and Easement Plan" dated May 2011, revised as of January 5,

2012, approved January 17, 2012, and recorded in the Cumberland County Registry of Deeds in Plan Book 212, Page 18 and 19, respectively.

Article 3. PROPERTIES; ADDITIONS THERETO:

Section 3.1. Properties: The real property which is and shall be held, transferred, sold, conveyed and occupied subject to this Declaration is located in Cumberland, Cumberland County, Maine and is more particularly described in Exhibit A attached hereto and by this reference made a part hereof as fully as though recited in this Section 3.1. The property is also shown on the The Subdivision Plan.

Section 3.2. Additional Lots: [Reserved].

Article 4. GENERAL RESTRICTIONS:

Section 4.1. Land Use and Building Type; Number of Dwellings: No Dwelling or structure shall be erected, re-erected or maintained except in accordance with this Declaration. No dwelling accessory building shall be used for rental purposes separate from the dwelling. Each residential lot shall only be used for no more than one single family dwelling provided, however, that the Association may utilize any property conveyed to it by Declarant pursuant to Section 7.4 below for recreational and recreational-related facilities, subject to the receipt of all required local, state and federal permits and approvals with respect thereto.

Section 4.2. Private Recreational Facilities: No recreational amenities, including but not limited to swimming pools, tennis courts, hot tubs, whirlpools, sand boxes, swing sets or jungle gyms shall be erected, constructed or placed on any residential lot within the properties, except where such amenities are incorporated into the approved design of the lot by the Design Review Committee.

Section 4.3. Minimum Living Area: All dwellings constructed on the Property shall contain a minimum of 1100 square feet of living area, exclusive of basements, garages and associated structures. No plans shall be approved unless the proposed dwelling shall include this minimum living area.

Section 4.4. Building Height: No new dwelling shall be erected which is more than thirty-five (35) feet in height or whose roof line extends above the tree canopy, whichever is lesser. No dwelling accessory building shall exceed twenty-five (25) feet in height. Height shall be measured as provided in the Cumberland Zoning Ordinance. Pre-existing dwellings and other buildings may be rehabilitated and restored in accordance with their original size, scale and appearance. All construction shall be in accordance with all applicable ordinances of the Town of Cumberland, Maine.

Section 4.5. Dwelling Quality: It is the intention and purpose of these covenants

to ensure that all dwellings shall be of a quality of design, workmanship and materials which are compatible and harmonious with the natural setting of the area and other dwellings within the development. All dwellings shall be constructed in accordance with applicable government building, safety and other codes, and the Design Guidelines. Declarant shall, as part of the design and construction approval process, have the right to approve or disapprove the general contractor, for any construction project.

Section 4.6. Location of Dwellings and Structures: To assure that buildings and other structures will be located so that desirable view, privacy and breeze will be available to the largest number of buildings or structures built within the properties and that structures will be located with regard to the topography of the properties taking into consideration the location of large trees, structures previously built or approved pursuant to this Article 4 and other aesthetic and environmental considerations, all dwellings, accessory buildings and other improvements constructed on any Lot shall be located within the building windows shown on the lots of the Subdivision Plan.

Section 4.7. Parking; Automobiles, Boats and Other Vehicles: The following parking and vehicle restrictions shall apply within the Property:

(a) No owner or resident of a Lot shall park, store or keep any vehicle which is otherwise permitted to be parked within the Property pursuant to his Declaration except wholly within the garage or driveway of the owners/residents home and further provided that any vehicle or boat stored within the Property shall be stored within the garage or other permitted accessory building within the Property.

(b) On-street parking shall occur only in areas designated for such use and is intended for turn over parking where parking needs cannot be accommodated on any Lot or designated Common Areas. Guests of a Lot owner may park in designated on-street spaces for no more than forty eight (48) consecutive hours without the express written approval of the Association.

(c) Off-street parking outside of the Lots shall occur only as specifically permitted by the Association.

(d) This section shall preclude the parking of service or delivery vehicles delivering to or servicing the Lots, unless in connection with business being conducted on a Lot.

(e) No Owner or Resident shall repair or restore any motor vehicle, boat, trailer or other vehicle upon any portion of any Lot or upon the Common Areas, except for emergency repairs thereto and then only to the extent necessary to enable movement thereof to a proper repair facility.

(f) For purposes of this section, "private passenger vehicle" shall mean reasonably well maintained vehicles as determined in the discretion of the Board of Directors, used primarily for residence passenger transportation and which can be enclosed within the resident's garage. "Private passenger vehicle" shall not include any of the following:

(i) Vehicles originally constructed (or subsequently altered) so as to be equipped for human habitation or to which a camper shell or other similar addition has been attached;

(ii) Vehicles which are primarily stored (as opposed to primarily operated as a passenger vehicle), such as vehicles damaged or missing parts, or vehicles not currently registered in accordance with the Maine Vehicle Code; or

(iii) Work vehicles with bins, ladders, ladder racks, or equipments visible to passers-by. The Board in its reasonable discretion may add to or modify this list as part of the Association Rules.

(g) The Board shall have the authority to promulgate further reasonable rules and restrictions of uniform application regarding the parking and/or operation of vehicles within the Property as may be deemed by it reasonable and appropriate.

Section 4.8. Driveways: Plans and specifications for driveways, culverts, pavement edging and markers shall be approved in writing by Declarant.

Section 4.9. Home Occupations: No home occupation or profession which involves the generation of traffic, including customer vehicles and/or delivery vehicles, shall be conducted in any dwelling or dwelling accessory building unless approved by the Declarant or the Association.

Section 4.10. Temporary Structures: No trailer, tent, shack or other structure, except as otherwise permitted herein, and no temporary building or structure of any kind shall be used for a residence, either temporary or permanent. Temporary buildings or structures used during the construction of a dwelling shall be in close proximity to the dwelling and in a location approved by Declarant and such buildings or structures shall be removed upon completion of construction.

Section 4.11. Completion of Construction: Construction of dwellings and dwelling accessory buildings shall commence within one (1) year of the date the building permit is granted by the Town of Cumberland. Any construction undertaken shall be continued with diligence toward the completion thereof and the exterior construction of

any dwelling and dwelling accessory buildings shall be completed within one (1) year of the date on which construction (including excavation) commences, except that such period may be extended by reason of strikes, fires, natural disasters and other matters beyond owner's control. Dwellings and other dwelling accessory buildings may not be temporarily or permanently occupied until the exteriors thereof have been completed. Substantially all of the landscaping shown in plans submitted to and approved by Declarant must be completed within ninety (90) days of completion of exterior construction unless Declarant approves an extension of such ninety (90) day period. Only one ninety (90) day extension shall be granted and all landscaping shown on said plans must be completed by the end of the extension. As a condition of approval of proposed plans for all structures, a bond may be required by Declarant which guarantees payment of the landscape contractor's estimated cost of installation to implement the plan as submitted to and approved by Declarant.

Section 4.12. Signs: Except during the initial sales phase of the Lots, or as may be waived by Declarant, no signs or advertising devices, including but without limitation, commercial, political, informational or directional signs or devices, or for sale or for rent signs, shall be erected or maintained on the residential lots, and except signs which comply with the requirements of the Village Green Cumberland Sign Guidelines. Dwelling identification signage is limited to one sign no larger than 6" x 18" mounted on the dwelling, by or on the door or near the driveway entrance to the Lot.

Section 4.13. Trees: It is the Declarant's intention that the natural woodland of the properties be preserved. Unless located within twenty (20) feet of a dwelling or dwelling accessory building or within twenty (20) feet of the approved site for such building, no trees measuring four (4) inches or more in diameter at breast height may be removed without a written variance from the Design Review Board as defined in Section 5.5 herein. No trees planted by the Declarant may be removed without the express written approval of the Declarant or the Board. In the event of a violation hereof, a special fine of \$2000 per tree removed may be levied by the Declarant or the Association against the responsible owner and said owner shall, to the extent practical, plant a new tree or trees of the same or different species in approximately the same location as the tree or trees wrongfully removed. Should said owner fail to replace such tree or trees, the Declarant or the Association, in addition to levying such fine, shall have the right to enter upon the property and plant a new tree or trees of the same location as the tree or trees wrongfully removed at a cost to be paid by the owner. Fines or charges pursuant to this Section 4.13 shall be collected and enforced in the same manner as assessments under Article 8.

Section 4.14. Utility Lines: All water, gas, electrical, telephone and other electronic pipes and lines and all other utility lines within the limits of the properties shall be installed in compliance with all applicable federal, state and local requirements, the Design Guidelines and with the consent of Declarant. All utility lines shall be maintained

by the Declarant until Declarant shall turn them over to the Association, at which time the Association will have sole responsibility for maintaining the utility lines in the common areas. Declarant and/or the Association shall have access to each of the lots for purposes of maintaining utility lines, including irrigation lines and similar utilities installed for the benefit of a particular Lot.

Section 4.15. Maintenance of Lots: All lots and all improvements on the lots shall be kept and maintained by the owner thereof in clean, safe, attractive and slightly condition and in good repair, subject to the rights of the Declarant and/or the Association to provide such maintenance services consistent with this Declaration and the Association contracts and budgets.

Section 4.16. No Noxious or Offensive Activity: No offensive or noxious activity shall be carried on upon the properties. "Offensive or Noxious" activity or behavior shall include but not be limited to a public nuisance or nuisance per se and shall also include any behavior which is inconsistent with both the reasonable pleasurable use of the properties by owners, their lessees and guests and their reasonable expectations of vacationing, year-round living, studying, working, recreating, or enjoying sports free of excessively noisy behavior grossly disrespecting the rights of others, flashing or excessively bright lights, racing vehicles, offensive displays of public sexuality, significantly loud electronic music distractions, or other similar unreasonable behavior or activity curtailing or likely to curtail the reasonable pleasure and use of the properties by others who are not participating in such offensive or noxious activity. Resort athletic events, concerts, festivals, competitions or shows primarily for the use and enjoyment of the properties by owners and their guests, conducted under permit from Declarant shall not constitute offensive or noxious activity or behavior unless such permit is withdrawn by Declarant, or its terms and conditions violated.

Section 4.17. No Hazardous Activities: No activities shall be conducted on the properties and no improvements constructed on the properties which are or might be unsafe or hazardous to any person or property. Without limiting the generality of the foregoing, no firearms shall be discharged upon the properties and no open fires shall be lighted or permitted on the properties except within a contained barbeque unit while attended and in use for cooking purposes or within a safe and well-designed fireplace.

Section 4.18. No Unsightliness: No Unsightliness shall be permitted upon the properties. Without limiting the generality of the foregoing, (a) any unsightly structures, facilities, equipment, tools, objects or conditions shall be enclosed within an approved building or appropriately screened from view, except equipment and tools when in actual use for maintenance or repairs; (b) no motor vehicles shall be constructed, reconstructed, repaired or abandoned upon the properties except in an enclosed garage or work space; (c) no lumber, grass, shrub or tree clippings, plant waste, metals, bulk materials or scrap shall be kept, stored or allowed to accumulate on the properties; (d) refuse, garbage or

trash shall be placed and kept at all times in a covered container and such container shall be kept within an enclosed structure or appropriately screened from view; (e) hanging, drying or airing of clothing or household fabrics shall not be permitted on the properties; (f) garage doors shall not be left open for extended periods of time.

Section 4.19. Restrictions on Animals: Usual and ordinary domestic pets may be kept on the properties, provided that dogs shall be leashed in accordance with Cumberland Ordinances and no dog runs or pens shall be maintained in the area between the dwelling and the adjacent roadway.

Section 4.20. No Annoying Lights, Sounds or Odors: No light shall be emitted from any portion of the properties which is unreasonably bright or causes unreasonable glare or does not comply with the Design Guidelines; no sound shall be emitted from any portion of the properties which is unreasonably loud or annoying including without limitation, speakers, horns, whistles, bells or other sound devices, except security and fire alarm devices use exclusively to protect any of the properties or buildings; no odors shall be emitted from any dwelling or any portion of the properties which are noxious or offensive to others.

Section 4.21. Rules and Regulations: In order to ensure the peaceful and orderly use and enjoyment of the properties, Declarant may from time to time adopt, modify and revoke in whole or in part, such reasonable rules and regulations, to be called Rules and Regulations, governing the conduct of persons on said properties as it may deem necessary, including, but not limited to, Design Guidelines, Sign Guidelines, and methods and procedures for enforcing compliance with the Declaration. In addition, the Board of Directors may from time to time adopt, modify and revoke in whole or in part, such reasonable Rules and Regulations governing conduct of persons on said properties as it may deem necessary. Said modification and revocations shall not apply to those Rules and Regulations adopted, modified or revoked by Declarant. Such Rules and Regulations upon adoption, and every amendment, modification and revocation thereof, shall be delivered promptly to each owner, the Association and the Design Review Board and shall be binding upon all owners. No such Rules or Regulations shall be established which violate the intention or provisions of this Declaration or the Design Guidelines or which shall unreasonably restrict the use of the properties by the owners thereof. The Rules and Regulations of Declarant shall control and supersede any Rules and Regulations of the Association in the event a conflict exists between the Rules and Regulations of Declarant and the Rules and Regulations of the Association. Such Rules and Regulations may not amend, alter or conflict with any provisions of this Declaration, the Bylaws of the Association.

Section 4.22. Snow Storage: Declarant shall have the right to designate areas within the properties to push, stock or store snow.

Section 4.23. Television Antennae: No antenna or other signal receiving system shall be constructed or maintained on the properties except such system as approved and made available by Declarant.

Section 4.24. Deviations by Agreement with Declarant: Declarant may enter into agreements with any owner, without the consent of any other owner, to deviate from any of the covenants set forth in this Article 4 for reasons of practical difficulties or particular hardships which otherwise would be suffered by such owner, provided that no such deviations shall be unreasonably inconsistent with the overall plan for the harmonious development of the Property. It is the intent of this Section 4.24 that such deviations be of a minimum amount or scope reasonably necessary to alleviate such difficulties or hardships. Any such deviation, which shall be manifested by agreement in writing, shall not constitute a waiver of any such covenant as to other lots on the properties. No such agreement may be in conflict with any other provisions of this Declaration, the Bylaws of the Association or the Audubon Agreement.

Section 4.25. Lots Not Subject to General Restrictions: Anything herein to the contrary notwithstanding, Declarant reserves the right to construct and maintain on the properties structures for use by it, its successors and assigns, as an office of offices in connection with the development, sale and management of the properties and in that regard to erect and maintain signs at selected locations. Said structures shall comply with the Design Guidelines.

Section 4.26. Subdivision of Property; Time Sharing, Interval Ownership: No lots may be further subdivided to create additional lots beyond the number permitted in Section 3.1 above, including conversion of structures into condominium units.

No unit of ownership may be subdivided to permit "Time Sharing" or other "devices" to effect interval ownership. For purposes of this Article, "devices" to effect interval ownership shall include but not be limited to ownership arrangements, including uses of corporations, trusts, partnerships or tenancies in common in which four or more persons not members of a single household have acquired, by means other than will, descent, inheritance or operation of law, an ownership interest (directly or indirectly, equitable or legal) in the same dwelling and such owners have a formal or informal right-to-use agreement. Such "devices" to effect interval ownership may or may not be time sharing arrangements established under the Maine Time Share Act, 33 M.R.S.A. §591, et seq., as amended.

Section 4.27. Drainage: Declarant may establish reasonable regulations and restrictions pertaining to drainage or siltation originating on construction sites and parking areas, porosity of pavement materials used on roadways and parking areas and similar provisions relating to hydrological factors on properties.



Section 4.28. Landscaping: The Association shall have the right to enter on any lot and install, remove or maintain any landscaping on that lot, if the owner shall not have installed the approved landscaping within the time allotted for completion, or shall fail to adequately maintain the landscaping in accordance with the applicable Guidelines.

Section 4.29. Subdivision Plan/Project Documents Compliance: The Properties shall be constructed and constantly maintained by the Declarant and thereafter by the Association in strict compliance with the Approved Subdivision Plan and Project Documents.

Any conflict between the above-cited Plan or Project Documents and this General Declaration shall be interpreted and enforced in accordance with the terms of the Plan or Project Documents which shall control and supersede this General Declaration and the Bylaws of the Association.

Article 5.     ARCHITECTURAL CONTROL AND REQUIRED APPROVAL OF CONSTRUCTION OF DWELLINGS, STRUCTURES, OF CLEARING, GRADING AND RELATED MATTERS:

Section 5.1. Approval by Declarant: No improvements of any kind, including but not limited to dwellings, swimming pools, ponds, garages, parking areas, fences, walls, tennis courts, greenhouses, drives, antennae, flag poles, lamp posts, mail boxes, curbs and walks shall ever be erected, altered or permitted to remain on any lands within the properties, nor shall any excavating, clearing, removal of trees, or shrubs, or landscaping be done on any lands within the properties, unless the complete plans and specifications therefore are approved in writing by Declarant prior to commencement of such work. Declarant shall consider the materials to be used on the external features of said buildings or structures, the location with respect to topography and finished grade elevations and harmony of landscaping with the natural setting and surroundings, and shall ascertain whether the architecture conforms to the Design Guidelines.

Section 5.2. General Requirements: Declarant shall exercise its best judgment to see that all improvements, construction, landscaping and alterations on the properties approved by Declarant conform and harmonize with the Design Guidelines and the natural surroundings and with existing structures as to external design, bulk, rooflines, material, color, siting, height, topography, grade and finished group elevation.

Declarant shall disapprove any plans submitted to it which are not sufficient for it to exercise the judgment required of it by these covenants.

Refusal of approval by Declarant of plans, locations or specifications may be based upon any ground, including purely aesthetic conditions which in the sole and uncontrolled discretion of Declarant shall appear sufficient to support the refusal.

Section 5.3. Liability: Declarant shall not be liable in damages to any persons submitting any plans for approval, or to any owner by reason of any action, failure to act, approval, disapproval, or failure to approve or disapprove, with regard to such plans. Any owner of any person submitting plans to Declarant for approval, by so doing, shall be deemed to have agreed and covenanted that he will not bring any action or suit to recover damages against Declarant, its officers as individuals, or its advisors, employees, or agents.

Section 5.4. Procedures for Obtaining Required Approval: Whenever approval is required of Declarant, appropriate complete plans, specifications and stake out shall be submitted to Declarant for preliminary and final review and approval. Declarant shall give notice to the applicant of receipt of the completed application for either preliminary or final approval and shall either approve, disapprove or approve with conditions such application within thirty (30) days after such notice. If the application is disapproved in any respect, the applicant shall be notified wherein such plans and specifications are deficient. If such plans and specifications are not approved, disapproved or approved with conditions within thirty (30) days after notice of receipt, they shall be deemed approved. At the discretion of Declarant, a reasonable filing fee shall accompany the submission of such plans to defray administrative expenses. A copy of each approved set of plans and specifications shall be kept on file by Declarant.

Section 5.5. Design Review Board: Declarant shall establish a Design Review Board for the following purposes, which Design Review Board shall act on behalf of Declarant with respect to those rights and obligations of Declarant set forth in this Declaration which relate to approval of construction on Lots:

5.5.1. Promulgation of design review guidelines and procedures.

5.5.2. Consideration of and action upon applications for approval of improvements. Board approval of improvements shall take the form of a Certificate of Approval issued after the Board has approved the plans and specifications of the proposed improvements, and a Certificate of Completion issued after the Board has reviewed the approved improvements and certified them to be complete in accordance with the plans and specifications including, without limitation, the approved landscaping of each lot. No final Certificate of Occupancy shall be issued without the Lot owner's submission of the Certificate of Completion to an appropriate representative of the Town of Cumberland.

5.5.3. Inspection of all construction activities on the properties, and enforcement of architectural controls and compliance with the Design Guidelines and approvals thereunder.

5.5.4. Other activities necessary or convenient to carrying out this

Section 5.5.

Section 5.6. Members of Design Review Board: The Design Review Board members shall consist of at least three (3) persons, initially appointed by Declarant, of whom at least two (2) shall be members of the Board of Directors. The Board of Directors shall act as the Design Review Board at any time(s) the Design Review Board is not established. No member of the Design Review Board may serve for term longer than three (3) years without being elected to serve by the Association, unless he/she is a member of the Board of Directors. No member of the Design Review Board may serve longer than six (6) consecutive years.

Section 5.7. Declarant Representative: The Declarant may appoint a representative to operate a planning and development office and to act for Declarant in processing and reviewing applications and enforcing compliance with the Design Guidelines and approval thereunder.

Article 6. MEMBERSHIP AND VOTING RIGHTS IN THE ASSOCIATION;  
ASSOCIATION PURPOSE AND POWERS:

Section 6.1. Membership: Prior to conveyance of any dwelling or lot on the properties, Declarant shall cause the Association to be formed. Every owner, as defined in Article 2 herein, shall be a member of the Association, provided that any person or entity who holds an interest in any dwelling or lot merely as a security for the performance of an obligation shall not be a member.

Section 6.2. Voting Rights: All members shall be entitled to one (1) vote for each residential lot, in which they hold the interests required for membership pursuant to this Article 6. When more than one person or entity holds such an interest or interests in any dwelling or lot, all such persons or entities shall be members, and the vote for such dwelling or lot shall be exercised as they among themselves determine by majority vote, but in no event shall more than one vote be cast with respect to any such dwelling or residential lot. A member's voting rights shall be suspended during any period in which the member is more than thirty (30) days in arrears for amounts due the Declarant or Association, including assessments.

Section 6.3. Declarant Control: Notwithstanding the foregoing, Declarant shall have the right to appoint, remove and replace the directors of the Association until the first meeting of members following the conveyance of ninety percent (90%) of the residential lots that Declarant has the right to create within the properties pursuant to Section 3.2 above, or ten (10) years from the date of recording this Declaration, whichever comes later. Declarant shall call a meeting within sixty (60) days of such conveyance or within sixty (60) days following the tenth year anniversary of the recording hereof, as the case may be, for the purpose of the electing directors by the

members. Declarant may also convey control to the Association at such earlier time as it may choose, following sixty (60) days advance written notice to the Association.

Section 6.4. Association Purpose and Powers: The Association is the governing body under this Declaration and shall have all powers generally reserved to community associations, except as otherwise stated in the Declaration or as limited by law, including, but not limited to, the power to:

6.4.1. Adopt and amend bylaws and rules and regulations;

6.4.2. Adopt and amend budgets for revenues, expenditures and reserves and collect assessments from owners;

6.4.3. Hire and terminate managing agents and other employees, agents and independent contractors;

6.4.4. Institute, defend or intervene in litigation or administrative proceedings in its own name on behalf of itself or two or more owners on matters affecting the Association;

6.4.5. Make contracts and incur liabilities;

6.4.6. Regulate and use, maintenance, repair, replacement and modification of the common properties;

6.4.7. Cause additional improvements to be made as part of the common properties;

6.4.8. Acquire, hold, encumber and convey in its own name and right, title or interest to real or personal property;

6.4.9. Grant easements, leases, licenses and concessions through or over the common properties;

6.4.10. Impose and receive any payments, fees or charges for the use, rental or operation of the common properties, other than restrictive zones and areas described in Article 10;

6.4.11. Impose charges for the late payment of assessments and after notice and an opportunity to be heard, levy reasonable fines for violations of the Declaration, Bylaws and Rules and Regulations of the Association;

6.4.12. Impose reasonable charges for the preparation and recording of amendments to the Declaration;

6.4.13. Provide for the indemnification of its officers and directors and maintenance of directors and officers liability insurance;

6.4.14. Assign its right to future income;

6.4.15. Exercise any other powers conferred by the Declaration or Bylaws;  
and

6.4.16. Exercise any other powers necessary and proper for the governance and operation of the Association.

6.4.17. Enforce compliance with the Approved Subdivision Plan.

Article 7. PROPERTY RIGHTS IN THE PROPERTIES AND OBLIGATIONS OF THE ASSOCIATION WITH RESPECT THERETO:

Section 7.1. Conveyance of Common Properties to the Association: Except as otherwise provided herein, Declarant may retain title to and shall not convey to the Association the common properties until such time as Declarant has conveyed to persons other than an affiliate of Declarant ninety percent (90%) of the residential lots that Declarant has the right to create within the properties pursuant to Section 3.2 above. Within one hundred twenty (120) days after the conveyance by Declarant of ninety percent (90%) of said residential lots, Declarant shall convey said common properties to the Association. At the time of said conveyance, the Declarant shall have maintained the working capital fund with sufficient funds to meet the anticipated Association expenses for one year after the conveyance. Until such time, Declarant shall hold said common properties for the benefit and enjoyment of the owners and shall levy the assessments contemplated by Section 8.1 and 8.2 against all lots not owned by Declarant pursuant to the powers granted Declarant in Section 8.1 hereof.

Section 7.2. Members' Easement Enjoyment: Subject to the provisions of the Declaration and to the incorporating documents of the Association, which is or will be the grantee of the common properties, every member as defined in Article 6 herein, shall have the right and easement of enjoyment in and to the common properties in common with other owners and such easement shall be appurtenant to and shall pass with the title to every dwelling or lot, subject to the Project Documents.

Section 7.3. Obligation of the Association with Respect to Common Properties: The Association, for itself, its successors and assigns, by acceptance of a deed to all or a portion of the common properties, subject to and with the benefit of the provisions of this Declaration, which shall be recorded in Cumberland County Registry of Deeds, hereby covenants with Declarant as follows:

7.3.1. The Association will accept conveyance of the common properties

which Declarant is obligated to or may convey to it.

7.3.2. The Association will preserve and maintain for the common benefit of the owners all of the common properties which the Association hereafter shall own, or have rights to or interests in including without limitation the obligation to maintain streets, roadways and other common areas and facilities which may be conveyed to the Association as common properties, pay taxes thereon, keep the same in good and sightly appearance, maintain insurance thereon, keep the same in good and sightly appearance, maintain insurance thereon as provided in the Bylaws and comply with and enforce the provisions of this Declaration. All areas designated as "Open Space" shall remain as open space and shall not be subdivided or built upon or otherwise altered from their natural character, except for such alteration reasonably necessary in order to create pedestrian walking trails and relocation of existing snowmobile trails, maintain the existing pond, maintain, repair and replace existing improvements and structures thereon, including above-ground and underground utilities, or to install new underground utilities across said areas, following which said areas will be restored as nearly as possible to their original condition.

Section 7.4. Extent of Members' Easements: The rights and easements of enjoyment created hereby shall be subject to the following:

7.4.1. Rights of Declarant, its successors and assigns, as herein reserved.

7.4.2. Rights of the Association which is the grantee of common properties, including, but not limited to the rights of the Association to suspend enjoyment rights of any member by reason of unpaid assessments or violations hereof or of Rules and Regulations, all as provided herein.

Section 7.5. Residential Driveways and Expenses: Declarant shall build all Private Roads shown on the Subdivision Plan but shall have no responsibility to construct any Residential Drives to any of the Lots. The individual Lot owners are responsible for constructing and maintaining all Residential Drives.

Section 7.6. Rights Reserved by the Declarant: Declarant, for itself, its successors and assigns, reserves for the benefit of Declarant or any properties of Declarant or any successor or assign of Declarant, which need not include the properties, the following rights in any of the properties transferred to the Association or the owners:

7.6.1. Unless expressly waived by Declarant, Declarant reserves exclusively unto itself, its successors and assigns, a perpetual, alienable and releasable easement and right in, on, over and under the Properties to erect, maintain, operate and use roadways, parking lots, poles, wires, cables, switches, computers, receptacles, satellite transmission earth stations, conduits, directional and informational signs, drainage ways, sewers, irrigation lines, wells, antennas, receivers, garbage collection

facilities, pumping stations, tanks, water mains and other suitable equipment including microwave and satellite stations for the conveyance, transmission or use of video, voice, facsimile and data communications, electricity, gas, sewer, water, drainage or other public convenience, utilities and communication facilities on, in or through those portions of the properties as may be reasonably required for access and utility purposes for the Properties as shown on the Subdivision Plan and also those associated areas shown as Open Space on the Subdivision Plan, provided, however that :

- (a) No utility easement shall run across any portion of the properties which is conveyed by a building window or across any area for which written approvals to construct a building thereon have been obtained within the past year from Declarant;
- (b) Such easement or installation of utilities therein or thereon shall be maintained in as attractive a state as is reasonably feasible; or
- (c) Declarant, without obligation, reserves the right to transfer any such utilities and easements, in whole or in part, which it owns to the Association, at which time the Association shall be responsible for and shall have the obligations to operate and maintain such utility easements.

These easements and rights expressly include the right to cut any trees, bushes or shrubbery, make any gradings of the soil or take any other similar action reasonably necessary to provide economical and safe utility installation and to maintain reasonable standards of health, safety and appearance, except that no such easements and rights may be exercised in violation of Section 4.13 of this Declaration or the Design Guidelines. Any material disturbance to the grounds of any owner or common properties caused by such utility installation shall be repaired and said grounds returned to a reasonable reconstruction of their prior condition by Declarant or prompt and reasonable remuneration for such repair shall be made to such owner or association of owners by Declarant. Declarant further reserves to itself, its successors and assigns, the right to locate the waterlines, pumping stations, siltation basins or tanks within the common properties, or on any lot with the permission of the owner thereof.

7.6.2. An easement is reserved for surface drainage in and along the streets and such other locations as are shown on the Subdivision Plans as “drainage easements” or otherwise designated for such intended purpose.

7.6.3. An easement is reserved for the purposes stated in Section 7.6.1 with respect to areas within platted streets and roadways. Declarant, its successors, assigns, employees and licensees, shall have the unobstructed use at all times of all streets and

roadways.

7.6.4. The right to construct and maintain on the common properties and open space, paths and trails for recreational use by owners or Declarant, provided such paths and trails shall be constructed so as not to adversely affect the scenic character of the common properties. Some areas of the Properties may be used for hiking and recreational trails as shown on the Subdivision Plan and Master Development Plan. Maintenance of those areas and trails shall be the responsibility of the Association to the extent located upon the Properties, but not extensions thereof which may continue into the Conservation Easement areas.

7.6.5. The right to connect with and use utility lines, wires, pipes and conduits located on the properties of construction and sales purposes, provided that Declarant shall be responsible for the cost of service so used.

7.6.6. The right to use common properties for ingress and egress and for the storage of construction materials and equipment used in the construction of dwellings or other improvements on the properties.

7.6.7. The right to operate a sales office and have prospective purchasers and others visit the office and use the common properties for ingress, egress and parking.

7.6.8. The right to install and maintain signs and lighting for sales and promotional purposes.

7.6.9. No Affirmative Obligation Unless Stated: ANY RESERVATION OR RIGHT OF DECLARATION WHICH IS STATED IN OR IMPLIED FROM THESE COVENANTS SHALL NOT GIVE RISE TO ANY AFFIRMATIVE OBLIGATION OR DUTY ON THE PART OF THE DECLARANT UNLESS EXPRESSLY STATED ON THESE COVENANTS.

Section 7.7. Eminent Domain:

7.7.1. If a lot is acquired by eminent domain or part of a lot is acquired by eminent domain leaving the owner with a remnant that may not practically or lawfully be used for any purpose permitted by the Declaration, the award must include compensation to the owner for that lot and its membership interest in the Association. Upon acquisition, unless the decree otherwise provides, that lot's membership interests in the Association are automatically reallocated to the remaining lots in proportion to the respective interests of those lots before the taking. Any remnant of a lot remaining after a part of a lot is taken under this subsection is thereafter part of the common properties.

7.7.2. Except as provided in Section 7.7.1, if part of a lot is acquired by eminent domain, the award must compensate the owner for the reduction in value of the



lot.

7.7.3. If part of the properties is acquired by eminent domain, the portion of the award attributed to the common properties taken must be paid to the Association. Any portion of the award attributable to the acquisition of common properties whose use is restricted to certain lots must be equally divided among the owners of the lots to which that portion of the common properties was restricted at the time of acquisition.

7.7.4. The court decree must be recorded in the Cumberland County Registry of Deeds.

Section 7.8. Lots Subject to Right of Entry: Each lot is subject to the right of the Association or its agents to enter thereon at all reasonable times and, in the case of an emergency, without notice, for the purpose of performing maintenance or repairs or for carrying out any of the rights or duties of the Association.

Section 7.9. Town of Cumberland Entry/Inspection: Upon request by the Code Enforcement Officer, Plumbing Inspector, or Town Engineer, the Association shall produce for inspection and copying at the Cumberland Town Office, or permit the inspection and copying at its own office of any or all of its corporate, financial, operating, inspection, and maintenance records, reports, contracts, budgets and other papers, for the purpose of determining its performance of any compliance with the requirements of the Declaration and Section 6.2 of the Town of Cumberland Subdivision Ordinance.

The Code Enforcement Officer, the Plumbing Inspector, or his authorized representative, or the Town Engineer, and other duly authorized employees of the Town bearing proper credentials or identification, shall be permitted to enter at all reasonable times, upon all real or personal property necessary to the operation of the private common use improvements, for inspection, observation, measurements, sampling, and testing related to the operation, maintenance, and repair of the private common use improvements.

#### Article 8. COVENANT FOR MAINTENANCE ASSESSMENTS:

##### Section 8.1. Assessments By Declarant and The Association:

8.1.1. Creation of the Lien and Personal Obligation of Assessments: Each owner of a lot, by acceptance of a deed therefor (whether or not it shall be so expressed in any such deed) shall be deemed to covenant for himself, his heirs, representatives, successors and assigns, to pay Declarant, prior to the conveyance of the common properties to the Association, or the Association, following such conveyance, assessments and charges as provided herein. All such assessments and charges shall be fixed, established and collected from time to time as hereinafter provided, shall be a charge on the lot or dwelling with respect to which such assessments and charges are

made and shall be a lien against such lot or dwelling. Each such assessment and charge, together with the interest thereon and costs of collection thereof, shall also be the personal obligation of the member who is the owner of such assessed lot at the time the assessment fell due.

8.1.2. Purpose of the Assessment: The assessments may be levied against the lots for purposes of promoting the recreation, health, safety, and welfare of the residents of the properties, and in particular for the improvement and maintenance of the common properties, services and facilities devoted to such purpose and related to the use and enjoyment of the common properties and of the members including, but not limited to, discharge of the obligations of the Declarant or the Association as imposed by this Declaration and/or the Bylaws, payment of taxes, if any, upon the common properties assessed to the Declarant or the Association and repair, replacement and additions thereto, for repair and maintenance of streets, roadways, utility lines and drainage facilities, and for the cost of labor, equipment, materials management and supervision thereof; the Assessments shall also be utilized for the provision of common services to the individual Lots as contracted and budgeted by the Association, such expenses to include without limitation, mowing, lawn and turf maintenance and landscaping; provided, however, that nothing in this Section 8.1.2 shall impose on the Declarant or the Association a duty to perform any services or supply any materials not required elsewhere herein.

8.1.3. Computation of Operating Budget and Assessment: It shall be the duty of the Board at least thirty (30) days prior to the Association's annual meeting to prepare a budget covering the estimated costs of operating the Association during the coming year. In determining assessments, the Board may take into account the benefit to specific lots or classifications of lots of particular expenditures. The Board shall cause the budget and the assessments to be levied against each lot for the following year, to be delivered to each member at least twenty-one (21) days prior to the meeting. The budget and assessments shall be deemed ratified and approved unless disapproved at the annual meeting by a vote of sixty percent (60%) of the total Association membership. In the event the budget is disapproved, the budget last approved by the members shall be continued until such time as the members approve a subsequent budget proposed by the Board.

The Board shall determine the total amount required, including the operational items such as insurance, repairs, reserves, maintenance and other operating expenses, as well as charges to cover any deficits from prior years and capital improvements and capital reserve accounts approved by the Board. The total annual requirements and any supplemental requirements shall be allocated between, assessed to and paid by the members as follows:

Each lot shall be assessed, and the owner or owners thereof shall pay, a

portion of said requirements, the numerator of which shall be one (1) and the denominator of which shall be equal to the number of lots on the properties subject to this Declaration. Each purchaser of a Lot shall pay one (1) month assessments in advance to the Association at the closing of the purchase of any Lot, unless waived by the Board or manager of the Subdivision. The Declarant's obligation for such assessments on unsold lots subject to this Declaration will be limited to the difference between the actual operating costs of the Association, including reserves, and the assessments levied on owners other than Declarant. In no event, however, will the Declarant be required to make a deficiency contribution in an amount greater than it would otherwise be liable for if it were paying assessments on unsold lots. The sum due the Association from each individual owner shall constitute an assessment of the Board of Directors and unpaid assessments shall constitute liens on the individual lots, subject to foreclosure as hereinafter provided.

8.1.4. Due Dates; Duties of the Board of Directors: All assessments shall be payable monthly in advance on the first day of each month as ordered by the Board. The Board shall fix the date of commencement and the amount of the assessment against each lot and shall prepare a roster of the lots and assessments applicable thereto which shall be kept in the office of the Association and shall be open to inspection by any member. Upon the written request of a member of his mortgagee, the Board shall promptly furnish such member of his mortgagee with a written statement of the unpaid charges due from such member.

8.1.5. Initial, Revised and Emergency Assessments: An amount equal to the scheduled monthly assessment will be paid to the Association by the owner of each lot at the time of each lot acquisition, to be held by the Association and applied as it may elect for all authorized purposes. This initial assessment shall be in addition to, and not in lieu of, regular monthly assessments provided herein. Each lot owner shall be entitled to a refund from the Association of this initial assessment at the time the lot is re-sold or otherwise transferred and the replacement lot owner has paid its initial assessment to the Association.

If at any time prior to or during the course of any fiscal year the Board shall deem the amount of the assessments to be inadequate by reason of a revision in its estimate of either expenses or other income, the Board shall prepare and cause to be delivered to the members a revised estimated annual budget for the balance of such fiscal year and shall call a meeting of the members to ratify such budget in the same manner as for an annual budget. After ratification, monthly assessments shall be determined and paid on the basis of such revisions.

The Board may, upon finding that an emergency exists which requires immediate assessment of the members, make an emergency assessment not to exceed an amount equal to the then current monthly assessment for each lot, which shall be due and

payable when communicated to the members.

8.1.6. Notice of Meetings: Written notice of any meeting called for the purpose of taking any action authorized under Section 8.1.3 or 8.1.5 of this Article 8 shall be sent to all members not less than twenty-one (21) days in advance of the meeting. Upon written request of any institutional holder of a first mortgage, that holder shall be entitled to written notice of any such meeting and shall be permitted to designate a representative to attend and observe the meeting.

Section 8.2. Effect of Non-Payment of Assessment of Other Charges; the Personal Obligation of the Owner; the Lien; Remedies: If any assessment or any other charges payable pursuant to this Declaration are not paid on the date when due as provided herein, then such assessments and charges shall become delinquent and shall, together with interest thereon and cost of collection thereof as provided hereinafter, thereupon become a continuing lien upon the lot against which such assessments are made and shall bind such property in the hands of the then owner, his heirs, devisees, personal representatives, successors and assigns. Such lien shall be prior to all other liens except: (s) tax or assessment liens on the lot by the taxing subdivision of any governmental authority, including but not limited to State, County, Town and School District taxing agencies; and (b) all sums unpaid on any first mortgage of record encumbering the lot. The personal obligation of the then owner to pay such assessment or personal charges shall remain his personal obligation for the statutory period and shall not pass to his successors in title unless expressly assumed by them.

If any assessment or charges are not paid within thirty days after the delinquent date, the assessments or charges shall bear interest from the date of delinquency at the rate of 18% per annum and Declarant or the Association, whichever is applicable, may bring an action at law against the person personally obligated to pay the same or to foreclose the lien against the lot, and there shall be added to the amount of such assessment or charges the costs of preparing and filing the complaint in such action, and in the event a judgment is obtained, such judgment shall include interest on the assessment or charges as above provided and a reasonable attorney's fee to be fixed by the court, together with the costs of the action.

#### Article 9. LOT BOUNDARIES:

Section 9.1. The Lot boundaries shall be as shown on the Subdivision Plan unless otherwise indicated in the deed of transfer of the Lot. Except as provided herein, all buildings or structures shall be located within the building windows designated on each Lot on the Subdivision Plan. "Structures" as used herein shall have the same definition as the Cumberland Zoning Ordinance but shall not include driveways or parking areas.

Section 9.2. Duplex Lots. With the prior written approval of the Declarant and Design Review Board, Lot owner(s) may create two unit structures in the nature of

duplexes outside of the building windows, provided that no more than one living unit may be created on each Lot. The party wall between the contiguous living units shall be the common boundary line between the Lots as shown on the Subdivision Plan. To the extent that the units as constructed do not follow the common boundary line, the owner of the encroaching unit shall have the perpetual easement, which shall be a real covenant running with the land, to maintain the structure as originally constructed, together with reasonable access to accomplish this maintenance. Nothing herein, however, shall operate as a license or easement to expand upon the original encroachment without the written approval of the affected Lot owner and the Declarant.

Article 10. LOT MAINTENANCE BY ASSOCIATION; PERPETUAL EASEMENT:

The Association shall have a perpetual easement on each Lot to enter the Lot to maintain the lawns, turf, and landscaping reasonably visible from adjoining streets to standards common to, and required in, the Subdivision. This easement shall include rights of entry to maintain and replace the irrigation systems associated therewith. The purpose of this easement is to assure minimum standards of Lot maintenance are consistently maintained throughout the Subdivision, which shall be the primary responsibility of the Lot owner. The Association shall enforce the minimum standards, which may be amended over time. The costs for such maintenance performed by the Association shall be included in the Lot assessments referenced in Article 8. Such maintenance shall not include buildings or structures, and may not include all landscaping or irrigation on each Lot, all of which shall be matters within the discretion of the Board. The Board shall have the right, but not the obligation, to make individual arrangements on particular lots for independent Lot owner maintenance on such terms and conditions as the Board shall determine so long as no Lot shall be released from the perpetual easement, or from the rescission of any individual agreements made by the Board by subsequent Board decision or vote of the Association. Under no circumstances shall the Association, or its contractors, employees or agents acting in furtherance of this maintenance right or the perpetual easement bear any liability for any acts or failure to act, including without limitation, damages or trespass.

Article 11. MORTGAGES OF LOTS; RIGHTS OF MORTGAGES:

Section 11.1. Right to Mortgage: Each lot owner shall have the right to mortgage or encumber his own respective lot. A lot owner who mortgages his lot shall notify the Board of Directors in writing of the name and address of his mortgagee(s) and shall file a conformed copy of the note and mortgage with the Board.

Section 11.2. Mortgage Foreclosure: Any mortgagee of a lot holding a recorded first mortgage on a lot that obtains title to the lot pursuant to the remedies provided in the mortgage, or through a completed foreclosure of the mortgage, or through deed (or assignment) in lieu of foreclosure, shall take the lot free of such claims and liens for unpaid assessments for common expenses, interest and costs levied against such lot

which accrue prior to the acquisition of title to such lot by the mortgagee, other than the proportionate share of the common expenses which become due and payable from and after the date on which the mortgagee shall acquire title to the lot through a completed foreclosure or deed (or assignment) in lieu of foreclosure.

Section 11.3. Notices to Eligible Mortgage Holder: The Association shall send written notice by prepaid United States mail to each Eligible Mortgage Holder of the following proposed actions either within a reasonable period prior to the taking of any of such proposed actions or at the time that notice thereof is given to owners unless another time is specified herein: (1) any condemnation loss or any casualty loss which affects a material portion of the properties or any lot on which there is a first mortgage held by such Eligible Mortgage Holder; (2) notice of any default or delinquency in the payment of assessments for common expenses or any other charges owed by an owner of a lot subject to a mortgage held of record by such an Eligible Mortgage Holder, or any other default in the performance or payment of such an owner of any obligation under this Declaration, the Bylaws or any rules and regulations of the Association, which delinquency or other default continues for a period of sixty (60) days, to the Eligible Mortgage Holder of the mortgage to which such owner's lot is subject; (3) any lapse, cancellation or material modification of any insurance policy or fidelity bond required to be maintained under the Declaration or Bylaws by the Association; (4) any proposed action which would require the consent of a specified percentage of Eligible Mortgage Holders as specified in Section 10.4 of this Article 10. Upon written request of any Eligible Mortgage Holder, the Association will provide an audited financial statement of the Association for the preceding fiscal year. "Eligible Mortgage Holder" means the holder of record of a recorded first mortgage on a lot which has delivered written notice to the Association stating its name and address, the name and address of the owner of the lot, the identifying number of the lot, and that such mortgage is a recorded first mortgage.

Section 11.4. Mortgagee Approval Rights: For purposes of this Section 10.4, where approval by a stated percentage of Eligible Mortgage Holders is required, such approval shall be based upon one (1) vote for each lot on which a mortgage is held. Any repair, replacement or restoration of the properties, after a partial condemnation or damage due to an insurable hazard, shall be performed as provided in this Declaration or Bylaws, unless other action is approved by at least fifty-one percent (51%) of Eligible Mortgage Holders. Any election to terminate the legal status of the properties pursuant to this Declaration after substantial destruction or a substantial taking in condemnation of the properties shall require the approval of at least fifty-one percent (51%) of all Eligible Mortgage Holders. Any abandonment or termination of the legal status of the properties by act or omission for reasons other than said substantial destruction or taking shall require the prior written approval of at least sixty-seven percent (67%) of Eligible Mortgage Holders. Any abandonment, partition, subdivision, encumbrance, sale or transfer of any of the common properties (except for granting easements for utilities or other public purposes consistent with the intended use of the common properties) by act

or omission shall require the prior written approval of at least fifty-one percent (51%) of the Eligible Mortgage Holders.

The written consent or approval of at least fifty-one percent (51%) of the Eligible Mortgage Holders of lots affected by such amendments shall be required to add or amend any material provisions of this Declaration or the Bylaws which establish, provide for, govern or regulate any of the following matters: (i) voting; (ii) assessments, assessment liens or subordination of such liens; (iii) reserves for maintenance, repair and replacement of the common properties; (iv) insurance or fidelity bonds; (v) rights to use of the common properties; (vi) responsibility for maintenance and repair of the common properties or the addition, annexation or contraction of the common properties or the addition, annexation or withdrawal of common properties to or from the properties except as provided herein; (viii) the interests in the common properties; (ix) convertibility of lots into common properties or of common properties into lots; (x) lease of lots; (xi) imposition of any restriction on a lot owner's right to sell, transfer, or otherwise convey his lot; (xii) a decision by the Association to establish self-management when professional management had previously been required by an Eligible Mortgage Holder; (xiii) any provisions which are for the express benefit of mortgagees, Eligible Mortgage Holders or insurers or guarantors; (xiv) boundaries of any lot; (xv) restoration or repair of the common properties after hazard damage or partial condemnation in a manner other than that specified in this Declaration or the Bylaws, or (xvi) any action to terminate the legal status of the properties. An addition or amendment to the Declaration or Bylaws shall not be considered material if it is for the purposes of correcting technical errors.

An Eligible Mortgage Holder who received written request to approve any additions or amendments which do not constitute either a material change to the Declaration or Bylaws or any amendment described in the preceding paragraph hereof who does not deliver to the requesting party a negative response within thirty (30) days after the giving of notice shall be deemed to have approved such request in writing.

Section 11.5. Rights of First Refusal: Notwithstanding anything to the contrary elsewhere contained in the Declaration, the Bylaws or the Rules and Regulations, in the event that the owners in the future adopt any right of first refusal in the case of the sale of any lot, such right of first refusal shall not affect, impair or apply to the right of any mortgagee to: (1) foreclose or take title to the lot pursuant to the remedies provided in the mortgage, (2) accept a deed (or assignment) in lieu of foreclosure in the event of default by a mortgagor, or (3) sell or lease a lot acquired by the procedures hereinabove set forth.

## Article 12. AMENDMENT:

Except in cases of amendments to this Declaration that may be unilaterally executed and recorded by the Declarant under Section 3.2 and 12.4, and subject to the

other provisions of this Declaration and the Bylaws, this Declaration, and the Plans may be amended as follows:

(a) Before Any Conveyance: Prior to the conveyance of any lot by the Declarant to a lot owner other than as security for an obligation, the Declarant shall have the right to amend and reamend this Declaration in any manner that the Declarant may deem appropriate.

(b) After First Conveyance: After the first conveyance of a lot by a Declarant, the terms of the following subparagraphs shall apply to the amendment of this Declaration:

(i) Notice: Notice of the subject matter of a proposed amendment shall be included in the notice of any meeting of the Board of Directors in which a proposed amendment is considered, and shall be served upon all owners in the manner provided for service of notices and upon Eligible Mortgage Holders in the manner provided.

(ii) Resolution: An amendment may be proposed by either the Board of Directors or by owners holding in the aggregate no less than twenty (20%) percent of the votes in the Association. No resolution of the Board of Directors adopting a proposed amendment shall be effective unless it has been adopted at a meeting of the Association duly called and held in accordance with the Bylaws by the affirmative vote of at least sixty-seven percent (67%) in voting interest of the owners and then executed and recorded as provided in paragraph B(5) of this Article 11.

(iii) Agreement: In the alternative, an amendment may be made by an agreement signed by the record owners of the lots to which at least sixty-seven percent (67%) of the votes in the Association are allocated in the manner required for the execution of a deed and acknowledged by at least one of them, and such amendment shall be effective when recorded.

(iv) Certain Amendments: Notwithstanding the foregoing provisions of this Article 11, except as otherwise provided in the Declaration, no amendment may increase the number of lots or change the boundaries of any lot, or the uses to which any lot is restricted without the consent of the owners and the consent of the Eligible Mortgage Holders representing or holding mortgages on lots having at least sixty-seven percent (67%) of the votes in the Association and, in the case of changes in the boundaries or permitted uses of a lot, the consent of the owners of the lots affected. No amendment of this Declaration shall make any change which would in any way affect any of the rights, privileges, powers and options of the Declarant, its successors or assigns, unless the Declarant or its successors or assigns shall join in the execution of such amendment.



(v) Execution and Recording: A copy of each amendment shall be attached to or included with a certificate, certifying that the amendment was duly adopted and all required notices were duly served, which certificate shall be executed and acknowledged by such officer or officers of the Association and/or member or members of the Board of Directors designated for the purpose of the Bylaws. The amendment shall be effective when such certificate and copy of the amendment are recorded in the Cumberland County Registry of Deeds.

(vi) Notice and Challenge: No action to challenge the validity of an amendment to this Declaration adopted by the Association pursuant to this Article 12 may be brought more than one year after such amendment is recorded. After each amendment to this Declaration adopted pursuant to this Article 11 has been recorded, notice thereof shall be sent to all owners and to all Eligible Mortgage Holders at the address last furnished to the Board of Directors, but failure to send such notices shall not affect the validity of such amendment. The Association shall make copies of the Declaration and all amendments thereto available for inspection at reasonable times upon reasonable request for such inspection.

Article 13. GENERAL PROVISIONS:

Section 13.1. Duration: The covenants and restrictions set forth in this Declaration shall run with and bind the land, for the benefit of all property owned by Declarant and shall inure to the benefit of and be enforceable by Declarant, the Association or the owner of any land subject to this Declaration, their respective legal representatives, heirs, successors and assigns, for a term of twenty (20) years from the date this Declaration is recorded, after which time said covenants shall be automatically extended for successive periods of ten (10) years unless an instrument signed by the then owners of eighty percent (80%) of the lots has been recorded agreeing to change said covenants and restrictions in whole or in part; provided, however, that no such agreement of change shall be effective date of such change, and unless written notice of the proposed agreement is sent to every owner at least ninety (90) days in advance of any action taken.

Section 13.2. Notices: Any notice sent or required to be sent to any person under the provisions of this Declaration shall be deemed to have been properly given when mailed, postage prepaid, to the last known address of the person as shown on the records of Declarant or the Association, whichever is applicable, in writing of any change of ownership of the properties, the owner's current address, and any failure of the owner to receive an information from Declarant or the Association at the correct address of the owner. The initial address for the Declarant and Association shall be:

Village Green Homeowner's Association  
c/o Bateman Investments, LLC

PO Box 3572  
Portland, ME 04104  
Attn: Nathan H. Bateman  
Telephone: (207) 772-2992

Section 13.3. Enforcement: Enforcement of these covenants and restrictions shall be by any proceeding at law or in equity against any person or persons violating or attempting to violate any covenant or restriction brought by Declarant, any lot owner or the Association. Such action may include, but is not limited to, an action to restrain violation or to recover damages, or against the land to enforce any lien created by these covenants. Such action may seek any remedy available at law or in equity including specific performance. Failure by Declarant, the Association or any owner to enforce any covenant or restriction herein contained in no event shall be deemed a waiver of the right to do so hereinafter.

Section 13.4. Modification: By recorded supplemental declaration, Declarant may modify any of this Declaration or any supplemental declaration for the purpose of clarifying any such provisions, provided no such modification shall change the substantive provisions of any such document or materially alter the rights of any owner established by any such document.

Section 13.5. Severability: Invalidation of any one of these covenants or restrictions by judgment or court in no way shall affect any other provisions, which shall remain in full force and effect.

Section 13.6. Arbitration: All claims, disputes and other matters in question between Declarant on the one hand, and the Association or any owners, on the other, arising out of, or relating to this Declaration of the breach thereof, except for claims which specific provision is made herein for enforcement by court proceedings, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining unless the parties mutually agree otherwise. This agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and the judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

Notice of the demand for arbitration shall be filed in writing with the other parties and with the American Arbitration Association. The demand for arbitration shall be made within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

Section 13.7. Construction: Whenever the singular number is used, the same shall include the plural shall include the singular and the masculine, feminine and neuter genders shall include each other, as the context may require.

Section 13.8. Beneficiaries of Easements, Rights and Privileges: The easements, licenses, rights and privileges established, created and granted by this Declaration shall be for the benefit of, and restricted solely to, Declarant, the Association and the Owners; and any owner may also grant the benefit of such easement, license, right or privilege to his tenants and guests and their immediate families for the duration of their tenancies or visits, subject in the case of the common properties to the Rules and Regulations of the Board, but the same is not intended to create nor shall it be construed as creating any rights in or for the benefit of the general public.

Section 13.9. Declarant's Rights: Declarant may at any time or from time to time delegate some or all of its rights under this Declaration to a successor Declarant or to the Association by a written instrument recorded in the Cumberland County Registry of Deeds. If Declarant ceases to exist or for any reason becomes legally unable to exercise its rights and duties hereunder, such rights and duties may be exercised by the Association.

IN WITNESS WHEREOF, the said Village Green Cumberland, LLC has caused this instrument to be executed by Nathan H. Bateman, Managing Member of Village Green Cumberland, LLC, thereunto duly authorized, as of the date first set forth above.

WITNESS:

VILLAGE GREEN CUMBERLAND, LLC

By: Bateman Investments, LLC

*its member/manager*

*Alice J. Meagher*

By:

*Nathan H. Bateman*

Nathan H. Bateman

Its: Member/Manager

STATE OF MAINE  
COUNTY OF CUMBERLAND, ss

*Jan. 20, 2012*  
~~October~~       , 2011

Then personally appeared before me the above named Nathan H. Bateman, Member/Manager of Bateman Investments, LLC, itself the Member/Manager of Village Green Cumberland, LLC and acknowledged the foregoing instrument to be his free act and deed in said capacity, and the free act and deed of Village Green Cumberland, LLC.

Before me,

*Alice J. Meagher*

Notary Public/ Attorney at Law

ALICE J. MEAGHER  
Notary Public, Maine  
My Commission Expires March 10, 2018

## EXHIBIT A

A certain lot or parcel of land situated off Main Street (Route 9) in the Town of Cumberland, County of Cumberland and State of Maine, and being more particularly bounded and described as follows:

Commencing at a 3/4 inch iron pipe at the intersection of land now or formerly of Llwelyn W. and Louise T. Richards as described in a certain deed recorded in Book 3136, Page 296, in Cumberland County Registry of Deeds and land conveyed by Margaret G. Wyman to Jeffrey W. Doane by warranty deed dated March 17, 1989 and recorded in said Registry of Deeds in Book 8702, Page 74; thence North 82° 27' 57" West, one hundred fifty-five and nineteen one hundredths feet (155.19') along said Richards' land to a 3/4 inch iron pipe located at land now or formerly of Charles and Carol Reeder as described in a certain deed recorded in Book 3738, Page 31 in said Registry; thence North 2° 43' 26" East along the westerly boundary of the within described premises, four hundred forty-nine and seventy-five one hundredths feet (449.75') to a one and one-half inch iron pipe at the northwesterly corner of land of said premises and the northeasterly corner of land now or formerly of John H. Poor as described in a certain deed recorded in Book 7693, Page 85 in said Registry; thence South 82° 3' 28" East, sixty-two and eighty-one one hundredths feet (62.81') to a point in the northerly line of land of these premises; thence continuing along the northerly line of land of said premises, South 71° 16' 10" East, eight hundred fifty and seventy-four one hundredths feet (850.74') to an iron pipe at the southwesterly corner of land now or formerly of H.E. Ginn & G.E. Christy as described in a certain deed recorded in Book 7880, Page 52; thence continuing along said land of Ginn and Christy, South 69° 16' 3" East, six hundred fifty-five and ninety-four one hundredths feet (655.94') to a 3/4 inch iron pipe at land now or formerly of the Town of Cumberland; thence South 35° 11' 40" West, three hundred eight and three one hundredths feet (308.03') along land of the said Town of Cumberland to a 2 inch iron pipe at the southwesterly corner of land of said Town of Cumberland; thence continuing along land of said Town of Cumberland, South 54° 51' 17" East, five hundred eleven and twenty-three hundred feet (511.23') to a monument found at other land of said Town of Cumberland as described in a certain deed recorded in Book 589, Page 207; thence continuing along land of said Town of Cumberland South 34° 38' 51" West, one thousand three hundred eighty and ten hundredths feet (1,380.10') to the northerly sideline of land now or formerly of Jim Burgess as described in a certain deed recorded in Book 2573, Page 259 in said Registry; thence North 54° 56' 51" West, five hundred thirty-six and forty-one hundredths feet (536.41') to a point in the northerly line of land now or formerly of Richard I. and Marjory P. Thompson as described in a certain deed recorded in Book 6436, Page 203 in said Registry and at land conveyed by said Margaret G. Wyman to Richard L. Doane and now of Dale Farris, et al by warranty deed dated August 18, 1997 and recorded in said Registry of Deeds in Book 13267, Page 73; thence along said land of Farris, North 9° 25' 54" East, six hundred thirty-seven and seventy-four hundredths feet (637.74') to an iron

pin set in the southerly sideline of other land conveyed by Margaret G. Wyman to Richard L. Doane, Richard W. Doane, Jean L. Doane and Jeffrey W. Doane by warranty deed dated March 17, 1989 and recorded in said Registry; thence continuing along said land South 79° 52' 13" East, forty-nine and twenty-seven hundredths feet (49.27') to a point; thence North 10° 7' 47" East, sixty and no hundredths feet (60.00') to a point; thence along said land North 79° 52' 13" West, fifty feet (50') to a point; thence along the easterly line of land conveyed by Margaret G. Wyman to Jeffrey W. Doane by warranty deed dated March 17, 1989 and recorded in said Registry in Book 8702, Page 74, North 9° 25' 54" East, four hundred fourteen and seventy-eight hundredths feet (414.78') to a point, said point being the northeasterly corner of said land of Jeffrey W. Doane; thence continuing along the northerly sideline of land of said Jeffrey W. Doane, North 59° 41' 32" West, six hundred thirty-four and seventy-one hundredths feet (634.71') to a 3/4 inch iron pipe at the northwesterly corner of land of said Jeffrey W. Doane and the point of beginning.

EXCEPTING, however, from the above described premises, a certain parcel of land reserved by the Town of Cumberland in its deed to Village Green Cumberland, LLC, bounded and described as follows:

A certain lot or parcel of land located on the northwesterly side of a proposed extension of Drowne Road in the Town of Cumberland, County of Cumberland, State of Maine, bounded and described as follows:

Beginning at a point on the northwesterly sideline of said proposed extension of Drowne Road and the southwesterly sideline of the land conveyed to the Town of Cumberland by Sophus M. Christensen by deed dated April 10, 1972 and recorded in the Cumberland County Registry of Deeds in Book 3224, Page 126, said point being located N 54°51'17" W along the southwesterly sideline of said land of the Town of Cumberland a distance of Forty-Four and 66/100 (44.66) feet from the easterly corner of Village Green Subdivision as shown on a plan entitled "Village Green Cumberland, Maine, Amended Final Subdivision Plan" prepared by DeLuca-Hoffman Associates, Inc., dated May 2011, revised January 5, 2012, and recorded in the Cumberland County Registry of Deed Plan Book 212, Page 18 (the "Subdivision Plan"). Thence:

(1) Southwesterly by the northwesterly sideline of said proposed extension of Drowne Road, following a curve to the right having a radius of Two Hundred and 00/100 (200.00) feet, an arc distance of Six and 93/100 (6.93) feet to a granite monument to be set at the point of tangency, said monument being located S 70°09'17" W a distance of Six and 93/100 (6.93) feet from the last mentioned point;

(2) S 71°08'52" W by the northwesterly sideline of said proposed extension of Drowne Road a distance of Fifty-Nine and 38/100 (59.38) feet to a capped rebar to be set and the easterly sideline of a lot labeled "Open Space" on the Subdivision Plan;

(3) N 18°51'08" W by the easterly sideline of said lot labeled "Open Space" a distance of Ninety-One and 38/100 (91.38) feet to a capped rebar to be set and the southwesterly sideline of said land of the Town of Cumberland;

(4) S 54°51'17" E by the southwesterly sideline of said land of the Town of Cumberland a distance of One Hundred Twelve and 81/100 (112.81) feet to the point of beginning.

The above described parcel contains 3,033 square feet, or 0.07 acres, as shown on the above referenced Subdivision Plan. Bearings are referenced to Grid North, Maine State Plane Coordinate System, West Zone (NAD83).

#### Wyman Way

A certain lot or parcel of land known as Wyman Way, being the premises described in a deed from Margaret G. Wyman to Richard L. Doane, Richard W. Doane, Jean L. Doane and Jeffrey W. Doane dated March 17, 1989 and recorded in the Cumberland County Registry of Deeds in Book 8702, Page 71, and being more particularly described therein as follows:

A certain lot or parcel of land situated off Main Street (Route 9) in the Town of Cumberland, County of Cumberland and State of Maine, and being more particularly bounded and described as follows:

Beginning at a 1" iron pipe, said pipe being located on the easterly right of way of said Main Street, said pipe also being the most northwesterly corner of land now or formerly of Byron Rawnsley and Katherine G. Rawnsley as described in a certain deed recorded in Book 1825, Page 214, in the Cumberland County Registry of Deeds; thence North ten degrees seven minutes forty eight seconds East (N 10° 07' 48" E) along the easterly right of way of Main Street sixty and twenty hundredths (60.20) feet to the most southwesterly corner of land now or formerly of Scott B. and Nancy A. Williams as described in a certain deed recorded in Book 2772, Page 154 in said Registry; thence South seventy nine degrees fifty two minutes twelve seconds East (S 79° 52' 12" E) along the southerly line of land of said Williams, nine and fifty five hundredths (9.55) feet to a point; thence along other land now or formerly of Margaret G. Wyman South sixty degrees forty three minutes thirteen seconds East (S 60° 43' 13" E) three hundred one and ninety five hundredths (301.95) feet to a point, said point being the beginning of

a tangent curve concaved southwesterly having a radius of three hundred thirty and no hundredths (330.00) feet, and a central angle of twenty five degrees forty three minutes fifty eight seconds ( $25^{\circ} 43' 58''$ ); thence continuing along said Wyman land and along said curve in a southeasterly direction one hundred forty eight and twenty one hundredths (148.21) feet to a point, said point being the beginning of a tangent reverse curve concaved to the northeast having a radius of two hundred seventy and no hundredths (270.00) feet and a central angle of forty four degrees fifty two minutes fifty nine seconds ( $44^{\circ} 52' 59''$ ); thence continuing along said Wyman land and along said curve in a southeasterly and easterly direction, two hundred eleven and fifty one hundredths (211.51) feet to a point; thence continuing along said Wyman land South seventy nine degrees fifty two minutes thirteen seconds East ( $S 79^{\circ} 52' 13'' E$ ) four hundred five and twenty seven hundredths (405.27) feet to a point at other land now or formerly of said Wyman; thence continuing along said Wyman land South ten degrees seven minutes forty seven seconds West ( $S 10^{\circ} 07' 47'' W$ ) sixty and no hundredths (60.0) feet to a point; thence continuing along said Wyman land and land of Richard L. Doane, as described in warranty deed of said Wyman of even date herewith and to be recorded in said Registry of Deeds, North seventy nine degrees fifty two minutes thirteen seconds West ( $N 79^{\circ} 52' 13'' W$ ) four hundred five and twenty seven hundredths (405.27) feet to a point, said point being the beginning of a tangent curve concaved northeasterly having a radius of three hundred thirty and no hundredths (330.00) feet and a central angle of forty four degrees fifty two minutes fifty nine seconds ( $44^{\circ} 52' 59''$ ); thence continuing along land of said Richard L. Doane and along said curve in a westerly and northwesterly direction two hundred fifty eight and fifty one hundredths (258.51) feet to a point, said point being the beginning of a tangent reverse curve concaved southwesterly having a radius of two hundred seventy and no hundredths (270.00) feet and a central angle of twenty five degrees forty three minutes fifty eight seconds ( $25^{\circ} 43' 58''$ ); thence continuing along land of said Richard L. Doane and along said curve in a westerly direction one hundred twenty one and twenty six hundredths (121.26) feet to a 1" iron pipe, said pipe marking the most northeasterly corner of land of said Rawnsley; thence North sixty degrees forty three minutes twelve seconds West ( $N 60^{\circ} 43' 12'' W$ ) along the northerly line of land of said Rawnsley, two hundred ninety one and twenty two hundredths (291.22) feet to said Main Street and the point of beginning.

Said premises known as Wyman Way are subject to the following:

a. Rights and easements granted to Central Maine Power Company and New England Telephone and Telegraph Company by Richard L. Doane, Richard W. Doane and Jeffrey W. Doane as set forth in an instrument dated August 2, 1989 and recorded in the Cumberland County Registry of Deeds in Book 8876, Page 255.

b. Rights reserved by Richard L. Doane and Lisa A. Doane in a deed to Richard W. Doane and Jean L. Doane dated August 15, 1997 and recorded in the Cumberland County Registry of Deeds in Book 13267, Page 68.



c. Road Maintenance Agreement by and among Richard W. Doane, Lisa A. Doane, Jean L. Doane, Jeffrey W. Doane, Richard L. Doane, Dale Farris and Cynthia S. Farris dated August 18, 1997 and recorded in said Registry of Deeds in Book 13267, Page 71.

d. Easement rights reserved by Jeffrey W. Doane as set forth in a deed from Richard W. Doane, Jean L. Doane, Richard L. Doane and Jeffrey W. Doane dated September 13, 2000 and recorded in the Cumberland County Registry of Deeds in Book 15732, Page 22, for the benefit of the premises conveyed by Margaret G. Wyman to Jeffrey W. Doane in a deed dated March 17, 1989 and recorded in said Registry of Deeds in Book 8702, Page 74.

Being a portion of the premises conveyed to the Town of Cumberland by Richard W. Doane, Jean L. Doane, Richard L. Doane, and Jeffrey W. Doane by deed dated September 13, 2000 and recorded in the Cumberland County Registry of Deeds in Book 15732, Page 22.

#### Drowne Road Access Easement

The above-described premises are conveyed together with an easement, in common with others, for all purposes of a public way, including without limitation, rights for vehicular and pedestrian ingress and egress, rights to construct, grade and pave a roadway and sidewalks, and rights for installation, maintenance, repair and replacement of any and all utilities, from the southwesterly side of Tuttle Road over (a) Drowne Road, (b) an area shown on the Subdivision Plan as "Proposed Drowne Road Right-of-Way Expansion Area on Tax Map R03 Lot 54 (0.22 Acres)", being an expansion of the width of a portion of Drowne Road, and (c) and an area shown as "Proposed Drowne Road Right-of-Way Expansion Area on Tax Map R03 Lot 51A (0.05 Acres)" being an extension of Drowne Road from its presently constructed terminus to the southeasterly boundary of the above described premises.

The above described premises are subject to a certain Contract Zoning Agreement by and between the Town of Cumberland and Village Green Cumberland, LLC, which is recorded in the Cumberland County Registry of Deeds in Book 28735, Page 158.

Being the same premises as conveyed to Village Green Cumberland, LLC by the Town of Cumberland, Maine by deed dated January 18, 2012 and recorded in the Cumberland County Registry of Deeds in Book 29285, Page 284.

## ATTACHMENT B

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Letter from Norway Savings



April 25, 2018

Planning Board  
Town of Cumberland, Maine  
290 Tuttle Road  
Cumberland, ME 04021

Department of Environmental Protection  
312 Canco Road  
Portland, ME 04103

Re: Village Green Project – Russell Road Extension – Cumberland, Maine

To Whom It May Concern:

Norway Savings Bank has reviewed the information for the proposed Village Green project (Russell Road Extension), Cumberland, Maine. The developers have provided us with their project summary and anticipated development costs and details.

This lending officer has enjoyed many successful lending relationships with the primary developers and their various entities over the past 17+ years. While this letter is in no way to be construed as a commitment to lend funds, I believe that the developers have the financial capacity, management skills, and marketing finesse to successfully develop this site and complete the project on time and on budget.

I trust this letter complies with Section 3, subsection B3c of the Site Location law, but if you should need further information or clarification, please feel free to contact me at (207) 482-7902.

Sincerely,

A handwritten signature in blue ink, appearing to read "Richard R. Flagg", is written over the word "Sincerely," and extends across the signature block.

Richard R. Flagg  
Regional Vice President, Commercial Lending

CC Nathan Bateman, Bateman Partners

## **ATTACHMENT C**

---

### **Maine Inland Fisheries & Wildlife Correspondence**



September 26, 2005

Phil Bozenhard  
Regional Wildlife Biologist  
Maine Department of Inland Fisheries and Wildlife  
RR1, 358 Shaker Road  
Gray, ME 04039

**Subject: Wildlife Resources, southeast of the corner of Route 9 and Tuttle Road,  
Cumberland, Maine**

Dear Mr. Bozenhard:

I am writing to request your review of the property outlined on the attached USGS topographic map for any known or potential significant wildlife resources. The proposed development site is located roughly 0.5 mile southeast of the intersection of Route 9 and Tuttle Road in Cumberland, Maine. The purpose of this review is to aid us in documenting potential rare species or habitats along the project area so that avoidance, protection and mitigation steps can be taken.

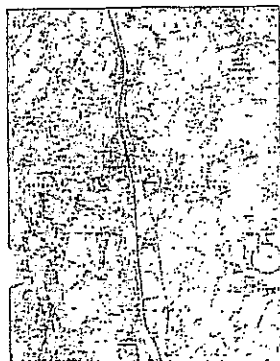
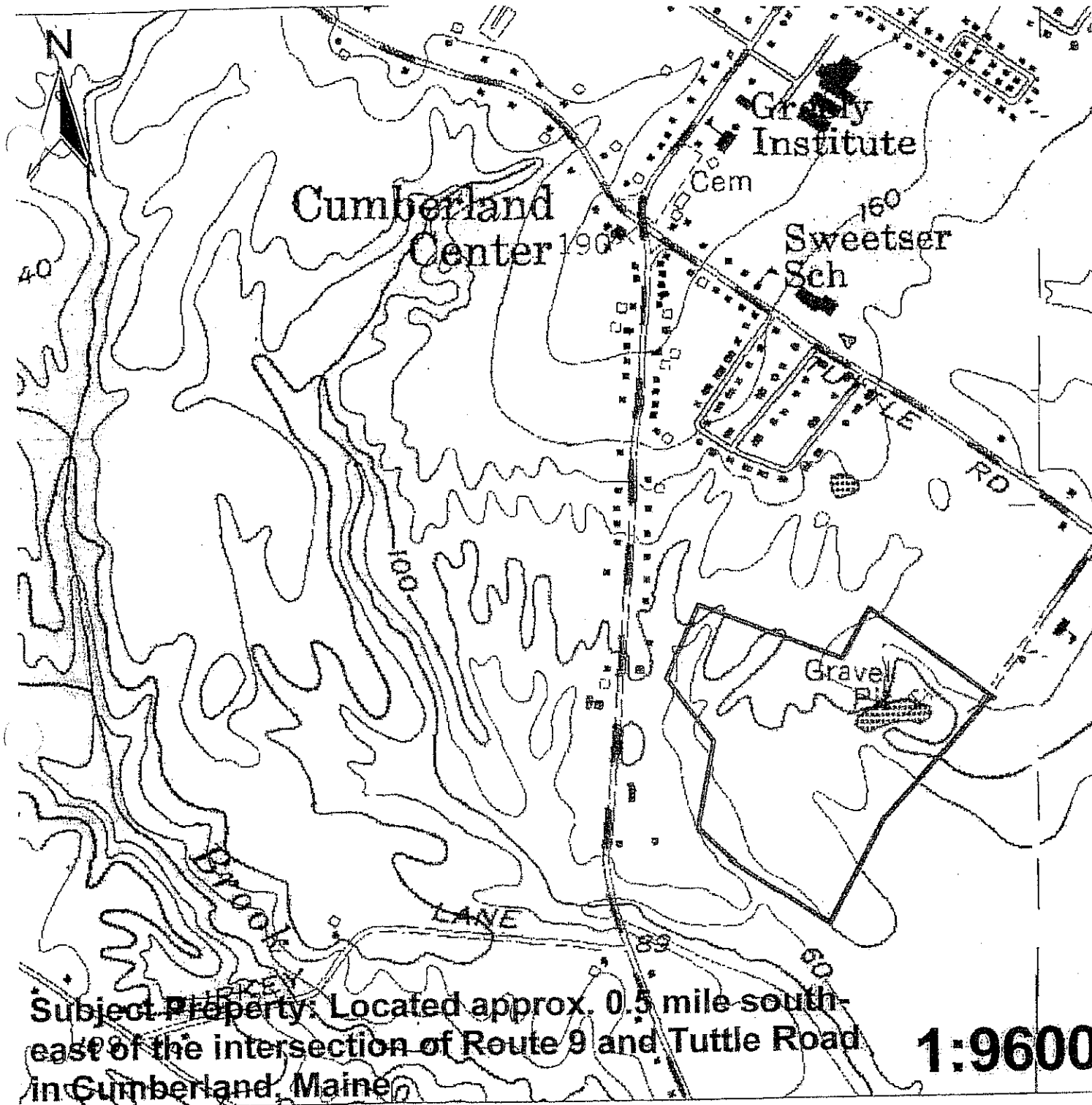
If you have any questions please feel free to call me. Thank you for your assistance in this matter.

Sincerely,

A handwritten signature in cursive script that reads "Lauren G. Leclerc".

Lauren Leclerc, Boyle Associates

Enclosure



Subject property location on USGS 7.5 Minute Quadrangle: Cumberland Center

**BOYLE**  
ASSOCIATES

1309 Broadway Avenue  
South Portland, Maine 04  
[www.boyleassociates.net](http://www.boyleassociates.net)



JOHN ELIAS BALDACCI  
GOVERNOR

STATE OF MAINE  
DEPARTMENT OF  
INLAND FISHERIES & WILDLIFE  
284 STATE STREET  
41 STATE HOUSE STATION  
AUGUSTA, ME 04333-0041  
TEL: 207-287-8000

ROLAND D. MARTIN  
COMMISSIONER

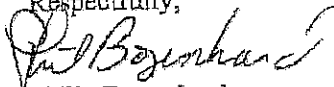
October 12, 2005

Lauren Leclerc  
Boyle Associates  
1309 Broadway Ave.  
South Portland, ME 04106

Dear Lauren:

In response to your request for information regarding sites in Gorham and Cumberland I have reviewed the files and found no significant wildlife habitat in either location.

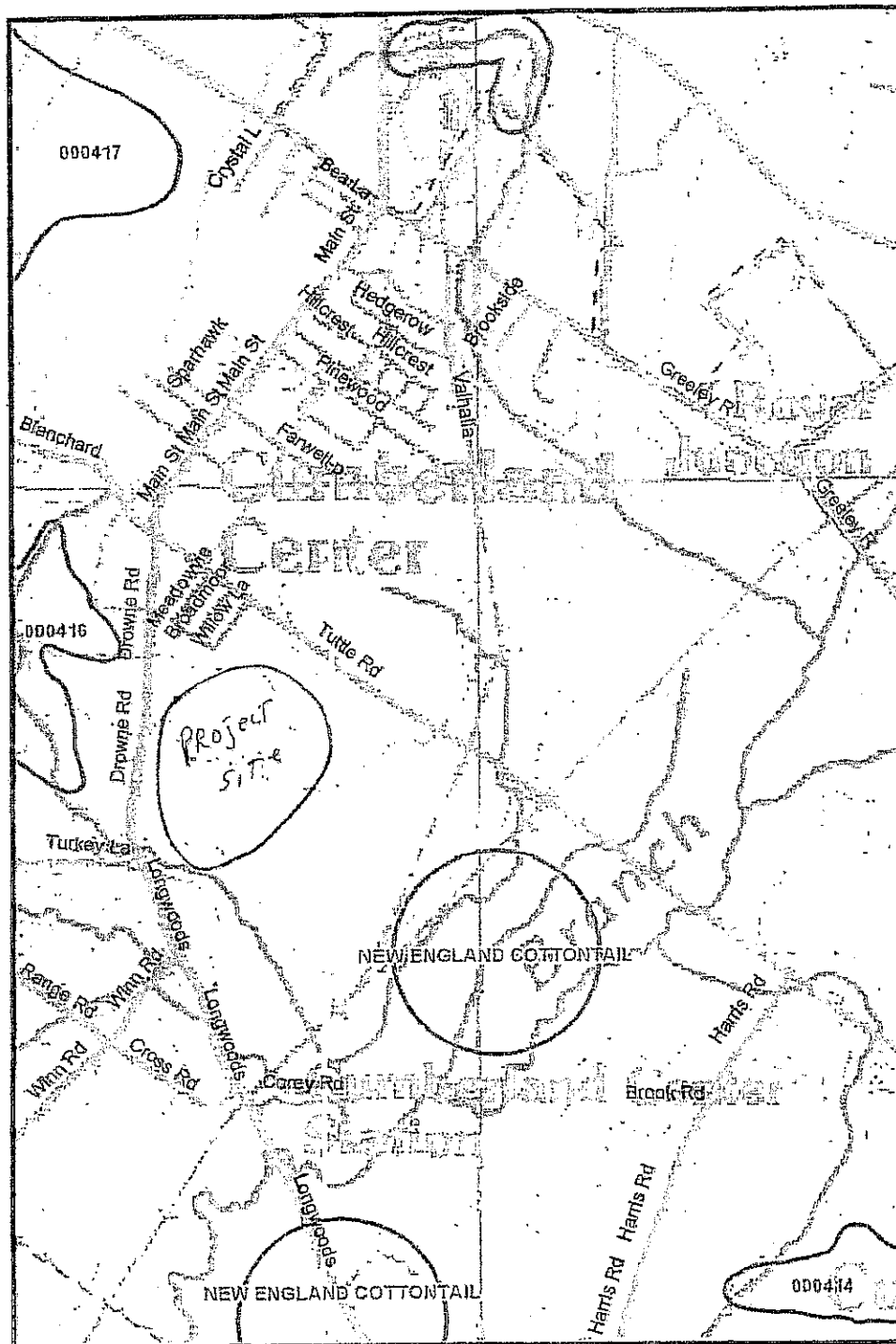
Respectfully,

  
Philip Bozenhard  
Regional Biologist

FISH AND WILDLIFE ON THE WEB!  
[www.mefishwildlife.com](http://www.mefishwildlife.com)

E-MAIL ADDRESS:  
[ifw.webmaster@maine.gov](mailto:ifw.webmaster@maine.gov)

# Search for Wildlife Observations & Habitat - Cumberland, ME



- ☐ Bald Eagle Nest Site
- ☐ Piping Plover / Least Tern
- ☐ Nesting, Feeding, & Brood-rearing Area
- ☐ Roseate Tern
- ☐ Nesting Area
- ☐ Deer Winter Area
- ☐ Inland Waterfowl / Wading Bird Habitat
- ☐ Coastal Waterfowl / Wading Bird Habitat
- ☐ Seabird Nesting Island
- ☐ Shorebird Area
- ☐ Biological Conservation
- ☐ Database Rare Species or Habitat Observation
- ☐ Rare Plant
- ☐ Rare / Exemplary Natural Community
- ☐ Township Boundary
- ☐ County

*No wildlife habitats associated with this site.*

0 0.2 0.4 0.6 0.8 Miles

1:26,316

UTM Projection, Zone 19N, NAD83



RR1, 358 Shaker Road  
Gray, ME 04039  
Voice: (207) 657-2345  
Fax: (207) 657-2980  
October 12, 2005







# United States Department of the Interior

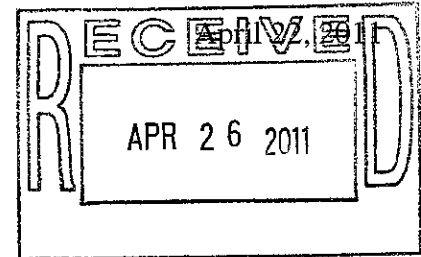


## FISH AND WILDLIFE SERVICE

Maine Field Office – Ecological Services  
17 Godfrey Drive, Suite #2  
Orono, ME 04473  
(207) 866-3344 Fax: (207) 866-3351

FWS/Region 5/ES/MEFO

Michael E. Tadema-Wielandt, P.E.  
DeLuca-Hoffman Associates, Inc. Consulting Engineers  
778 Main Street  
Suite 8  
South Portland, ME 04106



Dear Mr. Tadema-Wielandt:

Thank you for your letter dated April 12, 2011, requesting information or recommendations from the U.S. Fish and Wildlife Service (Service). This letter provides the Service's response pursuant to Section 7 of the Endangered Species Act (ESA), as amended (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), and the Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661-667d).

**Project Name/Location:** Cumberland residential development

**Log Number:** 53411-2011-SL-0189

### **Federally Listed Species**

Based on the information currently available to us, no federally threatened or endangered species under the jurisdiction of the Service are known to occur in the project area. Accordingly, no further action is required under Section 7 of the ESA, unless: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

### **Other protected species**

The New England cottontail rabbit (*Sylvilagus transitionalis*), a candidate for federal listing could occur on your project area. New England cottontail was officially listed as a candidate species for federal listing on September 12, 2006 (71 FR 53756). Thus, the New England cottontail will likely be federally listed in the future. At this time, the New England cottontail is afforded no protection under the Federal ESA. However, we strongly encourage you to consider this species in your project planning. This species uses old field and scrub shrub habitats. We

encourage you to conduct surveys to determine the presence of this species or its habitat on the project area.

The New England cottontail is listed as an endangered species by Maine Inland Fisheries and Wildlife. We encourage you to contact MDIFW's Mammal Group (John Depue, Maine Inland Fisheries and Wildlife, 650 State St., Bangor, ME 04401 Phone: 207 941-4473 or Scott Lindsay, Maine Inland Fisheries and Wildlife, Region A, RR 1, 358 Shaker Road, Gray, ME 04039 Phone: 207 657-2345) for more information.

### **Other Protected Species**

Occasional, transient bald eagles may occur in the general project area. The bald eagle was removed from the federal threatened list on August 9, 2007 and is now protected from take under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. "Take" means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb. The term "disturb" under the Bald and Golden Eagle Protection Act was recently defined within a final rule published in the Federal Register on June 5, 2007 (72 FR 31332). "Disturb" means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle; 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior; or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

Further information on bald eagle delisting and their protection can be found at <http://www.fws.gov/migratorybirds/baldeagle.htm>.

Please consult with our new national bald eagle guidelines, which can found at <http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>. These Guidelines are voluntary and were prepared to help landowners, land managers and others meet the intent of the Eagle Act and avoid disturbing bald eagles. If you believe this project will result in taking or disturbing bald or golden eagles, please contact our office for further guidance. We encourage early and frequent consultations to avoid take of eagles.

We have not reviewed this project for state-threatened and endangered wildlife, wildlife species of special concern, and significant wildlife habitats protected under the Maine Natural Resources Protection Act. We recommend that you contact the Maine Department of Inland Fisheries and Wildlife:

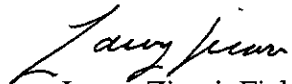
Steve Timpano  
Maine Department of Inland Fisheries and Wildlife  
284 State St.  
State House Station 41  
Augusta, ME 04333-0041  
Phone: 207 287-5258

We also recommend that you contact the Maine Natural Areas Program for additional information on state-threatened and endangered plant species, plant species of special concern, and rare natural communities:

Lisa St. Hilaire  
Maine Natural Areas Program  
Department of Conservation  
93 State House Station  
Augusta, ME 04333  
Phone: 207 287-8046

If you have any questions about this project, please contact Mark McCollough, endangered species biologist, at (207) 827-5938 ext.12.

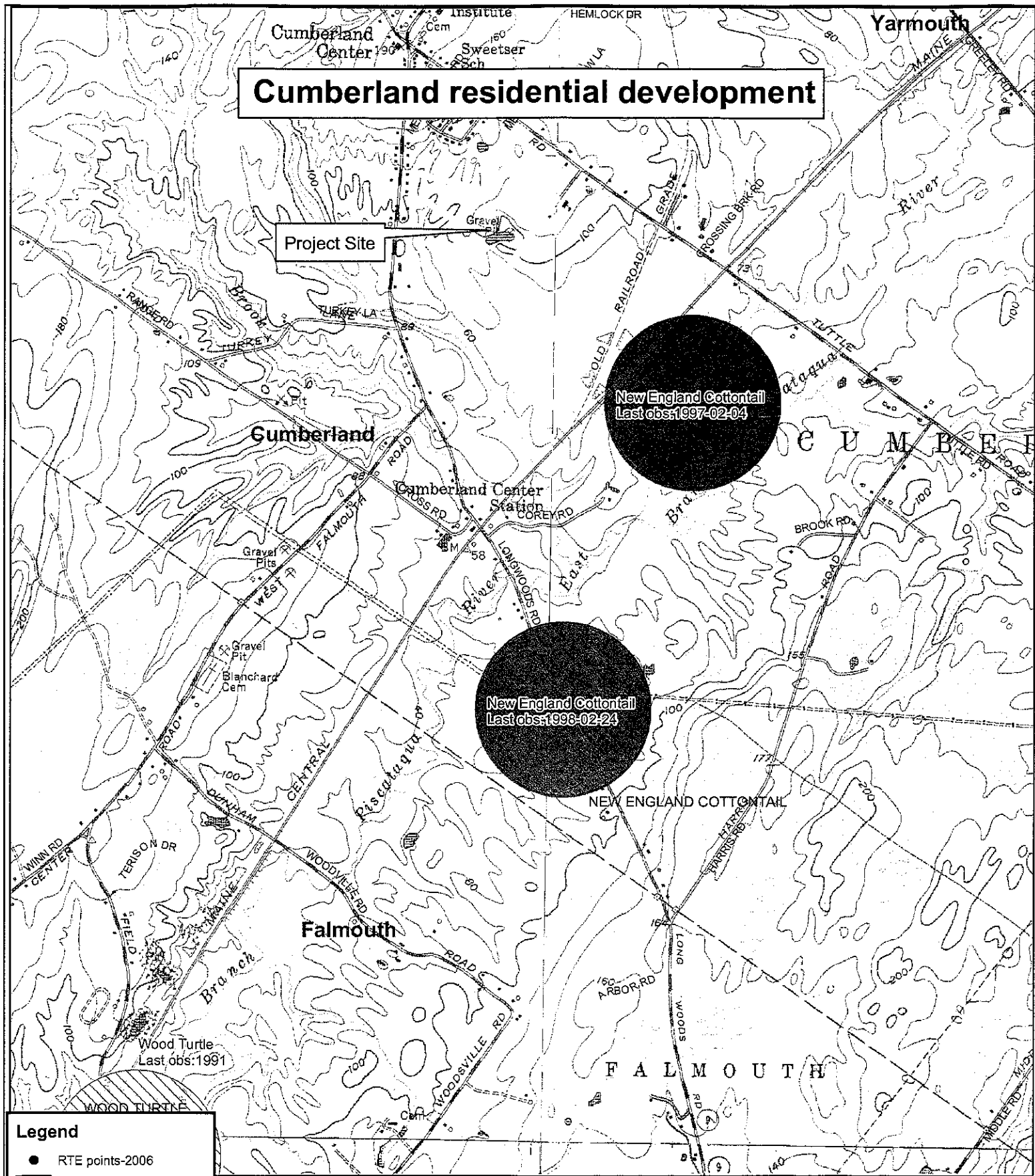
Sincerely,

A handwritten signature in cursive script, appearing to read "Laury Zicari".

Laury Zicari, Field Supervisor  
Maine Field Office

Enclosure

# Cumberland residential development

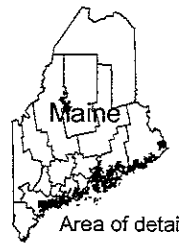
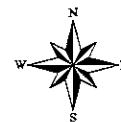
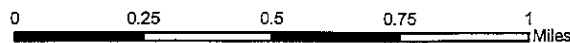


## Legend

- RTE points-2006
- ▨ RTE polys-2006

## MDIFW Heritage 2008-05 State legal status (SPROT)

- Endangered
- ▨ Threatened
- Special Concern
- Other



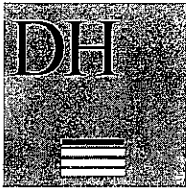
Data from USFWS, MDIFW & MNAP.

Area of detail

## **ATTACHMENT D**

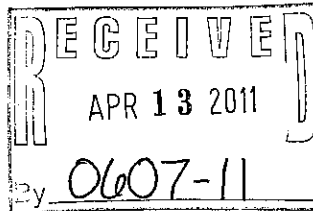
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### **Maine Historic Preservation Correspondence**



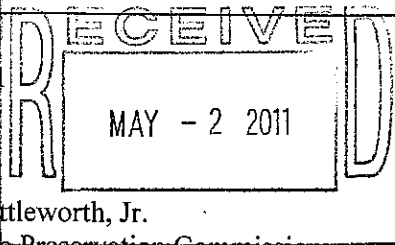
DeLUCA-HOFFMAN ASSOCIATES, INC.  
CONSULTING ENGINEERS

778 MAIN STREET  
SUITE 8  
SOUTH PORTLAND, MAINE 04106  
TEL. 207 775 1121  
FAX 207 879 0896



- SITE PLANNING AND DESIGN
- ROADWAY DESIGN
- ENVIRONMENTAL ENGINEERING
- PERMITTING
- AIRPORT ENGINEERING
- CONSTRUCTION ADMINISTRATION

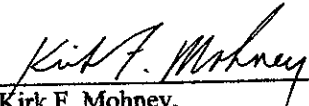
April 12, 2011



Mr. Earle Shettleworth, Jr.  
Maine Historic Preservation Commission  
55 Capitol Street  
State House Station 65  
Augusta, Maine 04333

**Subject: Village Green  
Proposed Residential Development  
Cumberland, Maine**

Based on the information submitted, I have concluded that there will be no historic properties affected by the proposed undertaking, as defined by Section 106 of the National Historic Preservation Act. Consequently, pursuant to 36 CFR 800.4(d)(1), no further Section 106 consultation is required unless additional resources are discovered during project implementation pursuant to 36 CFR 800.13.

  
Kirk F. Mohney,  
Deputy State Historic Preservation Officer  
Maine Historic Preservation Commission

4/28/11  
Date

Dear Mr. Shettleworth:

DeLuca-Hoffman Associates, Inc. has been retained to assist with the design and permitting of Village Green, a proposed 59-unit residential development located between Route 9 and Tuttle Road in Cumberland, Maine. The proposed development site contains approximately 55 acres of land as depicted on the following figures:

Figure 2 – USGS Location Map  
Figure 5 – Aerial Photograph

The development is expected to feature a new road network of approximately 1 mile in length and 59 residential units, as depicted on the attached layout plan. The units will be served by municipal water and sewer services.

Our office is interested in determining if there are any areas on or adjacent to the site with historical, architectural, or archeological significance as defined by the Natural Preservation Act of 1966. We identified 12 houses adjacent to the project site that are more than 50 years old and prepared Historic Building/Structure Survey Forms for each. The forms and a photo key map are attached for review. Please let me know if you have any questions or require further information.

Sincerely,

DeLUCA-HOFFMAN ASSOCIATES, INC.



Michael E. Tadema-Wielandt, P.E.  
Project Engineer

MTW/smk/JN2998/2011-04-12 Me-HPC-Shettleworth

Enclosure

c: Nathan Bateman, Village Green Cumberland, LLC

## **ATTACHMENT E**

---

### **Maine Natural Areas Program Correspondence**



STATE OF MAINE  
DEPARTMENT OF CONSERVATION  
157 HOSPITAL STREET  
93 STATE HOUSE STATION  
AUGUSTA, MAINE 04333-0093

JOHN ELIAS BALDACCI  
GOVERNOR

PATRICK K. MCGOWAN  
COMMISSIONER

October 25, 2005

Lauren Leclerc  
Boyle Associates  
1309 Broadway Avenue  
South Portland, ME 04106

Re: Rare and exemplary botanical features, southeast of the corner of Route 9  
and Tuttle Road, Cumberland.

Dear Ms. Leclerc:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of September 26, 2005 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the Town of Cumberland, Maine. Rare and unique botanical features include the habitat of rare, threatened or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been

MAINE NATURAL AREAS PROGRAM  
MOLLY DOHERTY, DIRECTOR



RECEIVED BY MAIL

PHONE: (207) 287-8044  
FAX: (207) 287-8040  
TTY: (207) 287-2213



documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

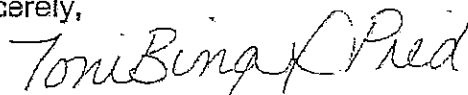
This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,



Toni Bingel Pied  
GIS Specialist/Assistant Ecologist  
93 State House Station  
Augusta, ME 04333-0093  
207-287-8044  
toni.pied@maine.gov

Enclosures

# Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Route 9 and Tuttle Rd., Cumberland Center.

| Scientific Name<br>Common Name                              | Last Seen | State<br>Rarity | Global<br>Rarity | State<br>Legal<br>Status | Federal<br>Legal<br>Status | Habitat Description  |
|---|-----------|-----------------|------------------|--------------------------|----------------------------|--|
| <i>Allium triococum</i><br>Wild Leek                        | S3        | G5              | SC               |                          |                            | Rich hardwood forests, usually alluvial.   |
| <i>Aster divaricatus</i><br>White Wood Aster                | S3        | G5              | T                |                          |                            | Dry woods and clearings.   |
| <i>Aureolaria pedicularia</i><br>Fern-leaved False Foxglove | S3        | G5              | SC               |                          |                            | Dry deciduous woods and clearings.   |
| <i>Carex polymorpha</i><br>Variable Sedge                   | S1        | G3              | E                |                          |                            | In Maine, habitat is between downslope seeps (with horsetails and wetland sedges) and upslope mixed oak/huckleberry forest. Preferred soil type is Deerfield Loamy Sand. All Maine occurrences are from coastal towns where climate is moderated by the ocean. |
| <i>Castanea dentata</i><br>American Chestnut                | S4        | G4              | SC               |                          |                            | Dry gravelly or rocky, mostly acidic soil.   |
| <i>Eleocharis engelmannii</i><br>Engelmann's Spikerush      | SH        | G4?             | PE               |                          |                            | Wet sand, peat or mud  |
| <i>Hieracium venosum</i><br>Rattlesnake Hawkweed            | S1        | G5T4Q           | E                |                          |                            | Dry open pine, or oak woods and barrens, usually in grassy openings.   |
| <i>Kalmia latifolia</i><br>Mountain-laurel                  | S2        | G5              | SC               |                          |                            | Rocky or gravelly woods and clearings, sometimes swamps.   |

# Rare or Exemplary Botanical Features in the Project Vicinity

Documented within a four mile radius of the proposed development, Route 9 and Turtle Rd., Cumberland Center.

| Scientific Name<br>Common Name                                      | Last Seen | State<br>Rarity | Global<br>Rarity | State<br>Legal<br>Status | Federal<br>Legal<br>Status | Habitat Description  |
|---|-----------|-----------------|------------------|--------------------------|----------------------------|--|
| <i>Lobelia siphilitica</i><br>Great Blue Lobelia                    | SX        | G5              | PE               |                          |                            | Rich low woods and swamps  |
| Maple - basswood - ash forest<br>Enriched Northern Hardwoods Forest | S3        | GNR             |                  |                          |                            | Rich northern hardwood forest of sheltered sites, primarily on broad coves with slopes above them. Sugar maple dominant; basswood characteristic. Bedrock enriched with calcium; soils rich in nutrients. Soils are mesic, with water from runoff and seeps. |
| <i>Phegopteris hexagonoptera</i><br>Broad Beech Fern                | S2        | G5              | SC               |                          |                            | Rich, often rocky, hardwood forests.   |
| <i>Polygala cruciata</i><br>Marsh Milkwort                          | SH        | G5T4            | PE               |                          |                            | Wet pinelands, savannas, peats, and sands.   |
| <i>Polygonum tenue</i><br>Slender Knotweed                          | SH        | G5              | PE               |                          |                            | Dry open soil (chiefly acid)   |
| <i>Ranunculus ambigens</i><br>Water-plantain Spearwort              | SH        | G4              | PE               |                          |                            | Sloughs, ditches, and muddy swamps.  |
| <i>Suaeda maritima</i> ssp. <i>richii</i><br>Rich's Sea-blite       | S1        | G5T3            | SC               |                          |                            | Salt-marshes and sea-strands.  |
| <i>Zinnichella palustris</i><br>Horned Pondweed                     | S2        | G5              | SC               |                          |                            | Fresh, brackish or alkaline waters, and stream edges.  |

## STATE RARITY RANKS

- S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3 Rare in Maine (on the order of 20-100 occurrences).
- S4 Apparently secure in Maine.
- S5 Demonstrably secure in Maine.
- SH Occurred historically in Maine, and could be rediscovered; not known to have been extirpated.
- SU Possibly in peril in Maine, but status uncertain; need more information.
- SX Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).

Note: State Ranks determined by the Maine Natural Areas Program.

## GLOBAL RARITY RANKS

- G1 Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- G2 Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3 Globally rare (on the order of 20-100 occurrences).
- G4 Apparently secure globally.
- G5 Demonstrably secure globally.

Note: Global Ranks are determined by NatureServe.

T indicates subspecies rank, Q indicates questionable rank, HYB indicates hybrid species.

## STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's endangered and threatened plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future, or federally listed as Endangered.
- T THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.
- SC SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE POSSIBLY EXTIRPATED; Not known to currently exist in Maine; not field-verified (or documented) in Maine over the past 20 years.

## FEDERAL STATUS

- LE Listed as Endangered at the national level.
- LT Listed as Threatened at the national level.

---

Please note that species names follow *Flora of Maine: A Manual for Identification of Native and Naturalized Vascular Plants of Maine*, Arthur Haines and Thomas F. Vining, 1998, V.F. Thomas Co., 219 Dead River Road, Bowdoin, ME 04287.

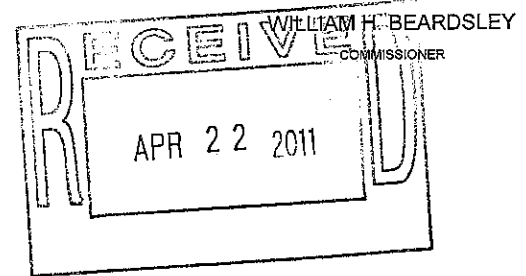
Where entries appear as binomials, all representatives (subspecies and varieties) of the species are rare in Maine; where names appear as trinomials, only that particular variety or subspecies is rare in Maine, not the species as a whole.

Visit our web site for more information on rare, threatened and endangered species!



STATE OF MAINE  
DEPARTMENT OF CONSERVATION  
93 STATE HOUSE STATION  
AUGUSTA, MAINE  
04333-0093

PAUL R. LEPAGE  
GOVERNOR



April 14, 2011

Michael Tadema-Wielandt  
DeLuca-Hoffman Associates, Inc.  
778 Main Street, Suite 8  
South Portland, ME 01406

Re: Rare and exemplary botanical features in proximity to: Proposed Residential Development, JN  
2998, Village Green, Cumberland, Maine

Dear Mr. Tadema-Wielandt:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of April 12, 2011 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in Cumberland, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$75.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,



Don Cameron  
Ecologist  
Maine Natural Areas Program  
207-287-8041  
[don.s.cameron@maine.gov](mailto:don.s.cameron@maine.gov)

Enclosures

## Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the Proposed Residential Development, JN 2998, Village Green, Cumberland, Maine.

| Feature Name                     | Global Rank | State Rank | State Status | EO Number | Last Seen  | Habitat  |
|----------------------------------|-------------|------------|--------------|-----------|------------|--|
| Castanea dentata                 |             |            |              |           |            | Hardwood to mixed forest (forest, upland)                        |
|                                  | G4          | S4         | SC           | 2         | 2001-02-13 |  |
| Allium tricoccum                 |             |            |              |           |            | Hardwood to mixed forest (forest, upland)                        |
|                                  | G5          | S3         | SC           | 28        | 1999-05-22 |  |
| Kalmia latifolia                 |             |            |              |           |            | Conifer forest (forest, upland)                                  |
|                                  | G5          | S2         | SC           | 13        | 1985-08-01 |  |
| Polygonum tenue                  |             |            |              |           |            | Dry barrens (partly forested, upland)                            |
|                                  | G5          | SH         | PE           | 1         | 1902-09-07 |  |
| Eleocharis engelmannii           |             |            |              |           |            | Open wetland, not coastal nor rivershore (non-forested, wetland) |
|                                  | G4G5Q       | SH         | PE           | 2         | 1916-08-31 |  |
| Ranunculus ambigens              |             |            |              |           |            | Open water (non-forested, wetland)                               |
|                                  | G4          | SH         | PE           | 2         | 1903-07-29 |  |
| Hieracium venosum var. nudicaule |             |            |              |           |            | Dry barrens (partly forested, upland)                            |
|                                  | G5T4Q       | S1         | E            | 1         | 1909-07    |  |
| Phegopteris hexagonoptera        |             |            |              |           |            | Hardwood to mixed forest (forest, upland)                        |
|                                  | G5          | S2         | SC           | 28        | 2001-08-28 |  |
| Zannichellia palustris           |             |            |              |           |            | Tidal wetland (non-forested, wetland)                            |
|                                  | G5          | S2         | SC           | 9         | 1913-09-13 |  |
| Aureolaria pedicularia           |             |            |              |           |            | Hardwood to mixed forest (forest, upland)                        |
|                                  | G5          | S3         | SC           | 13        | 1902-09-02 |  |
| Polygala cruciata var. aquilonia |             |            |              |           |            | Open wetland, not coastal nor rivershore (non-forested, wetland) |
|                                  | G5T4        | SH         | PE           | 1         | 1903-08-18 |  |
| Lobelia siphilitica              |             |            |              |           |            | Non-tidal rivershore (non-forested, seasonally wet)              |
|                                  | G5          | SX         | PE           | 3         | 1905-09    |  |
| Chimaphila maculata              |             |            |              |           |            | Hardwood to mixed forest (forest, upland)                        |
|                                  | G5          | S2         | E            | 30        | 2009-07-26 |  |

## STATE RARITY RANKS

- S1** Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine (20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SH** Known historically from the state, not verified in the past 20 years.
- SX** Apparently extirpated from the state, loss of last known occurrence has been documented.
- SU** Under consideration for assigning rarity status; more information needed on threats or distribution.
- S#?** Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).
- SNR** State rank not yet assessed.

**Note:** State Rarity Ranks are determined by the Maine Natural Areas Program.

## GLOBAL RARITY RANKS

- G1** Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3** Globally rare (20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.
- GNR** Global rank not yet assessed.

**Note:** Global Ranks are determined by NatureServe, for more information see <http://www.natureserve.org/explorer/ranking.htm>.

## STATE LEGAL STATUS

**Note:** State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E** **ENDANGERED**; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** **THREATENED**; Rare and, with further decline, could become endangered; or federally listed as Threatened.

## NON-LEGAL STATUS

- SC** **SPECIAL CONCERN**; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** **Potentially Extirpated**; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

Visit our website for more information on rare, threatened, and endangered species!  
<http://www.maine.gov/doc/nrimc/mnap>



## **ATTACHMENT F**

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**Class A Soil Survey Prepared by Albert Frick Associates Inc.**



**Albert Frick Associates, Inc**  
**Environmental Consultants**

95A County Road Gorham, Maine 04038  
(207) 839-5563 FAX (207) 839-5564  
[www.albertfrick.com](http://www.albertfrick.com) [info@albertfrick.com](mailto:info@albertfrick.com)

SC-M147

43

Albert Frick, SS, SE  
James Logan, SS, SE  
Matthew Logan, SE  
Brady Frick, SE  
Bryan Jordan, SE  
William O'Connor, SE  
Noel Dunn, Office Manager

RECEIVED

SEP - 9 '14

F.S.&T.

N/F RUSSELL PROPERTY  
Amanda's Way  
Cumberland

**SOIL NARRATIVE REPORT**

DATE: Soil profiles observed on July 30, 1014.

BASE MAP: Contour map 1-foot intervals, scaled 1"=40', provided by FST.

GROUND CONTROL: Test pits located by submeter GPS by AFA personnel.

THE SOIL MAPPING CONFORMS WITH A HIGH-INTENSITY CLASS A SURVEY.

**Class A** - Soil Survey

1. Mapping units of 1/8 acre or greater.
2. Scale of 1" = 100' or larger.
3. Up to 25% inclusions in mapping units of which no more than 15% may be dissimilar soils.
4. Ground control - base line and test pits located by land surveyor.
5. Base map with 2' contour lines.
5. Base map does not require contour lines.

This was prepared for a residential division of land utilizing public sewer and water.

The accompanying soil profile descriptions, soil map and this soil narrative report were done in accordance with the standards adopted by the Maine Association of Professional Soil Scientists, and the Maine Board of Certification of Geologists and Soil Scientists.

  
James Logan C.S.S. #213, S.E. #237 9, 8, 14  
Date

## LA MOINE (Aeric Haplaquepts)

### SETTING

|                               |   |
|-------------------------------|---|
| <b>Parent Material:</b>       | Lacustrine or marine sediments.             |
| <b>Landform:</b>              | Lake or marine, coastal plains or terraces. |
| <b>Position in Landscape:</b> | Intermediate positions in landform.         |
| <b>Slope Gradient Ranges:</b> | (B) 3-8% (C) 8-20%                          |

### COMPOSITION AND SOIL CHARACTERISTICS

|                              |  |   |  |
|------------------------------|--|---|--|
| Drainage Class:              | Somewhat poorly drained, with a perched water table 1.0 to 1.5 feet below the soil surface from November through May, and during periods of excessive precipitation. |   |  |
| Typical Profile Description: | Surface layer:   | Dark brown silt loam, 0-7"                            |  |
|                              | Subsurface layer:  | Light olive brown or yellowish brown silt loam, 7-12" |  |
|                              | Subsoil layer:   | Light olive brown and olive silty clay loam, 12-21"   |  |
|                              | Substratum:  | Olive silty clay, 21-65"                              |  |
| Hydrologic Group:            | Group D  |   |  |
| Surface Run Off:             | Medium   |   |  |
| Permeability:                | Moderate or moderately slow in surface layer, moderately slow or slow in subsoil, and slow or very slow in the dense substratum.                                     |   |  |
| Depth to Bedrock:            | Deep, greater than 40".  |   |  |
| Hazard to Flooding:          | None   |   |  |

### INCLUSIONS (Within Mapping Unit)

|                    |  |
|--------------------|--|
| <b>Similar:</b>    | Elmwood (S.W.P.), Colonel, Nicholville (SWP) |
| <b>Dissimilar:</b> | Scantic, Swanton                             |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness, due to the presence of a water table for some portion of the year. Proper foundation drainage or other site modification is recommended for construction.

## LAMOINE (ERODED)

### SETTING

|                               |   |
|-------------------------------|---|
| <b>Parent Material:</b>       | Lacustrine or marine sediments.             |
| <b>Landform:</b>              | Lake or marine, coastal plains or terraces. |
| <b>Position in Landscape:</b> | Intermediate positions in landform.         |
| <b>Slope Gradient Ranges:</b> | (C) 8-20%                                   |

### COMPOSITION AND SOIL CHARACTERISTICS

|                                     |  |   |
|-------------------------------------|--|---|
| <b>Drainage Class:</b>              | Somewhat poorly drained, with a perched water table 1.0 to 1.5 feet below the soil surface from November through May, and during periods of excessive precipitation. A portion of the friable silt loam cap has been lost to erosion within these map units. While there may be a reduced depth to clay hardpan within these map units, they are generally not considered hydric or wetland soils. |   |
| <b>Typical Profile Description:</b> | <b>Surface layer:</b>  | Dark brown silt loam, 0-7"                            |
|                                     | <b>Subsurface layer:</b>   | Light olive brown or yellowish brown silt loam, 7-12" |
|                                     | <b>Subsoil layer:</b>  | Light olive brown and olive silty clay loam, 12-21"   |
|                                     | <b>Substratum:</b>   | Olive silty clay, 21-65"                              |
| <b>Hydrologic Group:</b>            | Group D  |   |
| <b>Surface Run Off:</b>             | Medium   |   |
| <b>Permeability:</b>                | Moderate or moderately slow in surface layer, moderately slow or slow in subsoil, and slow or very slow in the dense substratum.   |   |
| <b>Depth to Bedrock:</b>            | Deep, greater than 40".  |   |
| <b>Hazard to Flooding:</b>          | None   |   |

### INCLUSIONS (Within Mapping Unit)

|                    |  |
|--------------------|--|
| <b>Similar:</b>    | Buxton, Elmwood (S.W.P.), Lamoine, Nicholville |
| <b>Dissimilar:</b> | Scantic, Swanton                               |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness, due to the presence of a water table within 1.5 feet of the soil surface for a significant portion of the year. Proper foundation drainage or other site modification is recommended for construction.

## NICHOLVILLE (Aquic Haplorthods)

### SETTING

|                               |  |
|-------------------------------|--|
| <b>Parent Material:</b>       | Lacustrine material having a high content of silt and fine sand.   |
| <b>Landform:</b>              | Commonly found on lake plains and upland till plains that have a mantle of water-deposited silt or very fine sand. |
| <b>Position in Landscape:</b> | Intermediate and upper portions of landscape feature.  |
| <b>Slope Gradient Ranges:</b> | (B) 3-8% (C) 8-20% (D) 20+%  |

### COMPOSITION AND SOIL CHARACTERISTICS

|                              |   |  |  |
|------------------------------|---|--|--|
| Drainage Class:              | Moderately well drained, with a perched water table 1.5 to 2.0 feet below the soil surface from November through May. |  |  |
| Typical Profile Description: | Surface layer:  | Very dark grayish brown silt loam, 0-10"                       |  |
|                              | Subsurface layer:   | Dark yellowish brown silt loam, 10-13"                         |  |
|                              | Subsoil layer:  | Yellowish brown and grayish brown very fine sandy loam, 13-18" |  |
|                              | Substratum:   | Grayish brown loamy very fine sand, 18-70"                     |  |
| Hydrologic Group:            | Group C   |  |  |
| Surface Run Off:             | Medium  |  |  |
| Permeability:                | Moderate throughout the profile.  |  |  |
| Depth to Bedrock:            | Very deep, greater than 60".  |  |  |
| Hazard to Flooding:          | None  |  |  |

### INCLUSIONS (Within Mapping Unit)

|                    |                              |
|--------------------|------------------------------|
| <b>Similar:</b>    | Elmwood, Lamoine             |
| <b>Dissimilar:</b> | Nicholville (S.W.P.), Buxton |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness due to the presence of a groundwater table. Proper foundation drainage or site modification is recommended for construction.

## NICHOLVILLE (S.W.P.)

### SETTING

|                               |  |
|-------------------------------|--|
| <b>Parent Material:</b>       | Lacustrine material having a high content of silt and fine sand.   |
| <b>Landform:</b>              | Commonly found on lake plains and upland till plains that have a mantle of water-deposited silt or very fine sand. |
| <b>Position in Landscape:</b> | Intermediate portion of landscape feature.   |
| <b>Slope Gradient Ranges:</b> | (B) 3-8%   |

### COMPOSITION AND SOIL CHARACTERISTICS

|                                     |   |  |
|-------------------------------------|---|--|
| <b>Drainage Class:</b>              | Nicholville (S.W.P.) is somewhat poorly drained, with a perched water table 0.5 to 1.5 feet below the soil surface from November through May and during periods of heavy precipitation. |  |
| <b>Typical Profile Description:</b> | <b>Surface layer:</b>   | Very dark grayish brown silt loam, 0-10"                       |
|                                     | <b>Subsurface layer:</b>  | Dark yellowish brown silt loam, 10-13"                         |
|                                     | <b>Subsoil layer:</b>   | Yellowish brown and grayish brown very fine sandy loam, 13-18" |
|                                     | <b>Substratum:</b>  | Grayish brown loamy very fine sand, 18-70"                     |
| <b>Hydrologic Group:</b>            | Group C   |  |
| <b>Surface Run Off:</b>             | Medium  |  |
| <b>Permeability:</b>                | Moderate throughout profiles.   |  |
| <b>Depth to Bedrock:</b>            | Very deep, greater than 60".  |  |
| <b>Hazard to Flooding:</b>          | None  |  |

### INCLUSIONS (Within Mapping Unit)

|                    |   |
|--------------------|---|
| <b>Similar:</b>    | Nicholville, Naumburg (S.W.P.), Lamoine |
| <b>Dissimilar:</b> | Roundabout, Scantic                     |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness due to the presence of a high groundwater table. Proper foundation drainage or site modification is recommended.

## ROUNABOUT (Aeric Haplaquepts)

### SETTING

|                               |  |
|-------------------------------|--|
| <b>Parent Material:</b>       | Derived from lacustrine and marine sediments.      |
| <b>Landform:</b>              | Low-lying lake or marine plains.                   |
| <b>Position in Landscape:</b> | Nearly level areas in lower portions of landscape. |
| <b>Slope Gradient Ranges:</b> | (B) 3-8%   |

### COMPOSITION AND SOIL CHARACTERISTICS

|                              |   |  |  |
|------------------------------|---|--|--|
| Drainage Class:              | Roundabout soils are somewhat poorly to poorly drained, and exhibit a perched water table 0.5 to 1.5 feet below the soil surface from November through May and during periods of excessive wetness. |  |  |
| Typical Profile Description: | Surface layer:  | Dark brown silt loam, few mottles, 0-7"                      |  |
|                              | Subsurface layer:   | Olive brown and grayish brown silt loam, many mottles, 7-26" |  |
|                              | Subsoil layer:  | Olive gray very fine sandy loam, many mottles, 26-30"        |  |
|                              | Substratum:   | Olive silt loam, common mottles, 30-65"                      |  |
| Hydrologic Group:            | Group C   |  |  |
| Surface Run Off:             | Slow to medium  |  |  |
| Permeability:                | Moderate to moderately slow in upper horizons, moderately slow to slow in the medium textured substratum, and moderately rapid to rapid in the coarser textured substratum.                         |  |  |
| Depth to Bedrock:            | Deep, greater than 40".   |  |  |
| Hazard to Flooding:          | None  |  |  |

### INCLUSIONS (Within Mapping Unit)

|                    |                                     |
|--------------------|-------------------------------------|
| <b>Similar:</b>    | Nicholville (SWP), Newbury, Scantic |
| <b>Dissimilar:</b> | Whately                             |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness due to a high water table for some portion of the year. Proper foundation drainage or site modification is recommended for construction. Roundabout soil may be classified as wetlands based upon the combined consideration of hydric conditions, hydrology, and vegetation.

## SCANTIC (Typic Haplaquepts)

### SETTING

|                               |  |
|-------------------------------|--|
| <b>Parent Material:</b>       | Marine or lacustrine sediments.                |
| <b>Landform:</b>              | Level or gently sloping marine or lake plains. |
| <b>Position in Landscape:</b> | Lower to intermediate positions.               |
| <b>Slope Gradient Ranges:</b> | (A) 0-3%                                       |

### COMPOSITION AND SOIL CHARACTERISTICS

|                                     |  |                                     |
|-------------------------------------|--|-------------------------------------|
| <b>Drainage Class:</b>              | Poorly drained, with a perched water table 0.5 to 1.0 feet beneath the soil surface.           |                                     |
| <b>Typical Profile Description:</b> | <b>Surface layer:</b>  | Dark grayish brown silt loam, 0-9"  |
|                                     | <b>Subsurface layer:</b>   | Olive gray silt loam, 9-11"         |
|                                     | <b>Subsoil layer:</b>  | Olive gray, silty clay loam, 11-16" |
|                                     | <b>Substratum:</b>   | Olive gray clay, 16-65"             |
| <b>Hydrologic Group:</b>            | Group D  |                                     |
| <b>Surface Run Off:</b>             | Slow   |                                     |
| <b>Permeability:</b>                | Moderate or moderately slow in upper profile, slow to very slow in dense substratum.           |                                     |
| <b>Depth to Bedrock:</b>            | Very deep, greater than 60".   |                                     |
| <b>Hazard to Flooding:</b>          | May flood occasionally on lowest fringes during spring and periods of excessive precipitation. |                                     |

### INCLUSIONS (Within Mapping Unit)

|                    |                             |
|--------------------|-----------------------------|
| <b>Similar:</b>    | Lamoine, Enosburg (Swanton) |
| <b>Dissimilar:</b> | Naskeag, Biddeford, Whately |

### USE AND MANAGEMENT

**Development with public sewer and water:** The limiting factor for building site development is wetness due to the presence of a shallow water table throughout most of the year. Proper foundation drainage or site modification is recommended for construction. Scantic soil may be classified as wetlands, based upon the combined consideration of hydric conditions, hydrology, and vegetation.



Town, City, Plantation  
CUMBERLAND

Street, Road Subdivision  
AMANDA'S WAY

Owner's Name  
FST (N/F RUSSELL)

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 1 ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| Texture                                    | Consistency             | Color                | Mottling                  |
|--|-------------------------|----------------------|---------------------------|
|  |                         | DARK BROWN           |                           |
| VERY FINE SANDY LOAM                       | FRIABLE                 | DARK YELLOWISH BROWN |                           |
|  |                         | YELLOWISH BROWN      |                           |
| LOAMY FINE SAND W/ SILT & SILT LOAM LENSES | SOMEWHAT FIRM IN LENSES | LIGHT OLIVE BROWN    | FEW FAINT<br>COMMON FAINT |

Soil Classification

Slope

Limiting Factor  
26"

☒ Ground Water  
☐ Restrictive Layer  
☐ Bedrock  
☐ Pit Depth

Profile Condition

Soil Series Name:  
NICHOLVILLE

Drainage Class:

Hydrologic Group:

Observation Hole TP 2 ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| Texture         | Consistency           | Color       | Mottling        |
|-----------------|-----------------------|-------------|-----------------|
| SILT LOAM       | FRIABLE               | DARK BROWN  |                 |
|                 |                       | OLIVE BROWN | FEW FAINT       |
| SILTY CLAY LOAM | SOMEWHAT FIRM TO FIRM | OLIVE       | COMMON DISTINCT |

Soil Classification

Slope

Limiting Factor  
11"

☒ Ground Water  
☐ Restrictive Layer  
☐ Bedrock  
☐ Pit Depth

Profile Condition

Soil Series Name:  
LAMOINE

Drainage Class:

Hydrologic Group:

SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole TP 3 ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| Texture                          | Consistency           | Color               | Mottling                |
|----------------------------------|-----------------------|---------------------|-------------------------|
|                                  |                       | VARIABLE DARK BROWN |                         |
| VERY FINE SANDY LOAM             | FRIABLE               | OLIVE BROWN         | FEW FAINT*              |
|                                  |                       | OLIVE               | COMMON FAINT            |
| LOAMY FINE SAND & SILT IN LENSES | SOMEWHAT FIRM TO FIRM |                     | *REDOXIMORPHIC FEATURES |

Soil Classification

Slope

Limiting Factor  
8"

☒ Ground Water  
☐ Restrictive Layer  
☐ Bedrock  
☐ Pit Depth

Profile Condition

Soil Series Name:  
ROUNABOUT

Drainage Class:

Hydrologic Group:

Observation Hole TP 4 ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| Texture         | Consistency | Color       | Mottling        |
|-----------------|-------------|-------------|-----------------|
|                 |             | DARK BROWN  |                 |
| SILT LOAM       | FRIABLE     | OLIVE BROWN |                 |
|                 |             | OLIVE       | COMMON FAINT    |
| SILTY CLAY LOAM | FIRM        | OLIVE GRAY  | COMMON DISTINCT |

Soil Classification

Slope

Limiting Factor  
10"

☒ Ground Water  
☐ Restrictive Layer  
☐ Bedrock  
☐ Pit Depth

Profile Condition

Soil Series Name:  
LAMOINE

Drainage Class:

Hydrologic Group:

Site Evaluator / Soil Scientist Signature

243/237

SE/CSS \*

7-30-14

Date

Town, City, Plantation  
**CUMBERLAND**

Street, Road Subdivision  
**AMANDA'S WAY**

Owner's Name  
**FST (N/F RUSSELL)**

### SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole **TP 5** ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| 0  | Texture                | Consistency                  | Color                          | Mottling               |
|----|------------------------|------------------------------|--------------------------------|------------------------|
|    |                        |                              | <b>VARIABLE DARK BROWN</b>     |                        |
| 10 | <b>SILT LOAM</b>       | <b>FRIABLE</b>               | <b>OLIVE BROWN &amp; OLIVE</b> | <b>COMMON FAINT</b>    |
| 20 | <b>SILTY CLAY LOAM</b> | <b>SOMEWHAT FIRM TO FIRM</b> |                                | <b>COMMON DISTINCT</b> |
| 30 |                        |                              |                                |                        |
| 40 |                        |                              |                                |                        |
| 50 |                        |                              |                                |                        |

Soil Classification: **Profile** **Condition** **Slope** **%** **Limiting Factor** **6"** ☒ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name: **SCANTIC** Drainage Class: Hydrologic Group:

Observation Hole **TP 6** ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| 0  | Texture                | Consistency    | Color              | Mottling               |
|----|------------------------|----------------|--------------------|------------------------|
|    | <b>SILT LOAM</b>       | <b>FRIABLE</b> | <b>OLIVE BROWN</b> |                        |
| 10 | <b>SILTY CLAY LOAM</b> | <b>FIRM</b>    | <b>OLIVE GRAY</b>  | <b>COMMON DISTINCT</b> |
| 20 |                        |                |                    |                        |
| 30 |                        |                |                    |                        |
| 40 |                        |                |                    |                        |
| 50 |                        |                |                    |                        |

Soil Classification: **Profile** **Condition** **Slope** **%** **Limiting Factor** **8"** ☐ Ground Water ☒ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name: **LAMOINE** Drainage Class: Hydrologic Group:

**\*ERODED PROFILE**

### SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole **TP 7** ☒ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| 0  | Texture   | Consistency                    | Color                             | Mottling            |
|----|---|--------------------------------|-----------------------------------|---------------------|
|    | <b>VERY FINE SANDY LOAM</b>                           | <b>FRIABLE</b>                 | <b>DARK BROWN</b>                 |                     |
| 10 |   |                                | <b>MIXED DARK YELLOWISH BROWN</b> | <b>FEW FAINT</b>    |
| 20 | <b>LOAMY FINE SAND &amp; SILT W/ SILT LOAM LENSES</b> | <b>SOMEWHAT FIRM IN LENSES</b> | <b>OLIVE BROWN</b>                | <b>COMMON FAINT</b> |
| 30 |   |                                |                                   |                     |
| 40 |   |                                |                                   |                     |
| 50 |   |                                |                                   |                     |

Soil Classification: **Profile** **Condition** **Slope** **%** **Limiting Factor** **14"** ☒ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name: **NICHOLVILLE** Drainage Class: **SWP** Hydrologic Group:

Observation Hole ☐ Test Pit ☐ Boring  
" Depth of Organic Horizon Above Mineral Soil

| 0  | Texture | Consistency | Color | Mottling |
|----|---------|-------------|-------|----------|
|    |         |             |       |          |
| 10 |         |             |       |          |
| 20 |         |             |       |          |
| 30 |         |             |       |          |
| 40 |         |             |       |          |
| 50 |         |             |       |          |

Soil Classification: **Profile** **Condition** **Slope** **%** **Limiting Factor** **"** ☐ Ground Water ☐ Restrictive Layer ☐ Bedrock ☐ Pit Depth

Soil Series Name: Drainage Class: Hydrologic Group:

Site Evaluator / Soil Scientist Signature

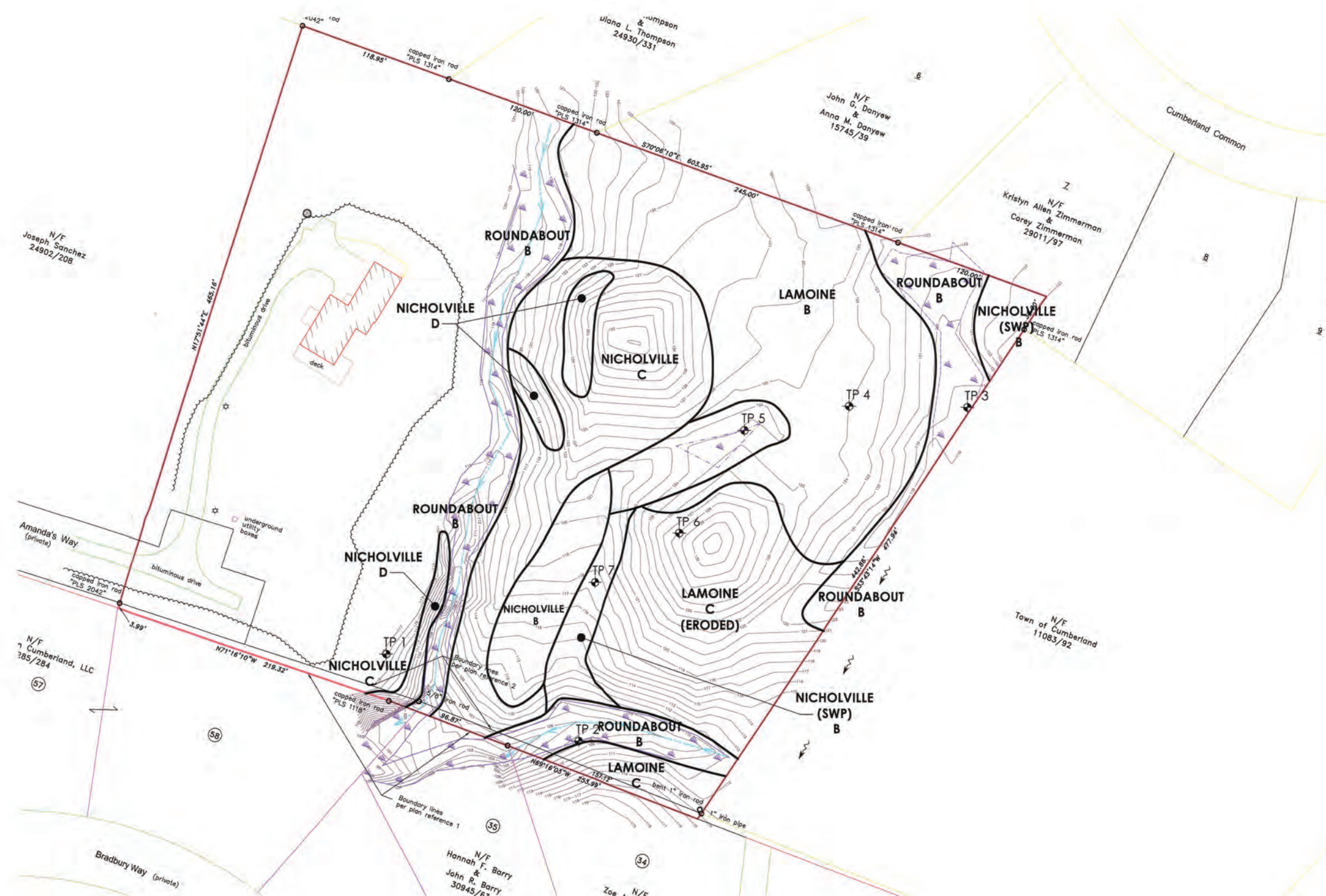
243/237

SE/CSS #

7-30-14

Date



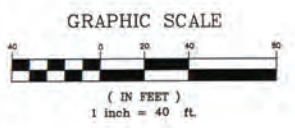


- SOILS MAP LEGEND:**
- SOIL TEST PIT (LOCATED BY SUBMETER GPS)
  - SOIL BOUNDARY LINE
  - SURFACE WATER RUNOFF
  - WETLAND AREA
  - STREAM

- SLOPE DESIGNATION**
- A — 0 - 3%
  - B — 3 - 8%
  - C — 8 - 20%
  - D — 20%+

NOTE: SEE ACCOMPANYING SOIL NARRATIVE REPORT, DATED AUGUST, 2014

THE ACCOMPANYING SOILS SURVEY WAS DONE IN ACCORDANCE WITH THE STANDARDS ADOPTED BY THE MAINE ASSOCIATION OF PROFESSIONAL SOIL SCIENTISTS, FEBRUARY 1995, AS AMENDED.



|                |       |            |   |  |
|----------------|-------|------------|---|--|
|                | DATE: | REVISIONS: | <b>CLASS A HIGH-INTENSITY<br/>SOIL SURVEY<br/>PREPARED FOR<br/>FAY, SPOFFORD &amp;<br/>THORNDIKE<br/>AMANDA'S WAY<br/>CUMBERLAND, MAINE</b> | <b>Albert Frick Associates, Inc.</b><br>Environmental Consultants<br>Gorham, Maine |
|                |       |            |   |  |
|                |       |            |   |  |
|                |       |            |   |  |
|                |       |            |   |  |
| Drawn By: B.O. |       |            | Checked By: J.L.  |  |
| Date: 7/30/14  |       |            | Scale: 1" = 40'   |  |

## ATTACHMENT G

---

### Water Quality Computations

**Job No. 195350072 Russell Property**  
**Village Green**  
**6/21/2018**

V:\1953\active\195350072\Eng\Calculations

The following table applies to the proposed four lot subdivision within the Russell Property.  
 Four lot area plus access ROW: 3.31 acres or 144,214 SF

**POST-DEVELOPMENT STORMWATER TREATMENT CALCULATIONS**

| <i>Watershed</i>        | <i>New Roof Area, sf</i> | <i>Other New Impervious Area, sf</i> | <i>Total New Impervious Area, sf</i> | <i>New Landscape Area, sf</i> | <i>Total New Developed Area, sf</i> | <i>Total WS Area, sf</i> | <i>Total WS Area, Ac</i> | <i>Structural Treatment?</i> | <i>BMP</i>                                  | <i>Treated New Impervious Area, sf</i> | <i>Treated New Landscape Area, sf</i> | <i>Treated New Developed Area, sf</i> |
|-------------------------|--------------------------|--------------------------------------|--------------------------------------|-------------------------------|-------------------------------------|--------------------------|--------------------------|------------------------------|---|--|---------------------------------------|---------------------------------------|
| <b>Russell Property</b> | <b>6,400</b>             | <b>20,760</b>                        | <b>27,160</b>                        | <b>28,453</b>                 | <b>55,613</b>                       | <b>144,214</b>           | <b>3.31</b>              | <b>yes</b>                   | <b>Pond 1 and Dripedge - see note below</b> | <b>25,500</b>                          | <b>16,550</b>                         | <b>42,050</b>                         |
| Total                   | 6,400                    | 20,760                               | 27,160                               | 28,453                        | 55,613                              | 144,214                  | 3.31                     | -                            | -   | 25,500                                 | 16,550                                | 42,050                                |
| <b>Percent Treated:</b> |                          |                                      |                                      |                               |                                     |                          |                          |                              |   | <b>93.9%</b>                           | <b>75.6%</b>                          |                                       |

Per Table 1 of Chapter 500.4.C(2)(a)(iii)  
 Percentage of Developed area to Land Available for Development <60  
 Percentage of Impervious Area Requiring Treatment 90%  
 Percentage of Total Developed Area Requiring Treatment 75%

**Provided Treatment %**                      **93.90%**                      **75.60%**

Note: The proposed Private access drive will be curbed on one side and contain a closed drainage system to collect runoff from the access drive and lot driveways and convey runoff to the system in Bradbury Way. The system in Bradbury Way connects to the overall project drainage system that discharges to the existing wetpond where water quality treatment and flood control is provided. The pond has ample capacity to handle the additional 37,310 SF of additional drainage area. Similar to the original development all houses will be developed with roof edge filter strips for water quality treatment of the roof.

## **ATTACHMENT H**

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**PWD Correspondence for  
Groundwater  
Water Supply  
Wastewater Disposal**



## Portland Water District

FROM SEBAGO LAKE TO CASCO BAY

April 25, 2018

Stephen Bushey  
Stantec Consulting Services Inc.  
482 Payne Road Scarborough Court  
Scarborough ME 04074-8929 US

Re: Bradbury Way, CU  
Ability to Serve with PWD Water

Dear Mr. Bushey:

The Portland Water District has received your request for an Ability to Serve Determination for the noted site submitted on April 4, 2018. Based on the information provided per plans dated April 25, 2018, we can confirm that the District will be able to serve the proposed project as further described in this letter. **Please note that this letter constitutes approval of the water system as currently designed. Any changes affecting the approved water system will require further review and approval by PWD.**

### Conditions of Service

The following conditions of service apply:

- The District can confirm that the existing water and sewer systems have the capacity to serve the additional 6 single-family house lots within the Village Green Subdivision in Cumberland.
- A new 4-inch ductile iron water main shall be installed in an easement within a private drive off Bradbury Way, from the existing 8" diameter service stub to the center of the last lot to be served. New 1-inch diameter copper domestic water services shall be installed to each subdivided lot.
- Our records show that the property is currently served with an 8-inch diameter domestic water line, which was installed as part of the previous phase of work. The existing water service line stubbed to this site may be used by the proposed development.

Prior to construction, the owner or contractor will need to complete the Main Extension Initiation form and pay all necessary fees. PWD will guide the applicant through the new development process.

### Existing Site Service

According to District records, the project site does currently have existing water service. An 8-inch diameter ductile iron water service line provides water service to the site. Please refer to the "Conditions of Service" section of this letter for requirements related to the use of this service.





### Water System Characteristics

According to District records, there is an 8-inch diameter ductile iron water main in Bradbury Way and a public fire hydrant located approximately 100 feet from the site entrance. Recent flow data is not available in this area. The most recent static pressure reading was 92 psi.

### Public Fire Protection

The installation of new public hydrants to be accepted into the District water system will most likely not be required. It is your responsibility to contact the Town of Cumberland Fire Department to ensure that this project is adequately served by existing and/or proposed hydrants.

### Domestic Water Needs

The data noted above indicates there should be adequate pressure and volume of water to serve the domestic water needs of your proposed project. Based on the high water pressure in this area, we recommend that you consider the installation of pressure reducing devices that comply with state plumbing codes.

### Private Fire Protection Water Needs

You have indicated that this project will not require water service to provide private fire protection to the site.

Should you disagree with this determination, you may request a review by the District's Internal Review Team. Your request for review must be in writing and state the reason for your disagreement with the determination. The request must be sent to MEANS@PWD.org or mailed to 225 Douglass Street, Portland Maine, 04104 c/o MEANS. The Internal Review Team will undertake review as requested within 2 weeks of receipt of a request for review.

If the District can be of further assistance in this matter, please let us know.

Sincerely,  
Portland Water District

A handwritten signature in black ink, appearing to read 'Robert A. Bartels', written in a cursive style.

Robert A. Bartels, P.E.  
Senior Project Engineer



## ATTACHMENT I

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### Solid Waste Computations

# Computations of Anticipated Solid Wastes Generated by the Project

---

## 1. Clearing

Approximately 1.0 acres of the site will be cleared during the development of the additional four lot project. Approximately 0.5 acres is associated with the initial roadway/utility infrastructure construction and the remaining 0.5 acres is associated with the lot development.

The timber will be cleared and marketed for lumber productions, paper mill use, or chipped and used for on-site erosion control mix. It is anticipated the majority of the trees cleared will be logged by commercial clearing operations.

## 2. Stumps/Grubbings

The computed volume of stumps and grubbings is based upon quantities of 400 cubic yards per acre of clearing. Therefore, the total stumps/grubbing for the site is 400 CY.

## 3. Construction Debris Generated by the Proposed Project

Assume 20 c.y./1,500 s.f. of building area.

While there are several housing designs that will be offered to the future homeowners, the average footprint is about 1,600 SF, which has been used for the construction debris estimates:

|   |                 |
|---|-----------------|
| Construction Debris per Home:               | 25 cubic yards  |
| Total Construction Debris from Development: | 100 cubic yards |

## 4. Solid Waste

Assume 1.35 cubic yards per 1,000 s.f. of building area to be generated on a monthly basis. The additional development (4 houses) is anticipated to contain a total building area of 6,400 SF (4 houses at 1,600 SF per house); therefore, the estimated volume of solid waste to be generated from the development is about 9 cubic yards per month or 0.3 cubic yards per day.

## **ATTACHMENT J**

---

### **Permit by Rule Application**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION  
PERMIT BY RULE NOTIFICATION FORM**

(For use with DEP Regulation, Natural Resources Protection Act- Permit by Rule Standards, Chapter 305)

PLEASE TYPE OR PRINT IN **BLACK INK ONLY**

| APPLICANT INFORMATION (Owner)          |  | AGENT INFORMATION (If Applying on Behalf of Owner)       |   |
|--|--|--|---|
| Name:                                  |  | Name:  | Stephen Bushey, PE - Stantec                                |
| Mailing Address:                       | 144 Haskell Road   | Mailing Address:   | 482 Payne Road  |
| Town:                                  | Yarmouth   | Town:  | Scarborough   |
| State and Zip Code:                    | Maine, 04097   | State and Zip Code:                                      | Maine, 04074  |
| Daytime Phone #:                       | 207.772.2992   | Daytime Phone #:   | 207.887.3478  |
| Email Address:                         | nathan@batemanpartnersllc.com  | Email Address:   | stephen.bushey@stantec.com                                  |
| PROJECT INFORMATION                    |  |  |   |
| Part of a larger project? (check one): | <input type="checkbox"/> Yes<br><input type="checkbox"/> No                    | After the Fact? (check one):                             | <input type="checkbox"/> Yes<br><input type="checkbox"/> No |
| Project Town:                          |  | Project involves work below mean low water? (check one): | <input type="checkbox"/> Yes<br><input type="checkbox"/> No |
| Brief Project Description:             |  |  |   |
| Brief Directions to Site:              | Property is located off Main Street (Route 9) onto Amanda's Way in Cumberland. |  |   |

**PERMIT BY RULE (PBR) SECTIONS (Check at least one):** I am filing notice of my intent to carry out work which meets the requirements for Permit By Rule (PBR) under DEP Rules, Chapter 305. **I and my agents, if any, have read and will comply with all of the standards in the Sections checked below.**

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Sec. (2) Act. Adj. to Protected Natural Res. | <input type="checkbox"/> Sec. (10) Stream Crossing                                | <input type="checkbox"/> Sec. (17) Transfers/Permit Extension  |
| <input type="checkbox"/> Sec. (3) Intake Pipes                        | <input type="checkbox"/> Sec. (11) State Transportation Facil.                    | <input type="checkbox"/> Sec. (18) Maintenance Dredging  |
| <input type="checkbox"/> Sec. (4) Replacement of Structures           | <input type="checkbox"/> Sec. (12) Restoration of Natural Areas                   | <input type="checkbox"/> Sec. (19) Activities in/on/over significant vernal pool habitat   |
| <input type="checkbox"/> Sec. (5) REPEALED                            | <input type="checkbox"/> Sec. (13) F&W Creation/Enhance/Water Quality Improvement | <input type="checkbox"/> Sec. (20) Activities located in/on/over high or moderate value inland waterfowl & wading bird habitat or shorebird feeding & roosting areas |
| <input type="checkbox"/> Sec. (6) Movement of Rocks or Vegetation     | <input type="checkbox"/> Sec. (14) REPEALED                                       |  |
| <input type="checkbox"/> Sec. (7) Outfall Pipes                       | <input type="checkbox"/> Sec. (15) Public Boat Ramps                              |  |
| <input type="checkbox"/> Sec. (8) Shoreline stabilization             | <input type="checkbox"/> Sec. (16) Coastal Sand Dune Projects                     |  |
| <input type="checkbox"/> Sec. (9) Utility Crossing                    |   |  |

**NOTE: Municipal permits may also be required. Contact your local code enforcement office for more information. Federal permits may be required for stream crossings and for projects involving wetland fill. Contact the Army Corps of Engineers at the Maine Project Office for more information.**

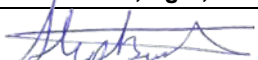
**NOTIFICATION FORMS CANNOT BE ACCEPTED WITHOUT THE NECESSARY ATTACHMENTS**

- ☐ **Attach** all required submissions for the PBR Section(s) checked above. The required submissions for each PBR Section are outlined in Chapter 305 and may differ depending on the Section you are submitting under.
- ☐ **Attach** a check for the correct fee made payable to: "Treasurer, State of Maine". The current fee for NRPA PBR Notifications can be found at the Department's website: <http://www.maine.gov/dep/feesched.pdf>
- ☐ **Attach** a location map that clearly identifies the site (U.S.G.S. topo map, Maine Atlas & Gazetteer, or similar).
- ☐ **Attach Proof of Legal Name** if applicant is a corporation, LLC, or other legal entity. Provide a copy of Secretary of State's registration information (available at <http://icrs.informe.org/nei-sos-icrs/ICRS?MainPage=x>) Individuals and municipalities are not required to provide any proof of identity.

I authorize staff of the Departments of Environmental Protection, Inland Fisheries & Wildlife, and Marine Resources to access the project site for the purpose of determining compliance with the rules.

I also understand that this PBR becomes effective 14 calendar days after receipt by the Department *unless the Department approves or denies the PBR prior to that date.*

**By signing this Notification Form, I represent that the project meets all applicability requirements and standards in the rule and that the applicant has sufficient title, right, or interest in the property where the activity takes place.**

|                                  |   |       |               |
|----------------------------------|---|-------|---------------|
| Signature of Agent or Applicant: |  | Date: | June 21, 2018 |
|----------------------------------|---|-------|---------------|

**Keep a copy as a record of permit.** Send the form with attachments via certified mail or hand deliver to the Maine Dept. of Environmental Protection at the appropriate regional office listed below. The DEP will send a copy to the Town Office as evidence of the DEP's receipt of notification. No further authorization by DEP will be issued after receipt of notice. Permits are valid for two years. **Work carried out in violation of any standard is subject to enforcement action.**

AUGUSTA DEP  
17 STATE HOUSE STATION  
AUGUSTA, ME 04333-0017  
(207)287-7688

PORTLAND DEP  
312 CANCO ROAD  
PORTLAND, ME 04103  
(207)822-6300

BANGOR DEP  
106 HOGAN ROAD  
BANGOR, ME 04401  
(207)941-4570

PRESQUE ISLE DEP  
1235 CENTRAL DRIVE  
PRESQUE ISLE, ME 04769  
(207)764-0477

|                 |      |      |           |           |              |
|-----------------|------|------|-----------|-----------|--------------|
| OFFICE USE ONLY | Ck.# | Date | Staff     | Staff     | After Photos |
| PBR #           | FP   |      | Acc. Date | Def. Date |              |















Stantec Consulting Services Inc.  
482 Payne Road Scarborough Court, Scarborough ME 04074-8929

July 12, 2018

**Ms. Christine Woodruff**

Maine Department of Environmental Protection  
312 Canco Road  
Portland, Maine 04103

**Subject: Russell Property Subdivision**

**DEP #L-25376-L3-A-N/L-25376-TE-B-N/L-25376-L6-C-N**

**Minor Amendment Applications**

**Co-Applicant's: Village Green Cumberland, LLC and George & Constance**

**Russell**

**Letter of Response #3**

Dear Christine:

I am following up on a telephone discussion I had with Ben Viola on Monday July 9<sup>th</sup> regarding the Village Green/Russell Property expansion. As I outlined in our Letter of Response #2, dated June 21, 2018, we have updated the site plan for the Russell property to include a closed drainage system that will help collect and convey stormwater runoff from the proposed private drive to the existing wetpond #1 that serves a large part of the Village Green development. This design change allows us to better comply with the Chapter 500 requirements for water quality treatment and flood controls, particularly when considering just the Russell property and not the entirety of the Village Green Site. It was not apparent that Ben had yet been able to review that letter and supporting materials and I assume he will have a chance to review that information provided to you. The discussion with Ben Viola on Monday revolved around the original wetpond design and general criteria for meeting the BMP's for sizing etc., as Ben expressed concern about the wetpond design criteria. I noted in an email to you and Ben on Monday that the pond does not contain a gravel filter bench, as is common on wetponds, and this was noted by Ben during our discussion. I reviewed the original SWM report and also Chapter 500 and found that the original designers apparently asked for a waiver of the gravel bench requirement, as they cited Chapter 500.4.C.5 regarding exceptions to the typical wetpond design requirements. Because the wetpond discharges to a large forested wetland the underdrained gravel bench was eliminated from the design. This was previously approved and that's how the pond was constructed. We trust that this originally approved design condition may remain valid and acceptable, as it appears to be fully compliant with the Chapter 500 language.

Further to this discussion, I am now providing further design information on the wetpond in support of our proposal to direct approximately 0.58 acres of additional impervious area and 0.38 acres of additional landscaped/developed area from the Russell property to the wetpond. The following summarizes the watershed areas contributing to the wetpond:





Ms. Christine Woodruff  
July 12, 2018  
Page 2

| Watershed subarea <sup>1</sup>        | Total Impervious area (SF) | Total landscape area (SF) |
|---------------------------------------|----------------------------|---------------------------|
| 22B                                   | 7,539                      | 3,829                     |
| 23B                                   | 19,561                     | 16,697                    |
| 24B                                   | 1,831                      | 3,035                     |
| 25B                                   | 8,827                      | 3,375                     |
| 22C                                   | 7,382                      | 11,245                    |
| 23C                                   | 4,577                      | 1,111                     |
| 24C                                   | 11,809                     | 15,358                    |
| 25C                                   | 3,097                      | 981                       |
| 26C (Russell site road and driveways) | 25,265                     | 16,553                    |
| 50                                    | 30,544                     | 74,160                    |
| 51                                    | 85,656                     | 101,478                   |
| 51                                    | 60,109                     | 66,432                    |
| <b>Total</b>                          | <b>266,432</b>             | <b>314,251</b>            |

We have reviewed the original design calculations and plans and find the following as it relates to the wetpond volumes:

Tributary Area – Impervious = 266,432 SF

Tributary Area – Landscaped or undeveloped = 314,251 SF

#### **Permanent Pool Volume**

Required PPV = 65,355 CF (2.0" x Impervious + 0.8" x Landscaped area)

Provided PPV = 151,608 CF

Mean Depth at PPV = 3.03 feet<sup>2</sup>

#### **Channel Protection Volume**

Required CPV = 32,678 CF (1.0" x Impervious + 0.4" x Landscaped area)

Provided CPV = 39,061 CF

Based on this information and review we continue to believe that the existing wetpond is satisfactorily sized to provide water quality treatment and flood control to the additional area created by 4 house lots and private driveway on the Russell property. We note that the wetpond involved significant clean-up of what could be only considered an undesirable condition i.e many tires, garbage and debris previously

---

<sup>1</sup> See Watershed plan and HydroCAD calcs for subarea designations and locations

<sup>2</sup> We assume that the request to measure mean depth at the permanent pool and not at 1' below mean depth was previously reviewed and approved by the Department and thus remains applicable to the current conditions and proposal.



Ms. Christine Woodruff  
July 12, 2018  
Page 3

littered the old pit and the Village Green Development was instrumental in its clean up into a widely valued neighborhood resource and habitat.

If you have any questions with regards to the information submitted, please contact our office.

Sincerely,

**STANTEC CONSULTING SERVICES INC.**

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Associate  
Phone: 207-887-3478  
Fax: 207-887-3376  
stephen.bushey@stantec.com

c: Ben Viola  
Nathan Bateman

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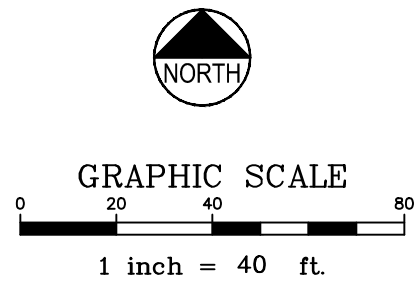
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Notes

PLAN REFERENCES

- "AMENDED FINAL SUBDIVISION PLAN, VILLAGE GREEN, CUMBERLAND, MAINE", SHEET C-4.0, APPROVED BY THE TOWN OF CUMBERLAND PLANNING BOARD ON MARCH 29, 2016 AND RECORDED IN THE C.C.R.D. BOOK 216, PAGE 109 ON APRIL 11, 2016.
- "PLAN OF BOUNDARY SURVEY, 50 AMANDA'S WAY, CUMBERLAND, MAINE", MADE FOR FAY, SPOFFORD & THORNDIKE, PREPARED BY TITCOMB ASSOCIATES, DATED JULY 22, 2014.
- PLAN SET ENTITLED "SUBDIVISION APPLICATION FOR VILLAGE GREEN, CUMBERLAND, MAINE, WYMAN WAY AND DROWNE ROAD, PERMIT SET, PHASE 1, VILLAGE GREEN REVITALIZATION MASTER PLAN, MAY 2011", PREPARED BY DeLUCA-HOFFMAN ASSOCIATES, INC.



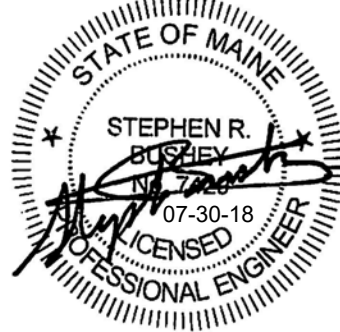
PLANT LIST

| QTY | SYM | BOTANICAL NAME                     | COMMON NAME              | SIZE           | REMARKS             |
|-----|-----|------------------------------------|--------------------------|----------------|---------------------|
| 2   | A   | <i>Acer rubrum</i> "Red Maple"     | Red Maple                | 3" CAL.        |                     |
| 5   | F   | <i>M. "Snowdrift"</i>              | Snowdrift Flowering Crab | 2-½" - 3" CAL. |                     |
| 25  | G   | <i>P. Abies</i>                    | Norway Spruce            | 6'             |                     |
| 2   | K   | <i>A. Grandiflora</i> "Robin Hill" | Shadblow                 | 2" CAL.        | 2-3 TRUNK           |
| 9   | O   | <i>C. Sericea</i> 'Isanti'         | Compact Red Twig Dogwood | 2' HT.         |                     |
| 4   | S   | <i>S. Vulgaris</i>                 | Common Lilac             | 4-½' HT.       | B&B, Purple Blossom |
| 8   | V   | <i>P. Mariana</i>                  | Black Spruce             | 5'-6'          | B&B                 |

|   |  |          |     |    |          |
|---|--|----------|-----|----|----------|
| 7 | RESUBMITTED TO TOWN OF CUMBERLAND                      | 10.07.20 | SRB | By | Y1/AM/DD |
| 6 | REVISED PER DCP COMMENTS AND RESUBMITTED               | 10.08.21 | SRB |    |          |
| 5 | REVISED PER TOWN COMMENTS AND RESUBMITTED              | 10.04.25 | SRB |    |          |
| 4 | REVISED PER PORTLAND WATER DISTRICT COMMENTS           | 10.04.16 | SRB |    |          |
| 3 | REVISED PER PORTLAND WATER DISTRICT COMMENTS           | 10.04.08 | SRB |    |          |
| 2 | ISSUED TO TOWN FOR MINOR PERMIT AMENDMENT              | 10.03.01 | SRB |    |          |
| 1 | THIRD AMENDED FINAL SUBDIVISION PLAN SUBMITTED TO TOWN | 17.03.01 | SRB |    |          |

File Name: 50072\_russell\_base CDD SRB SRB OCT. 2017  
DWN CHKD DSGN DATE

Permit-Seal



Client/Project

VILLAGE GREEN CUMBERLAND, LLC

PROPOSED 4TH AMENDED SUBDIVISION PLAN  
VILLAGE GREEN - RUSSELL PROPERTY  
CUMBERLAND, MAINE

Title

PHASE 4  
LANDSCAPE PLAN -  
BRACKETT LANE

Project No.

195350072

Scale

1" = 40'

Sheet





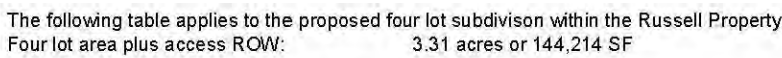
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## Notes



|                                 | Per Table 1 of Chapter 500-C.2(c)(2)(viii)<br>Percentage of<br>Developed<br>area to Land<br>Available for<br>Development<br><60 | Percentage of<br>Impervious<br>area to Land<br>Requiring<br>Treatment<br>80% | Percentage of<br>Total Developed<br>Area Requiring<br>Treatment<br>75% |
|---------------------------------|---|--|--|
| <b>Provided<br/>Treatment %</b> | <b>93.90%</b>   | <b>75.60%</b>  |  |

**Note:** The proposed Private access drive will be curbed on one side and contain a closed drainage system to collect runoff from the access drive and lot driveways and connect to the system in Bradbury Way. The system in Bradbury Way connects to the overall project drainage system that discharges to the existing wetpond where water quality is tested and found to be provided. The system in Bradbury Way is designed to provide an additional 37.30 SF of additional drainage area. Similar to the original development all houses will be developed with roof edge filter strips for water quality treatment of the roof.

**Note:** The proposed Private access drive will be curbed on one side and contain a closed drainage system to collect runoff from the access drive and lot driveways and convey runoff to the system in Bradbury Way. The system in Bradbury Way connects to the overall project drainage system that discharges to the existing wetpond where water quality treatment and flood control is provided. The pond has ample capacity to handle the additional 37,310 SF of additional drainage area. Similar to the original development all houses will be developed with roof edge strip for water quality treatment of the roof.



1. EROSION CONTROL MEASURES INCLUDING, BUT NOT LIMITED TO, SILTATION FENCE OR EROSION CONTROL MIX BARRIER SHALL BE INSTALLED AT THE TOE OF ALL DOWNGRADIENT SLOPES THROUGHOUT THE DURATION OF CONSTRUCTION.
2. ALL SLOPES SHALL RECEIVE LOAM, SEED AND EROSION CONTROL BLANKET WITHIN 5 DAYS OF REACHING FINAL GRADE.
3. TYPICAL PRIVATE DRIVE CROSS SECTION, WITH AND WITHOUT CURB AS SHOWN ON THE ORIGINAL VILLAGE GREEN DEVELOPMENT PLAN SHEET 10.1 SHALL APPLY.

Client/Project  
VILLAGE GREEN CUMBERLAND, LLC

PROPOSED 4TH AMENDED SUBDIVISION PLAN  
VILLAGE GREEN - RUSSELL PROPERTY  
CUMBERLAND, MAINE

Title  
PHASE 4  
PLAN AND PROFILE -  
BRACKETT LANE

|             |          |
|-------------|----------|
| Project No. | Scale    |
| 195350072   | 1" = 40' |

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C-1.0



