



ALBEMARLE REGIONAL HEALTH SERVICES
APPLICATION FOR ENVIRONMENTAL SERVICES

File# [ ]

County: Currituck

Parcel Identification Number (for Site Evaluations only): 0108-000-052M-0000

Type of Service Requested: [X] Site Evaluation/Improvement Permit for Wastewater System (\$225)
Existing Wastewater System Inspection (\$60)
Construction Authorization for Repair of Wastewater System (\$60)

Applicant Name : Bissell Professional Group
Mailing Address : PO Box 1068
City/State/Zip : Kitty Hawk, NC 27949
Telephone Number : 252-261-3266 Fax: 252-261-1760 Email: mark@bissellprofessionalgroup.com

Property Owner Name : Robert & Deloris Harrell, Fred & Terry Suter [ ] Check if same as Applicant
Mailing Address : PO Box 758
City/State/Zip : Nags Head, NC 27959
Telephone Number : 252-441-7887

Location of Property: (Directions if no address) 6828 Caratoke Hwy, Grandy, NC 27939

If Existing System Inspection; list size/type of new construction: N/A
Self-storage facility.
Type of Facility (House, Mobile Home, etc): Sewer service is for office - 4 employees/day
Number of Bedrooms: N/A Number of People: 4
Size of Property (acres): 11.48 ac. Plat or Site Plan provided (yes or no): Yes
Type of Water Supply (public supply or private well): Public

THE APPLICANT SHALL MARK THE SITE AND MAKE THE SITE ACCESSIBLE FOR A SITE EVALUATION. A \$60.00 REVISIT FEE WILL BE CHARGED IF THE PROPERTY IS UNIDENTIFIABLE OR UNACCESSIBLE DUE TO VEGETATIVE OVERGROWTH, LOCKED GATES, LOOSE DOGS, ETC.

THE APPLICANT SHALL BE RESPONSIBLE FOR NOTIFYING THE HEALTH DEPARTMENT OF ANY DESIGNATED WETLANDS ON THE PROPERTY.

THE APPLICANT SHALL BE RESPONSIBLE FOR NOTIFYING THE HEALTH DEPARTMENT IF THERE IS WASTEWATER GENERATED ON THE SITE OTHER THAN DOMESTIC WASTEWATER.

IF THE INFORMATION SUBMITTED BY THE APPLICANT IS FOUND TO BE INCORRECT, OR IF THE SITE AND SOIL CONDITIONS ARE ALTERED, ANY IMPROVEMENT PERMIT SHALL BECOME INVALID.

PLEASE ALLOW UP TO 2 WEEKS FOR COMPLETION.

I have read this application and certify that the information provided herein is true, complete, and correct. Authorized county and state officials are granted right of entry to the property to conduct the services requested.

Date: 5-23-23 Owner or Agent Signature: [Signature]

NOTE: A minimum additional fee of \$225.00 is required for the issuance of an Authorization for Wastewater System Construction on suitable lots where an Improvement Permit has been issued.

Table with contact information for various counties: Bertie Co., Camden Co., Chowan Co., Currituck Co., Hertford Co., Pasquotank Co., Perquimans Co. Includes phone and fax numbers for each.

**FINANCIAL RESPONSIBILITY/OWNERSHIP FORM  
SEDIMENTATION POLLUTION CONTROL ACT**

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environmental Quality. Submit the completed form to the appropriate Regional Office. (Please type or print and, if the question is not applicable or the e-mail address or phone number is unavailable, place N/A in the blank.)

**Part A.**

1. Project Name Pinnacle Storage Grandy
2. Location of land-disturbing activity: County Currituck City or Township Grandy  
Highway/Street US 158 Latitude(decimal degrees) 36.219056 Longitude(decimal degrees) -75.869417
3. Approximate date land-disturbing activity will commence: 9/15/2022
4. Purpose of development (residential, commercial, industrial, institutional, etc.): Commercial
5. Total acreage disturbed or uncovered (including off-site borrow and waste areas): 12.05
6. Amount of fee enclosed: \$ 1300.00. The application fee of \$100.00 per acre (rounded up to the next acre) is assessed without a ceiling amount (Example: 8.10-acre application fee is \$900). Checks should be addressed to NCDEQ.
7. Has an erosion and sediment control plan been filed? Yes  Enclosed  No
8. Person to contact should erosion and sediment control issues arise during land-disturbing activity:  
Name Robert High E-mail Address robert@roberthighdevelopment.com  
Phone: Office # (910) 790-9490 Mobile # (910) 443-7327
9. Landowner(s) of Record (attach accompanied page to list additional owners):  

<u>Robert &amp; Deloris Harrell, Fred &amp; Terry Suter</u>	<u>252-441-7887</u>
Name	Phone: Office #      Mobile #
<u>PO Box 758</u>	<u>6701 S Croatan Hwy</u>
Current Mailing Address	Current Street Address
<u>Nags Head      NC      27959</u>	<u>Nags Head      NC      27959</u>
City                      State                      Zip	City                      State                      Zip
10. Deed Book No. 864 Page No. 279 Provide a copy of the most current deed.

**Part B.**

1. Company(ies) who are financially responsible for the land-disturbing activity (Provide a comprehensive list of all responsible parties on accompanied page.) If the company is a sole proprietorship or if the landowner(s) is an individual(s), the name(s) of the owner(s) may be listed as the financially responsible party(ies).

<u>Pinnacle Storage of Grandy, LLC</u>	<u>robert@roberthighdevelopment.com</u>
Company Name	E-mail Address
<u>324 Greenville Avenue</u>	<u>same</u>
Current Mailing Address	Current Street Address
<u>Wilmington NC 28403</u>	
City State Zip	City State Zip
Phone: Office # <u>(910) 790-9490</u>	Mobile # _____

Note: If the Financially Responsible Party is not the owner of the land to be disturbed, include with this form the landowner's signed and dated written consent for the applicant to submit a draft erosion and sedimentation control plan and to conduct the anticipated land disturbing activity.

2. (a) If the Financially Responsible Party is a domestic company registered on the NC Secretary of State business registry, give name and street address of the Registered Agent:

<u>Robert M. High</u>	<u>robert@roberthighdevelopment.com</u>
Name of Registered Agent	E-mail Address
<u>324 Greenville Ave</u>	<u>same</u>
Current Mailing Address	Current Street Address
<u>Wilmington NC 28403</u>	
City State Zip	City State Zip
Phone: Office # <u>(910) 790-9490</u>	Mobile # _____

\_\_\_\_\_  
 Name of Individual to Contact (if Registered Agent is a company)

- (b) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina agent who is registered on the NC Secretary of State business registry:

_____ Name of Registered Agent	_____ E-mail Address
_____ Current Mailing Address	_____ Current Street Address
_____ City State Zip	_____ City State Zip
Phone: Office # _____	Mobile # _____

\_\_\_\_\_  
 Name of Individual to Contact (if Registered Agent is a company)



Continued from Items 9 & 10 in Part A of the Financial Responsibility/Ownership Form for multiple owners. Attach copies of this page as needed to list all landowners.

Landowner 2 of Record:

Name \_\_\_\_\_ Phone: Office # \_\_\_\_\_ Mobile # \_\_\_\_\_  
Current Mailing Address \_\_\_\_\_ Current Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Deed Book No. \_\_\_\_\_ Page No. \_\_\_\_\_ Provide a copy of the most current deed.

Landowner 3 of Record:

Name \_\_\_\_\_ Phone: Office # \_\_\_\_\_ Mobile # \_\_\_\_\_  
Current Mailing Address \_\_\_\_\_ Current Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Deed Book No. \_\_\_\_\_ Page No. \_\_\_\_\_ Provide a copy of the most current deed.

Landowner 4 of Record:

Name \_\_\_\_\_ Phone: Office # \_\_\_\_\_ Mobile # \_\_\_\_\_  
Current Mailing Address \_\_\_\_\_ Current Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Deed Book No. \_\_\_\_\_ Page No. \_\_\_\_\_ Provide a copy of the most current deed.

Landowner 5 of Record:

Name \_\_\_\_\_ Phone: Office # \_\_\_\_\_ Mobile # \_\_\_\_\_  
Current Mailing Address \_\_\_\_\_ Current Street Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Deed Book No. \_\_\_\_\_ Page No. \_\_\_\_\_ Provide a copy of the most current deed.



Continued from Item 1 in Part B of the Financial Responsibility/Ownership Form for multiple parties.  
Attach copies of this page as needed to list all financially responsible parties.

\_\_\_\_\_  
Company 2 Name

\_\_\_\_\_  
E-mail Address

\_\_\_\_\_  
Current Mailing Address

\_\_\_\_\_  
Current Street Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
City State Zip

Phone: Office # \_\_\_\_\_

Mobile # \_\_\_\_\_

\_\_\_\_\_  
Company 3 Name

\_\_\_\_\_  
E-mail Address

\_\_\_\_\_  
Current Mailing Address

\_\_\_\_\_  
Current Street Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
City State Zip

Phone: Office # \_\_\_\_\_

Mobile # \_\_\_\_\_

\_\_\_\_\_  
Company 4 Name

\_\_\_\_\_  
E-mail Address

\_\_\_\_\_  
Current Mailing Address

\_\_\_\_\_  
Current Street Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
City State Zip

Phone: Office # \_\_\_\_\_

Mobile # \_\_\_\_\_

\_\_\_\_\_  
Company 5 Name

\_\_\_\_\_  
E-mail Address

\_\_\_\_\_  
Current Mailing Address

\_\_\_\_\_  
Current Street Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
City State Zip

Phone: Office # \_\_\_\_\_

Mobile # \_\_\_\_\_

(c) If the Financially Responsible Party is engaging in business under an assumed name, give name under which the company is Doing Business As. If the Financially Responsible Party is an individual, General Partnership, or other company not registered and doing business under an assumed name, **attach a copy of the Certificate of Assumed Name.**

\_\_\_\_\_  
Company DBA Name

The above information is true and correct to the best of my knowledge and belief and was provided by me under oath. (This form must be signed by the Financially Responsible Person if an individual(s) or his attorney-in-fact, or if not an individual, by an officer, director, partner, or registered agent with the authority to execute instruments for the Financially Responsible Party). I agree to provide corrected information should there be any change in the information provided herein.

Robert M. High

Type or print name

Registered Agent

Title or Authority

Signature

*MA*

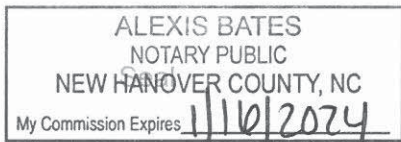
Date

5/25/23

I, Alexis Bates, a Notary Public of the County of New Hanover

State of North Carolina, hereby certify that Robert High appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him/her.

Witness my hand and notarial seal, this 25 day of may, 20 23



Alexis Bates Alexis Bates  
Notary

My commission expires

1/16/2024

# Operation & Maintenance Agreement

**Project Name:** Pinnacle Storage Grandy  
**Project Location:** 6828 Caratoke Hwy, Grandy, NC 27939

## Cover Page

Maintenance records shall be kept on the following SCM(s). This maintenance record shall be kept in a log in a known set location. Any deficient SCM elements noted in the inspection will be corrected, repaired, or replaced immediately. These deficiencies can affect the integrity of structures, safety of the public, and the pollutant removal efficiency of the SCM(s).

The SCM(s) on this project include (check all that apply & corresponding O&M sheets will be added automatically):

Infiltration Basin	Quantity:		Location(s):	
Infiltration Trench	Quantity:		Location(s):	
Bioretention Cell	Quantity:		Location(s):	
Wet Pond	Quantity:	2	Location(s):	Southwest, southeast corners of property
Stormwater Wetland	Quantity:		Location(s):	
Permeable Pavement	Quantity:		Location(s):	
Sand Filter	Quantity:		Location(s):	
Rainwater Harvesting	Quantity:		Location(s):	
Green Roof	Quantity:		Location(s):	
Level Spreader - Filter Strip	Quantity:		Location(s):	
Proprietary System	Quantity:		Location(s):	
Treatment Swale	Quantity:		Location(s):	
Dry Pond	Quantity:		Location(s):	
Disconnected Impervious Surface	Present:	No	Location(s):	
User Defined SCM	Present:	No	Location(s):	
Low Density	Present:	No	Type:	

I acknowledge and agree by my signature below that I am responsible for the performance of the maintenance procedures listed for each SCM above, and attached O&M tables. I agree to notify NCDEQ of any problems with the system or prior to any changes to the system or responsible party.

Responsible Party:	Robert M. High
Title & Organization:	Registered Agent, Pinnacle Storage of Grandy, LLC
Street address:	324 Greenville Avenue
City, state, zip:	Wilmington, NC 28403
Phone number(s):	910-790-9490
Email:	robert@roberthighdevelopment.com

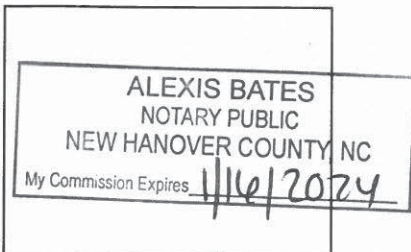
Signature: \_\_\_\_\_

Date: 5/25/23

I, Alexis Bates, a Notary Public for the State of North Carolina  
 County of New Hanover, do hereby certify that Robert High  
 personally appeared before me this 25 day of May, 2023 and

acknowledge the due execution of the Operations and Maintenance Agreement.

Witness my hand and official seal, Alexis Bates Alexis Bates



Seal

My commission expires

1/16/2024



## Wet Pond Maintenance Requirements

Important operation and maintenance procedures:

- Immediately after the wet detention basin is established, the plants on the vegetated shelf and perimeter of the basin should be watered twice weekly if needed, until the plants become established (commonly six weeks).
- No portion of the wet pond should be fertilized after the initial fertilization that is required to establish the plants on the vegetated shelf.
- Stable groundcover will be maintained in the drainage area to reduce the sediment load to the wet pond.
- If the pond must be drained for an emergency or to perform maintenance, the flushing of sediment through the emergency drain will be minimized as much as possible.
- At least once annually, a dam safety expert will inspect the embankment. Any problems that are found will be repaired immediately.
- The measuring device used to determine the sediment elevation shall be such that it will give an accurate depth reading and not readily penetrate into accumulated sediments.

After the wet pond is established, it will be inspected **quarterly and within 24 hours after every storm event greater than 1.0 inches (or 1.5 inches if in a Coastal County)**. Records of operation and maintenance shall be kept in a known set location and shall be available upon request.

Inspection activities shall be performed as follows. Any problems that are found shall be repaired immediately.

SCM element:	Potential problem:	How to remediate the problem:
The entire wet pond	Trash/debris is present.	Remove the trash/debris.
The perimeter of the wet pond	Areas of bare soil and/or erosive gullies have formed.	Regrade the soil if necessary to remove the gully, plant ground cover and water until it is established. Provide lime and a one-time fertilizer application.
The inlet device	The inlet pipe is clogged (if applicable).	Unclog the pipe. Dispose of the sediment off-site.
	The inlet pipe is cracked or otherwise damaged (if applicable).	Repair or replace the pipe.
	Erosion is occurring in the swale (if applicable).	Regrade the swale if necessary and provide erosion control devices such as reinforced turf matting or riprap to avoid future problems with erosion.
The forebay	Sediment has accumulated to a depth greater than the original design depth for sediment storage.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the SCM.
	Erosion has occurred.	Provide additional erosion protection such as reinforced turf matting or riprap if needed to prevent future erosion problems.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.

**Wet Pond Maintenance Requirements (Continued)**

<b>SCM element:</b>	<b>Potential problem:</b>	<b>How to remediate the problem:</b>
<b>The main treatment area</b>	Sediment has accumulated to a depth greater than the original design sediment storage depth.	Search for the source of the sediment and remedy the problem if possible. Remove the sediment and dispose of it in a location where it will not cause impacts to streams or the SCM.
	Algal growth covers over 50% of the area.	Consult a professional to remove and control the algal growth.
	Cattails, phragmites or other invasive plants cover 50% of the basin surface.	Remove the plants by wiping them with pesticide (do not spray).
<b>The vegetated shelf</b>	Best professional practices show that pruning is needed to maintain optimal plant health.	Prune according to best professional practices.
	Plants are dead, diseased or dying.	Determine the source of the problem: soils, hydrology, disease, etc. Remedy the problem and replace plants. Provide a one-time fertilizer application to establish the ground cover if a soil test indicates it is necessary.
	Weeds are present.	Remove the weeds, preferably by hand. If pesticide is used, wipe it on the plants rather than spraying.
<b>The embankment</b>	Shrubs have started to grow on the embankment.	Remove shrubs immediately.
	Evidence of muskrat or beaver activity is present.	Consult a professional to remove muskrats or beavers and repair any holes or erosion.
	A tree has started to grow on the embankment.	Consult a dam safety specialist to remove the tree.
	An annual inspection by an appropriate professional shows that the embankment needs repair.	Make all needed repairs immediately.
<b>The outlet device</b>	Clogging has occurred.	Clean out the outlet device and dispose of any sediment in a location where it will not cause impacts to streams or the SCM.
	The outlet device is damaged.	Repair or replace the outlet device.
<b>Floating wetland island (if applicable)</b>	Weeds or volunteer trees are growing on the mat.	Remove the weeds or trees.
	The anchor cable is damaged, disconnected or missing.	Restore the anchor cable to its design state.



**Wet Pond Maintenance Requirements (Continued)**

<b>SCM element:</b>	<b>Potential problem:</b>	<b>How to remediate the problem:</b>
<b>The receiving water</b>	Erosion or other signs of damage have occurred at the outlet.	Repair the damage and improve the flow dissipation structure.
	Discharges from the wet pond are causing erosion or sedimentation in the receiving water.	Contact the local NCDEQ Regional Office.



## Wet Detention Pond Design Summary

### Wet Pond Diagram

<p style="text-align: center;"><b>WET POND ID</b></p> <div style="border: 1px solid black; width: 100px; margin: 0 auto; text-align: center;">1</div> <p>Pretreatment other than forebay? <span style="border: 1px solid black; padding: 2px 10px;">No</span></p> <p>Has Veg. Filter? <span style="border: 1px solid black; padding: 2px 10px;">No</span></p>	<p style="text-align: center;"><b>FOREBAY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Permanent Pool El.</td><td style="text-align: center;">10</td></tr> <tr><td>Temporary Pool El:</td><td style="text-align: center;">10.78</td></tr> <tr><td>Clean Out Depth:</td><td style="text-align: center;">5</td></tr> <tr><td>Sediment Removal E</td><td style="text-align: center;">5</td></tr> <tr><td>Bottom Elevation:</td><td style="text-align: center;">4</td></tr> </table>	Permanent Pool El.	10	Temporary Pool El:	10.78	Clean Out Depth:	5	Sediment Removal E	5	Bottom Elevation:	4	<p style="text-align: center;"><b>MAIN POND</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Permanent Pool El.</td><td style="text-align: center;">10</td></tr> <tr><td>Temporary Pool El:</td><td style="text-align: center;">10.78</td></tr> <tr><td>Clean Out Depth:</td><td style="text-align: center;">9</td></tr> <tr><td>Sediment Removal E</td><td style="text-align: center;">1</td></tr> <tr><td>Bottom Elevation:</td><td style="text-align: center;">0</td></tr> </table>	Permanent Pool El.	10	Temporary Pool El:	10.78	Clean Out Depth:	9	Sediment Removal E	1	Bottom Elevation:	0
Permanent Pool El.	10																					
Temporary Pool El:	10.78																					
Clean Out Depth:	5																					
Sediment Removal E	5																					
Bottom Elevation:	4																					
Permanent Pool El.	10																					
Temporary Pool El:	10.78																					
Clean Out Depth:	9																					
Sediment Removal E	1																					
Bottom Elevation:	0																					
<p style="text-align: center;"><b>WET POND ID</b></p> <div style="border: 1px solid black; width: 100px; margin: 0 auto; text-align: center;">2</div> <p>Pretreatment other than forebay? <span style="border: 1px solid black; padding: 2px 10px;">No</span></p> <p>Has Veg. Filter? <span style="border: 1px solid black; padding: 2px 10px;"></span></p>	<p style="text-align: center;"><b>FOREBAY</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Permanent Pool El.</td><td style="text-align: center;">9.5</td></tr> <tr><td>Temporary Pool El:</td><td style="text-align: center;">10.2</td></tr> <tr><td>Clean Out Depth:</td><td style="text-align: center;">4.5</td></tr> <tr><td>Sediment Removal E</td><td style="text-align: center;">5</td></tr> <tr><td>Bottom Elevation:</td><td style="text-align: center;">4</td></tr> </table>	Permanent Pool El.	9.5	Temporary Pool El:	10.2	Clean Out Depth:	4.5	Sediment Removal E	5	Bottom Elevation:	4	<p style="text-align: center;"><b>MAIN POND</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>Permanent Pool El.</td><td style="text-align: center;">9.5</td></tr> <tr><td>Temporary Pool El:</td><td style="text-align: center;">10.2</td></tr> <tr><td>Clean Out Depth:</td><td style="text-align: center;">9</td></tr> <tr><td>Sediment Removal E</td><td style="text-align: center;">0.5</td></tr> <tr><td>Bottom Elevation:</td><td style="text-align: center;">-0.5</td></tr> </table>	Permanent Pool El.	9.5	Temporary Pool El:	10.2	Clean Out Depth:	9	Sediment Removal E	0.5	Bottom Elevation:	-0.5
Permanent Pool El.	9.5																					
Temporary Pool El:	10.2																					
Clean Out Depth:	4.5																					
Sediment Removal E	5																					
Bottom Elevation:	4																					
Permanent Pool El.	9.5																					
Temporary Pool El:	10.2																					
Clean Out Depth:	9																					
Sediment Removal E	0.5																					
Bottom Elevation:	-0.5																					

**ATTACH ADDITIONAL SHEETS IF NECESSARY**

DEMLR USE ONLY		
Date Received	Fee Paid	Permit Number
Applicable Rules: <input type="checkbox"/> Coastal SW – 1995 <input type="checkbox"/> Coastal SW – 2008 <input type="checkbox"/> Ph II - Post Construction (select all that apply) <input type="checkbox"/> Non-Coastal SW- HQW/ORW Waters <input type="checkbox"/> Universal Stormwater Management Plan <input type="checkbox"/> Other WQ Mgmt Plan: _____		

**State of North Carolina**  
**Department of Environment and Natural Resources**  
**Division of Energy, Mineral and Land Resources**

**STORMWATER MANAGEMENT PERMIT APPLICATION FORM**

*This form may be photocopied for use as an original*

**I. GENERAL INFORMATION**

- Project Name (subdivision, facility, or establishment name - should be consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):  
Pinnacle Storage of Grandy
- Location of Project (street address):  
6828 Caratoke Hwy  
 City: Grandy County: Currituck Zip: 27939
- Directions to project (from nearest major intersection):  
From the intersection of US 158 and SR 1127 (Garrenton Rd) in Grandy, go north approx. 0.6 mi. Project (and Grange Drive) is located on left, just south of the Weeping Radish brewery.
- Latitude: 36° 13' 08.6" N Longitude: 75° 52' 09.9" W of the main entrance to the project.

**II. PERMIT INFORMATION:**

- Specify whether project is (check one):  New     Modification     Renewal w/ Modification<sup>†</sup>  
<sup>†</sup>Renewals with modifications also requires SWU-102 – Renewal Application Form
- If this application is being submitted as the result of a **modification** to an existing permit, list the existing permit number \_\_\_\_\_, its issue date (if known) \_\_\_\_\_, and the status of construction:  Not Started     Partially Completed\*     Completed\*    \*provide a designer's certification
- Specify the type of project (check one):  
 Low Density     High Density     Drains to an Offsite Stormwater System     Other
- If this application is being submitted as the result of a **previously returned application** or a **letter from DEMLR requesting a state stormwater management permit application**, list the stormwater project number, if assigned, \_\_\_\_\_ and the previous name of the project, if different than currently proposed, \_\_\_\_\_.
- Additional Project Requirements (check applicable blanks; information on required state permits can be obtained by contacting the Customer Service Center at 1-877-623-6748):  
 CAMA Major     Sedimentation/Erosion Control: 12.05 ac of Disturbed Area  
 NPDES Industrial Stormwater     404/401 Permit: Proposed Impacts \_\_\_\_\_
- If any of these permits have already been acquired please provide the Project Name, Project/Permit Number, issue date and the type of each permit: \_\_\_\_\_
- Is the project located within 5 miles of a public airport?     No     Yes

**III. CONTACT INFORMATION**

1. a. Print Applicant / Signing Official's name and title (specifically the developer, property owner, lessee, designated government official, individual, etc. who owns the project):

Applicant/Organization: Pinnacle Storage of Grandy, LLC

Signing Official & Title: Robert M. High, Registered Agent

b. Contact information for person listed in item 1a above:

Street Address: 324 Greenville Avenue

City: Wilmington

State: NC

Zip: 28403

Mailing Address (if applicable): same as above

City: \_\_\_\_\_

State: \_\_\_\_\_

Zip: \_\_\_\_\_

Phone: ( 910 ) 790-9490

Fax: ( \_\_\_\_\_ ) \_\_\_\_\_

Email: robert@roberthighdevelopment.com

c. Please check the appropriate box. The applicant listed above is:

The property owner (Skip to Contact Information, item 3a)

Lessee\* (Attach a copy of the lease agreement and complete Contact Information, item 2a and 2b below)

Purchaser\* (Attach a copy of the pending sales agreement and complete Contact Information, item 2a and 2b below)

Developer\* (Complete Contact Information, item 2a and 2b below.)

2. a. Print Property Owner's name and title below, if you are the lessee, purchaser or developer. (This is the person who owns the property that the project is located on):

Property Owner/Organization: Robert & Deloris Harrell, Fred & Terry Suter

Signing Official & Title: Robert Harrell

b. Contact information for person listed in item 2a above:

Street Address: 6701 S Croatan Hwy

City: Nags Head

State: NC

Zip: 27959

Mailing Address (if applicable): PO Box 758

City: Nags Head

State: NC

Zip: 27959

Phone: ( 252 ) 441-7887

Fax: ( \_\_\_\_\_ ) \_\_\_\_\_

Email: bharrell@harrellandassociates.com

3. a. (Optional) Print the name and title of another contact such as the project's construction supervisor or other person who can answer questions about the project:

Other Contact Person/Organization: \_\_\_\_\_

Signing Official & Title: \_\_\_\_\_

b. Contact information for person listed in item 3a above:

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_

State: \_\_\_\_\_

Zip: \_\_\_\_\_

Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

Fax: ( \_\_\_\_\_ ) \_\_\_\_\_

Email: \_\_\_\_\_

4. Local jurisdiction for building permits: Currituck County

Point of Contact: Jason Litteral

Phone #: ( 252 ) 232-6052



**IV. PROJECT INFORMATION**

1. In the space provided below, briefly summarize how the stormwater runoff will be treated.  
All surface and roof runoff will be captured and piped to 2 wet detention basins with forebays. Treated runoff will be released via outlet structure to an existing farm ditch, which flows north to a natural outlet.  
Unimproved areas will be established with suitable groundcover, graded to drain and are not routed to the stormwater pond.
  
2. a. If claiming vested rights, identify the supporting documents provided and the date they were approved:  
 Approval of a Site Specific Development Plan or PUD                      Approval Date: \_\_\_\_\_  
 Valid Building Permit    Issued Date: \_\_\_\_\_  
 Other: \_\_\_\_\_    Date: \_\_\_\_\_
  
- b. If claiming vested rights, identify the regulation(s) the project has been designed in accordance with:  
 Coastal SW – 1995                       Ph II – Post Construction
  
3. Stormwater runoff from this project drains to the Pasquotank River basin.
  
4. Total Property Area: 11.48 acres    5. Total Coastal Wetlands Area: 0 acres  
6. Total Surface Water Area: 0 acres
  
7. Total Property Area (4) – Total Coastal Wetlands Area (5) – Total Surface Water Area (6) = Total Project Area: 11.48 acres  
*\* Total project area shall be calculated to exclude the following: the normal pool of impounded structures, the area between the banks of streams and rivers, the area below the Normal High Water (NHW) line or Mean High Water (MHW) line, and coastal wetlands landward from the NHW (or MHW) line. The resultant project area is used to calculate overall percent built upon area (BUA). Non-coastal wetlands landward of the NHW (or MHW) line may be included in the total project area.*
  
8. Project percent of impervious area: (Total Impervious Area / Total Project Area) X 100 = 65.9 %
  
9. How many drainage areas does the project have? 2 (For high density, count 1 for each proposed engineered stormwater BMP. For low density and other projects, use 1 for the whole property area)
  
10. Complete the following information for each drainage area identified in Project Information item 9. If there are more than four drainage areas in the project, attach an additional sheet with the information for each area provided in the same format as below.

Basin Information	Drainage Area 1	Drainage Area 2	Drainage Area __	Drainage Area __
Receiving Stream Name	Dowdys Bay	Dowdys Bay		
Stream Class *	SC	SC		
Stream Index Number *	30-1-15	30-1-15		
Total Drainage Area (sf)	254,303	160,635		
On-site Drainage Area (sf)	253,803	160,635		
Off-site Drainage Area (sf)	500	0		
Proposed Impervious Area** (sf)	207,534	123,697		
% Impervious Area** (total)	82%	77%		

Impervious** Surface Area	Drainage Area 1	Drainage Area 2	Drainage Area __	Drainage Area __
On-site Buildings/Lots (sf)	78,000	80,975		
On-site Streets (sf)	0	0		
On-site Parking (sf)	129,034	41,917		
On-site Sidewalks (sf)	0	672		
Other on-site (sf)	0	0		
Future (sf)	0	0		
Off-site (sf)	500	0		
Existing BUA*** (sf)	0	0		
Total (sf):	207,534	123,697		

\* Stream Class and Index Number can be determined at: <http://portal.ncdenr.org/web/wq/ps/csu/classifications>

\*\* Impervious area is defined as the built upon area including, but not limited to, buildings, roads, parking areas, sidewalks, gravel areas, etc.

\*\*\* Report only that amount of existing BUA that will remain after development. Do not report any existing BUA that is to be removed and which will be replaced by new BUA.

11. How was the off-site impervious area listed above determined? Provide documentation. Proposed off-site driveway apron. Coordinate area in CAD

**Projects in Union County:** Contact DEMLR Central Office staff to check if the project is located within a Threatened & Endangered Species watershed that may be subject to more stringent stormwater requirements as per 15A NCAC 02B .0600.

## V. SUPPLEMENT AND O&M FORMS

The applicable state stormwater management permit supplement and operation and maintenance (O&M) forms must be submitted for each BMP specified for this project. The latest versions of the forms can be downloaded from <http://portal.ncdenr.org/web/wq/ws/su/bmp-manual>.

## VI. SUBMITTAL REQUIREMENTS

Only complete application packages will be accepted and reviewed by the Division of Energy, Mineral and Land Resources (DEMLR). A complete package includes all of the items listed below. A detailed application instruction sheet and BMP checklists are available from [http://portal.ncdenr.org/web/wq/ws/su/statesw/forms\\_docs](http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs). The complete application package should be submitted to the appropriate DEMLR Office. (The appropriate office may be found by locating project on the interactive online map at <http://portal.ncdenr.org/web/wq/ws/su/maps>.)

Please **indicate that the following required information have been provided by initialing** in the space provided for each item. All original documents MUST be signed and initialed in **blue ink**. Download the latest versions for each submitted application package from [http://portal.ncdenr.org/web/wq/ws/su/statesw/forms\\_docs](http://portal.ncdenr.org/web/wq/ws/su/statesw/forms_docs).

- |  |          |
|--|----------|
|  | Initials |
| 1. Original and one copy of the Stormwater Management Permit Application Form.   | _____    |
| 2. Original and one copy of the signed and notarized Deed Restrictions & Protective Covenants Form. (if required as per Part VII below)  | _____    |
| 3. Original of the applicable Supplement Form(s) ( <u>sealed, signed and dated</u> ) and O&M agreement(s) for each BMP.  | _____    |
| 4. Permit application processing fee of \$505 payable to NCDENR. (For an Express review, refer to <a href="http://www.envhelp.org/pages/onestopexpress.html">http://www.envhelp.org/pages/onestopexpress.html</a> for information on the Express program | _____    |

and the associated fees. Contact the appropriate regional office Express Permit Coordinator for additional information and to schedule the required application meeting.)

5. A detailed narrative (one to two pages) describing the stormwater treatment/management for the project. This is required in addition to the brief summary provided in the Project Information, item 1. \_\_\_\_\_
6. A USGS map identifying the site location. If the receiving stream is reported as class SA or the receiving stream drains to class SA waters within ½ mile of the site boundary, include the ½ mile radius on the map. \_\_\_\_\_
7. Sealed, signed and dated calculations (one copy). \_\_\_\_\_
8. Two sets of plans folded to 8.5" x 14" (sealed, signed, & dated), including: \_\_\_\_\_
  - a. Development/Project name.
  - b. Engineer and firm.
  - c. Location map with named streets and NCSR numbers.
  - d. Legend.
  - e. North arrow.
  - f. Scale.
  - g. Revision number and dates.
  - h. Identify all surface waters on the plans by delineating the normal pool elevation of impounded structures, the banks of streams and rivers, the MHW or NHW line of tidal waters, and any coastal wetlands landward of the MHW or NHW lines.
    - Delineate the vegetated buffer landward from the normal pool elevation of impounded structures, the banks of streams or rivers, and the MHW (or NHW) of tidal waters.
  - i. Dimensioned property/project boundary with bearings & distances.
  - j. Site Layout with all BUA identified and dimensioned.
  - k. Existing contours, proposed contours, spot elevations, finished floor elevations.
  - l. Details of roads, drainage features, collection systems, and stormwater control measures.
  - m. Wetlands delineated, or a note on the plans that none exist. (Must be delineated by a qualified person. Provide documentation of qualifications and identify the person who made the determination on the plans.
  - n. Existing drainage (including off-site), drainage easements, pipe sizes, runoff calculations.
  - o. Drainage areas delineated (included in the main set of plans, not as a separate document).
  - p. Vegetated buffers (where required).
9. Copy of any applicable soils report with the associated SHWT elevations (Please identify elevations in addition to depths) as well as a map of the boring locations with the existing elevations and boring logs. Include an 8.5" x 11" copy of the NRCS County Soils map with the project area clearly delineated. For projects with infiltration BMPs, the report should also include the soil type, expected infiltration rate, and the method of determining the infiltration rate. (Infiltration Devices submitted to WiRO: Schedule a site visit for DEMLR to verify the SHWT prior to submittal, (910) 796-7378.) \_\_\_\_\_
10. A copy of the most current property deed. Deed book: 864 \_\_\_\_\_ Page No: 279 \_\_\_\_\_
11. For corporations and limited liability corporations (LLC): Provide documentation from the NC Secretary of State or other official documentation, which supports the titles and positions held by the persons listed in Contact Information, item 1a, 2a, and/or 3a per 15A NCAC 2H.1003(e). The corporation or LLC must be listed as an active corporation in good standing with the NC Secretary of State, otherwise the application will be returned.  
<http://www.secretary.state.nc.us/Corporations/CSearch.aspx> \_\_\_\_\_



**VII. DEED RESTRICTIONS AND PROTECTIVE COVENANTS**

For all subdivisions, outparcels, and future development, the appropriate property restrictions and protective covenants are required to be recorded prior to the sale of any lot. If lot sizes vary significantly or the proposed BUA allocations vary, a table listing each lot number, lot size, and the allowable built-upon area must be provided as an attachment to the completed and notarized deed restriction form. The appropriate deed restrictions and protective covenants forms can be downloaded from [http://portal.ncdenr.org/web/lr/state-stormwater-forms\\_docs](http://portal.ncdenr.org/web/lr/state-stormwater-forms_docs). Download the latest versions for each submittal.

In the instances where the applicant is different than the property owner, it is the responsibility of the property owner to sign the deed restrictions and protective covenants form while the applicant is responsible for ensuring that the deed restrictions are recorded.

**By the notarized signature(s) below, the permit holder(s) certify that the recorded property restrictions and protective covenants for this project, if required, shall include all the items required in the permit and listed on the forms available on the website, that the covenants will be binding on all parties and persons claiming under them, that they will run with the land, that the required covenants cannot be changed or deleted without concurrence from the NC DEMLR, and that they will be recorded prior to the sale of any lot.**

**VIII. CONSULTANT INFORMATION AND AUTHORIZATION**

Applicant: Complete this section if you wish to designate authority to another individual and/or firm (such as a consulting engineer and/or firm) so that they may provide information on your behalf for this project (such as addressing requests for additional information).

Consulting Engineer: Briant Robey, PE

Consulting Firm: Eastern Carolina Engineering, PC

Mailing Address: PO Box 128

City: Camden State: NC Zip: 27921

Phone: (252 ) 331-9379 Fax: (252 ) 331-2390

Email: briant@easterncarolinaengineering.com

**IX. PROPERTY OWNER AUTHORIZATION** (if Contact Information, item 2 has been filled out, complete this section)

I, (print or type name of person listed in Contact Information, item 2a) Robert Harrell, certify that I own the property identified in this permit application, and thus give permission to (print or type name of person listed in Contact Information, item 1a) Robert M. High with (print or type name of organization listed in Contact Information, item 1a) Pinnacle Storage of Grandy, LLC to develop the project as currently proposed. A copy of the lease agreement or pending property sales contract has been provided with the submittal, which indicates the party responsible for the operation and maintenance of the stormwater system.

As the legal property owner I acknowledge, understand, and agree by my signature below, that if my designated agent (entity listed in Contact Information, item 1) dissolves their company and/or cancels or defaults on their lease agreement, or pending sale, responsibility for compliance with the DEMLR Stormwater permit reverts back to me, the property owner. As the property owner, it is my responsibility to notify DEMLR immediately and submit a completed Name/Ownership Change Form within 30 days; otherwise I will be operating a stormwater treatment facility without a valid permit. I understand that the operation of a stormwater treatment facility without a valid permit is a violation of NC General Statute 143-215.1 and may result in appropriate enforcement action including the assessment of civil penalties of up to \$25,000 per day, pursuant to NCCGS 143-215.6.

Signature: \_\_\_\_\_ Date: 6/22/23

I, Michelle A. Meredith, a Notary Public for the State of North Carolina, County of Dare, do hereby certify that Robert F. Harrell personally appeared before me this 22 day of June, 2023, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal, Michelle A. Meredith



SEAL

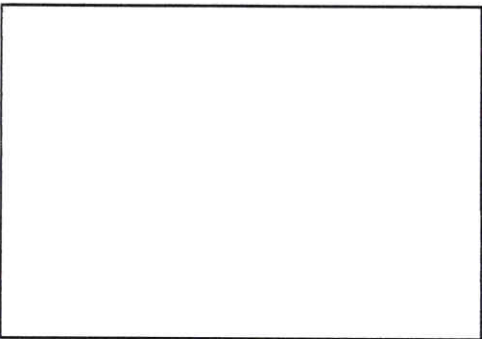
My commission expires 10/20/25

**X. APPLICANT'S CERTIFICATION**

I, (print or type name of person listed in Contact Information, item 1a) Robert M. High, certify that the information included on this permit application form is, to the best of my knowledge, correct and that the project will be constructed in conformance with the approved plans, that the required deed restrictions and protective covenants will be recorded, and that the proposed project complies with the requirements of the applicable stormwater rules under 15A NCAC 2H .1000 and any other applicable state stormwater requirements.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, and acknowledge the due execution of the application for a stormwater permit. Witness my hand and official seal, \_\_\_\_\_



SEAL

My commission expires \_\_\_\_\_

DEPARTMENT OF TRANSPORTATION

THREE PARTY RIGHT OF WAY

-AND-

ENCROACHMENT AGREEMENT ON  
PRIMARY AND SECONDARY SYSTEM

Pinnacle Storage of Grandy, LLC

324 Greenville Ave, Wilmington, NC 28403

-AND-

County of Currituck, North Carolina

153 Courthouse Rd Ste 204, Currituck, NC 27929

THIS AGREEMENT, made and entered into this the 22 day of May, 20 23, by and between the Department of Transportation, party of the first part; and Pinnacle Storage of Grandy, LLC

party of the second part; and County of Currituck, North Carolina

party of the third part,

WITNESSETH

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) US 158 (Caratoke Highway), located Approx. 2910 feet north from the intersection with SR 1127 (Garrenton Rd) toward Grandy; more specifically, at the south side of the intersection with Grange Drive;

with the construction and/or erection of: water distribution system improvements to serve the proposed Pinnacle Storage Grandy self-storage facility.

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the installation, operation, and maintenance of the above described facility will be accomplished in accordance with the party of the first part's latest UTILITIES ACCOMMODATIONS MANUAL, and such revisions and amendments thereto as may be in effect at the date of this agreement. Information as to these policies and procedures may be obtained from the Division Engineer or State Utilities Manager of the party of the first part.

That the said party of the second part binds and obligates himself to install and maintain the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway, nor obstruct nor interfere with the proper maintenance thereof, to reimburse the party of the first part for the cost incurred for any repairs or maintenance to its roadways and structures necessary due to installation and existence of the facilities of the party of the second part, and if at any time the party of the first part shall require the removal of or changes in the location of the said facilities, that the said party of the second part binds himself, his successors and assigns, to promptly remove or alter the said facilities, in order to conform to the said requirement, without any cost to the party of the first part.

That the party of the second part agrees to provide during construction and any subsequent maintenance proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

That the party of the second part agrees to restore all areas disturbed during installation and maintenance to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any installation or maintenance operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the construction site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.



During the performance of this contract, the second party, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor"), agrees as follows:

- a. **Compliance with Regulations:** The contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the U. S. Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- b. **Nondiscrimination:** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- c. **Solicitations for Subcontracts, including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- d. **Information and Reports:** The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Department of Transportation or the Federal Highway Administration to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the Department of Transportation, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
- e. **Sanctions for Noncompliance:** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to,
  - (1) withholding of payments to the contractor under the contract until the contractor complies, and/or
  - (2) cancellation, termination or suspension of the contract, in whole or in part.
- f. **Incorporation of Provisions:** The contractor shall include the provisions of paragraphs "a" through "f" in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Department of Transportation or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Department of Transportation to enter into such litigation to protect the interests of the State, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

That when title to the subject that constitutes the aforesaid encroachment passes from the party of the second part and vests in the party of the third part, the party of the third part agrees to assume all responsibilities and rights and to perform all obligations as agreed to herein by the party of the second part.

R/W (166) : Party of the Second Part certifies that this agreement is true and accurate copy of the form R/W (166) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

WITNESS:

*Alexis Bates* Alexis Bates

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

WITNESS:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DEPARTMENT OF TRANSPORTATION

BY: \_\_\_\_\_  
DIVISION ENGINEER

Robert High Development, LLC

324 Greenville Ave.

Wilmington, NC

*[Signature]*

Second Party

County of Currituck

153 Courthouse Road

Currituck, NC 27929

\_\_\_\_\_  
Third Party

Stormwater / E&SC Project Narrative and Appendix  
for

**PINNACLE STORAGE GRANDY  
US 158, GRANDY, NC**

Grandy Township, Currituck County, North Carolina

Owners: Robert & Deloris Harrell; Fred & Terry Suter

Developer: Pinnacle Storage of Grandy, LLC

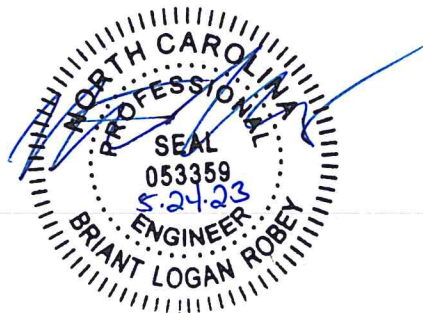
Project Manager: Bissell Professional Group, LLC

Prepared by:



154 US Highway 158 East  
Camden, NC 27921  
(252) 621-3570 PHONE (252) 331-2390 FAX

Project Engineer: Briant L. Robey, PE



May 24, 2023



## **PINNACLE STORAGE GRANDY US 158, GRANDY, NC**

### **PROJECT NARRATIVE FOR E&SC PLAN AND STORMWATER PERMIT**

**Project #22012  
Grandy Township,  
Currituck County, North Carolina**

**May 24, 2023**

Pinnacle Storage Grandy is a proposed RV and mini-storage development off US 158 and Grange Drive in Currituck, situated approximately 0.6 miles north of the intersection of US 158 and SR 1127 (Garrenton Rd), on the west side of the highway. The 11.48-acre project site pending sale to Pinnacle Storage of Grandy, LLC, as developer is part of a larger, 32.38-acre parcel owned by Harrell and Suter and recently subdivided. The project site parcel is zoned LI (Light Industrial) and is bordered by other LI zoning as part of the parcel residual and along US 158; AG (Agricultural) to the north and south; and GB (General Business) to the south along US 158. Adjacent uses include farmland, woodland, a craft brewery to the north, and a horse farm to the south.

The existing site is unimproved farmland consisting chiefly of Munden loamy sand and Nimmo loamy sand at 0-to-2 percent slope, with a hydrologic soil group of B and D, respectively, in their natural states. Storm runoff flows overland to adjacent farm ditches. An existing farm ditch along the south edge of the site collects this drainage, turns north and flows off-site, where runoff is collected along Red Dog Lane and Caratoke Highway. Ultimately, this drainage passes through a culvert under Caratoke Highway and discharges to wetlands which are tributary to Dowdys Bay, ID 30-1-15.

The proposed improvements to the site by Pinnacle Storage of Grandy, LLC, as developer, consist of, mainly, four mini-storage buildings and associated parking/drive aisle area. The development is split into front and rear sections; the rear section is dedicated to Buildings 1, 2, and 3 and treated by Pond 1, and the front section holds a larger Building 4 that will be treated by Pond 2. All of the site's total proposed 330,598 sf built-upon area (approx. 66.1% of the overall site) will consist of new construction, and all of this area will be routed to the ponds. To treat and attenuate the peak runoff from these BUAs, two wet ponds (Ponds 1 and 2) are proposed as new stormwater BMPs. Roof downspouts will splash at ground level and have been designed to surface drain into grated curb/sump inlets, which will also drain adjacent vehicle areas. The combined flows pass to the pond forebays.



Runoff areas were analyzed for the pre-development site through WinTR-55, and use a standard Type III storm unit hydrograph with NOAA Atlas 14 precipitation depths except in the 2-, 5-, and 10-year storms, which are assigned depths of 4, 5, and 6 inches, respectively, per the Currituck County Unified Development Ordinance. Under the Currituck County UDO, the 5-year post-development peak flow rate for new major site plans must not exceed the 2-year pre-development peak flow rate under a fully wooded condition – therefore the curve numbers in this analysis take this into account. The front and rear portions of the site have been analyzed separately (“East” and “West”) to ensure that localized runoff rates are matched. The 5-year, 10-year, 25-year, and 100-year storms are also presented as points of comparison.

The post-development runoff areas were analyzed by EPA-SWMM, using the same storms as the pre-development analysis, the Horton infiltration model and dynamic wave routing over a 5-day analysis period. A full map of links, nodes, and subcatchment areas used in this analysis is shown in Appendix A. Undeveloped area not tributary to the ponds, approx. 1.96 acres, has also been analyzed via WinTR-55 as a generally 50’ wide grass strip sheet-flowing off-site. The peak runoff rate from this area has been added to the pond discharge rates to demonstrate the overall site balance. Results from these programs are provided in the Appendix.

The ponds discharge through outlet structures, which have been sized with three stages in mind: a drawdown orifice to drain the 1.5” storm, a 5-year weir that discharges at a historic 2-year rate, and a 10-year weir that discharges at a historic 10-year rate. A riprap emergency overflow with 1’ freeboard is provided for larger storms. Summary tables are provided to demonstrate that overall site discharge is reduced from the pre-development condition. From the outlet structures, outfall pipes convey the pond discharge to the existing south farm ditch, which will continue to follow the historic drainage pattern previously described.

The total area of the limits of disturbance are shown as 12.05 ac. for these improvements, including driveway aprons and utility connections. Temporary gravel construction entrances will control sediment tracking onto the adjacent Grange Drive and US 158; culvert inlet protection and gravel check dams will be provided in the existing perimeter ditches. RECM lining is provided at pipe discharge points. Silt fence is shown at the perimeter of all site disturbance. Areas of post-construction revegetation (permanent seeding) are shown on the plans and in details, as well as requirements for temporary stabilization and guidelines for sequencing erosion control measures during construction.

# APPENDICES

---

<b>APPENDIX A</b>	<b>STORMWATER AND EROSION CONTROL CALCULATIONS</b>
	<b>ITEM 1      POND VOLUME AND SA/DA WORKSHEETS</b>
	<b>ITEM 2      TR-55 PRE-DEVELOPMENT REPORTS</b>
	<b>ITEM 3      SWMM 5.2 ANNOTATED NODE AND LINK MAPS</b>
	<b>ITEM 4      SWMM POST-DEVELOPMENT ANALYSIS RESULTS: 1.5", 5-, 10-, 25-YR STORMS</b>
	<b>ITEM 5      TR-55 POST-DEVELOPMENT REPORT FOR UNDETAINED FLOW</b>
	<b>ITEM 6      COMPARISON OF PRE- AND POST-DEVELOPMENT RUNOFF RATES</b>
<b>APPENDIX B</b>	<b>USDA NRCS WEB SOIL SURVEY DATA</b>
<b>APPENDIX C</b>	<b>USGS QUAD MAP</b>
<b>APPENDIX D</b>	<b>FEMA FIRMETTE</b>
<b>APPENDIX E</b>	<b>PRECIPITATION DATA</b>
<b>APPENDIX F</b>	<b>CURRENT PROPERTY DEED</b>
<b>APPENDIX G</b>	<b>NC SECRETARY OF STATE CORPORATION SEARCH INFO</b>

# APPENDIX A

---

## STORMWATER AND EROSION CONTROL CALCULATIONS

### ITEMS IN THIS SECTION:

- 1 POND VOLUME AND SA/DA WORKSHEETS
- 2 TR-55 PRE-DEVELOPMENT REPORTS
- 3 SWMM 5.2 ANNOTATED NODE AND LINK MAP
- 4 SWMM POST-DEVELOPMENT ANALYSIS RESULTS:  
1.5", 5-, 10-, 25-YR STORMS
- 5 TR-55 POST-DEVELOPMENT REPORT FOR UNDETAINED FLOW
- 6 COMPARISON OF PRE- AND POST-DEVELOPMENT RUNOFF RATES



# POND VOLUME CALCULATIONS

FOR

Z:\Project\ECE '22\22012 - Harrell-Suter Tracts (Grandy Storage)\1\_Design\3\_Calcs\SWMM

## POND 1

LENGTH	F
PERIMETER AT BOTTOM OF MAIN BASIN SHELF	640.95
SUBMERGED SHELF WIDTH	6.00

AREA	F <sup>2</sup>
MAIN BASIN SURFACE AREA	22,793.20
FOREBAY SURFACE AREA	9,393.93
AREA AT EDGE OF FOREBAY SHELF	6,849.85
PERMANENT POOL SURFACE AREA	32,187.13
AREA AT EDGE OF MAIN BASIN SHELF	19,380.77
AREA OF MAIN BASIN BOTTOM	6,488.91
AREA OF FOREBAY BOTTOM	2,150.56
SURFACE AREA AT 1.5" STORAGE	34,182.20
AREA AT TOP OF SHELF	32,187.13

ELEVATIONS	F
PP ELEVATION	10.00
ELEVATION AT EDGE OF MAIN BASIN SHELF	9.00
ELEVATION OF MAIN BASIN BOTTOM	1.00
ELEVATION OF FOREBAY BOTTOM	5.00
ELEVATION OF TOP OF SHELF	10.00
ELEVATION OF 1.5" STORAGE	10.78

VOLUME CALCULATIONS	F <sup>3</sup>
MAIN BASIN VOLUME AT PERMANENT POOL	124,565.71
MAIN BASIN SHELF VOLUME	1,922.86
AVERAGE POND DEPTH	6.33
FOREBAY VOLUME	23,338.50
TOTAL PERMANENT POOL VOLUME	147,904.20
FOREBAY PERCENTAGE OF MAIN BASIN VOLUME	15.78%
TEMP. STORAGE VOLUME (1.5" RUNOFF)	25,884.04

**Pinnacle Storage Grandy - Pond 1**

WET POND SA/DA AND DRAWDOWN WORKSHEET

**SA/DA PERCENTAGES FOR 85% TSS REMOVAL PER 2017 MDC GUIDELINES**

% IMPRV	3.0 FT	3.5 FT	4.0 FT	4.5 FT	5.0 FT	5.5 FT	6.0 FT	6.5 FT	7.0 FT
10%	0.78	0.70	0.61	0.53	0.44	0.22	0.00	0.00	0.00
20%	1.48	1.26	1.04	0.96	0.87	0.79	0.70	0.61	0.52
30%	2.18	1.92	1.65	1.52	1.39	1.26	1.13	1.00	0.87
40%	2.96	2.61	2.26	2.05	1.83	1.61	1.39	1.18	0.96
50%	3.65	3.26	2.87	2.61	2.35	2.09	1.83	1.57	1.31
60%	4.35	3.83	3.31	3.05	2.78	2.52	2.26	2.00	1.74
70%	5.22	4.57	3.92	3.57	3.22	2.87	2.52	2.18	1.83
80%	5.92	5.22	4.52	4.09	3.65	3.22	2.78	2.35	1.91
90%	6.53	5.79	5.05	4.62	4.18	3.57	2.96	2.70	2.44
100%	7.13	6.53	5.92	5.40	4.87	4.35	3.83	3.31	2.78

WATERSHED AREA : **5.838** ACRES  
 WATERSHED % IMPERVIOUS: **81%**  
 PERMANENT POOL ELEVATION: **10** FT  
 PERMANENT POOL AVG. DEPTH: **6.33** FT  
 SA/DA PERCENTAGE FACTOR: **2.816** %

(FROM ABOVE TABLE - TAKEN FROM DESIGN OF STORM WATER

CONTROL FACILITIES WORKSHOP MANUAL - PENC 1988)

POND SURFACE AREA REQ'D: **7161** SF  
 FOREBAY AREA: **1043** SF

**Surface Area Provided = 32187 sf**

**Pinnacle Storage Grandy - Pond 1**

WET POND SA/DA AND DRAWDOWN WORKSHEET

**VOLUME OF 1.5" RAINFALL**

AREA OF ROOFS:	1.791	AC		Normal Pool Elevation	10
AREA OF PARKING/CONCRETE:	2.962	AC			
AREA OF GREEN AREAS:	1.085	AC			
VOLUME OF RUNOFF	25664.5	CF		$VOL(CF)=[(ROOF*1.0)+(PARKING*.95)+(GRASS*0.2)]*43,560/12*1.5$	
PERMANENT POOL SURFACE ARE	32187	SF			
STORAGE DEPTH =			0.80	FT	
ESTIMATED ELEVATION OF 1.5" RAINFALL			10.80		

ACTUAL 1.5" RUNOFF STAGE 0.78 FT  
ACTUAL STORAGE VOLUME PROVIDED AT STAGE AS CALCULATED IN ( 25884 CF

**DRAWDOWN - WATER QUALITY**

Q(2 DAYS) = 0.14979 CFS  
Q(5 DAYS) = 0.05992 CFS

DEPTH OF DRAWDOWN DEVICE BELOW OUTLET 1.5 FT  
1.5" RUNOFF OUTLET DEVICE: 2.79826 INCH DIA HOLE  $A=[Q/(Cd*SQRT(2gh))]^2*144$   
 $Rad.=SQRT(A/PI)$   
 $Dia. =2*Rad.$

DIAMETER OF HOLE TO USE: 3 INCH DIAMETER  
DRAWDOWN RATE 0.12052 CFS  
1.5" STORM RUNOFF DRAWDOWN TIME 2.4858 DAYS



# POND VOLUME CALCULATIONS

FOR

Z:\Project\ECE '22\22012 - Harrell-Suter Tracts (Grandy Storage)\1\_Design\3\_Calcs\SWMM

## POND 2

LENGTH	F
PERIMETER AT BOTTOM OF MAIN BASIN SHELF	456.58
SUBMERGED SHELF WIDTH	6.00

AREA	F <sup>2</sup>
MAIN BASIN SURFACE AREA	16,136.96
FOREBAY SURFACE AREA	5,892.94
AREA AT EDGE OF FOREBAY SHELF	4,430.64
PERMANENT POOL SURFACE AREA	22,029.90
AREA AT EDGE OF MAIN BASIN SHELF	13,635.49
AREA OF MAIN BASIN BOTTOM	4,747.32
AREA OF FOREBAY BOTTOM	1,852.36
SURFACE AREA AT 1.5" STORAGE	23,468.60
AREA AT TOP OF SHELF	22,029.90

ELEVATIONS	F
PP ELEVATION	9.50
ELEVATION AT EDGE OF MAIN BASIN SHELF	8.50
ELEVATION OF MAIN BASIN BOTTOM	0.50
ELEVATION OF FOREBAY BOTTOM	5.00
ELEVATION OF TOP OF SHELF	9.50
ELEVATION OF 1.5" STORAGE	10.20

VOLUME CALCULATIONS	F <sup>3</sup>
MAIN BASIN VOLUME AT PERMANENT POOL	88,417.47
MAIN BASIN SHELF VOLUME	1,369.74
AVERAGE POND DEPTH	6.38
FOREBAY VOLUME	16,157.04
TOTAL PERMANENT POOL VOLUME	104,574.50
FOREBAY PERCENTAGE OF MAIN BASIN VOLUME	15.45%
TEMP. STORAGE VOLUME (1.5" RUNOFF)	15,924.47

**Pinnacle Storage Grandy - Pond 2**

WET POND SA/DA AND DRAWDOWN WORKSHEET

**SA/DA PERCENTAGES FOR 85% TSS REMOVAL PER 2017 MDC GUIDELINES**

% IMPRV	3.0 FT	3.5 FT	4.0 FT	4.5 FT	5.0 FT	5.5 FT	6.0 FT	6.5 FT	7.0 FT
10%	0.78	0.70	0.61	0.53	0.44	0.22	0.00	0.00	0.00
20%	1.48	1.26	1.04	0.96	0.87	0.79	0.70	0.61	0.52
30%	2.18	1.92	1.65	1.52	1.39	1.26	1.13	1.00	0.87
40%	2.96	2.61	2.26	2.05	1.83	1.61	1.39	1.18	0.96
50%	3.65	3.26	2.87	2.61	2.35	2.09	1.83	1.57	1.31
60%	4.35	3.83	3.31	3.05	2.78	2.52	2.26	2.00	1.74
70%	5.22	4.57	3.92	3.57	3.22	2.87	2.52	2.18	1.83
80%	5.92	5.22	4.52	4.09	3.65	3.22	2.78	2.35	1.91
90%	6.53	5.79	5.05	4.62	4.18	3.57	2.96	2.70	2.44
100%	7.13	6.53	5.92	5.40	4.87	4.35	3.83	3.31	2.78

WATERSHED AREA : **3.688** ACRES  
 WATERSHED % IMPERVIOUS: **77%**  
 PERMANENT POOL ELEVATION: **9.5** FT  
 PERMANENT POOL AVG. DEPTH: **6.38** FT  
 SA/DA PERCENTAGE FACTOR: **2.702** %

(FROM ABOVE TABLE - TAKEN FROM DESIGN OF STORM WATER

CONTROL FACILITIES WORKSHOP MANUAL - PENC 1988)

POND SURFACE AREA REQ'D: **4341** SF

**Surface Area Provided = 22029.90 sf**

**Pinnacle Storage Grandy - Pond 2**

WET POND SA/DA AND DRAWDOWN WORKSHEET

**VOLUME OF 1.5" RAINFALL**

Normal Pool Elevation 9.5

AREA OF ROOFS: 1.86 AC  
AREA OF PARKING/CONCRETE: 0.98 AC  
AREA OF GREEN AREAS: 0.85 AC  
VOLUME OF RUNOFF 15642.9 CF      VOL (CF)=[(ROOF\*1.0)+(PARKING\*.95)+(GRASS\*0.2)]\*43,560/12)\*1.5  
PERMANENT POOL SURFACE ARE 22029.9 SF  
STORAGE DEPTH = 0.71 FT  
ESTIMATED ELEVATION OF 1.5" RAINFALL 10.21

ACTUAL 1.5" RUNOFF STAGE 0.70 FT  
ACTUAL STORAGE VOLUME PROVIDED AT STAGE AS CALCULATED IN 15844.7 CF

**DRAWDOWN - WATER QUALITY**

Q(2 DAYS) = 0.09169 CFS  
Q(5 DAYS) = 0.03668 CFS

DEPTH OF DRAWDOWN DEVICE BELOW OUTLET 1.5 FT  
1.5" RUNOFF OUTLET DEVICE: 2.24939 INCH DIA HOLE       $A=[Q/(Cd*\text{SQRT}(2gh))]^2*144$   
0.20833       $\text{Rad.}=\text{SQRT}(A/\text{PI})$   
DIAMETER OF HOLE TO USE: 2.5 INCH DIAMETER       $\text{Dia.}=2*\text{Rad.}$   
DRAWDOWN RATE 0.07928 CFS  
1.5" STORM RUNOFF DRAWDOWN TIME 2.31302 DAYS

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Storm Data

Rainfall Depth by Rainfall Return Period

1-Yr (in)	1.5-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	100-Yr (in)
1.0	1.5	4.0	5.0	6.0	7.37	9.9

Storm Data Source: User-provided custom storm data  
Rainfall Distribution Type: Type III  
Dimensionless Unit Hydrograph: <standard>



BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Hydrograph Peak/Peak Time Table

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

-----  
SUBAREAS

Ex West	.00	4.14	6.94	10.04	14.59	23.53
	n/a	12.51	12.48	12.45	12.44	12.42

Ex East	.00	1.06	2.38	4.04	6.66	12.18
	n/a	12.55	12.49	12.45	12.43	12.41

REACHES

OUTLET	.00	5.19	9.31	14.07	21.22	35.61
--------	-----	------	------	-------	-------	-------

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Sub-Area Time of Concentration Details

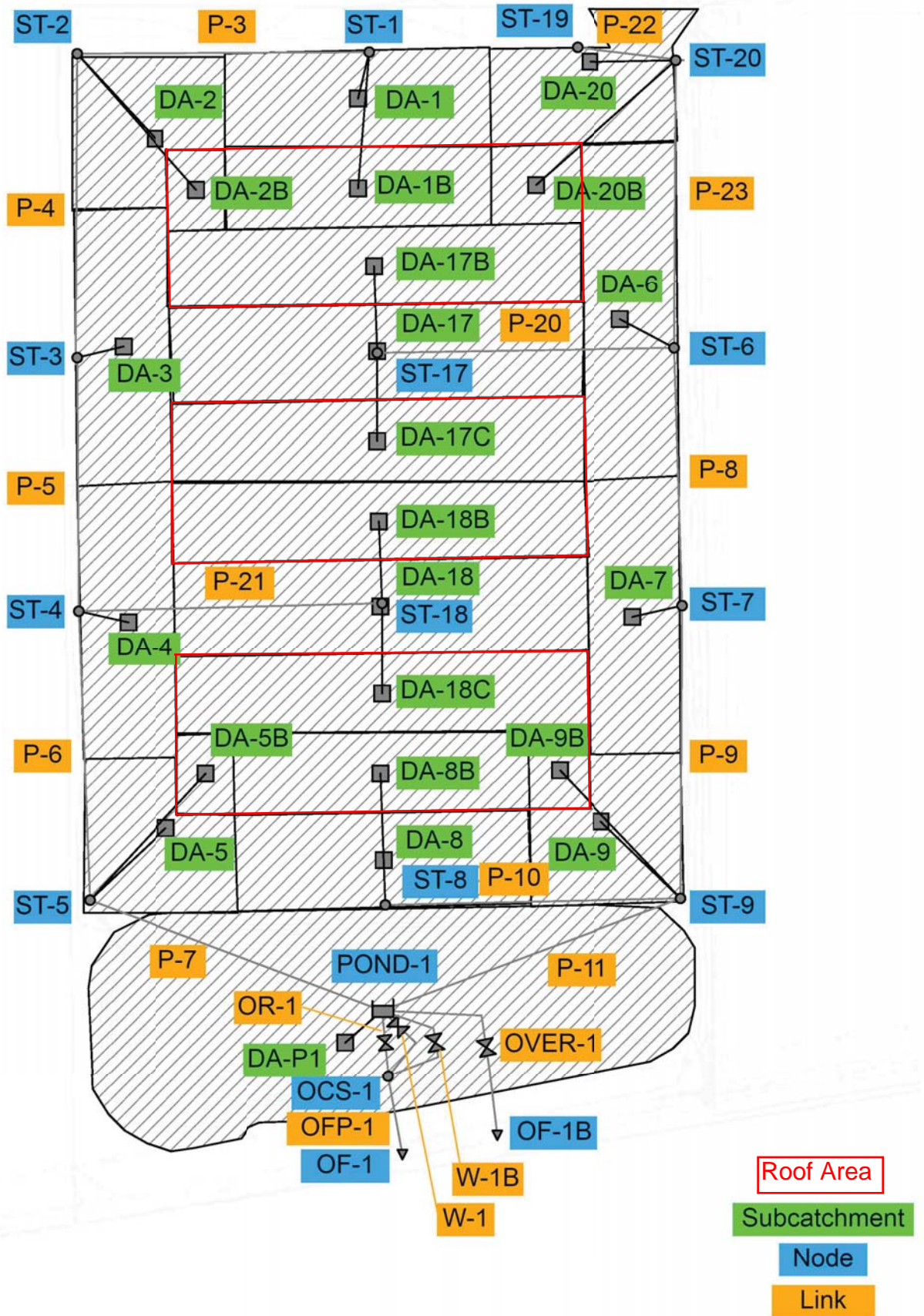
Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
-----							
Ex West							
SHEET	99	0.0050	0.400				0.553
SHALLOW	276	0.0050	4				0.067
					Time of Concentration		0.620
							=====
Ex East							
SHEET	99	0.0060	0.400				0.514
SHALLOW	167	0.0060	4				0.037
					Time of Concentration		.551
							=====

BLR

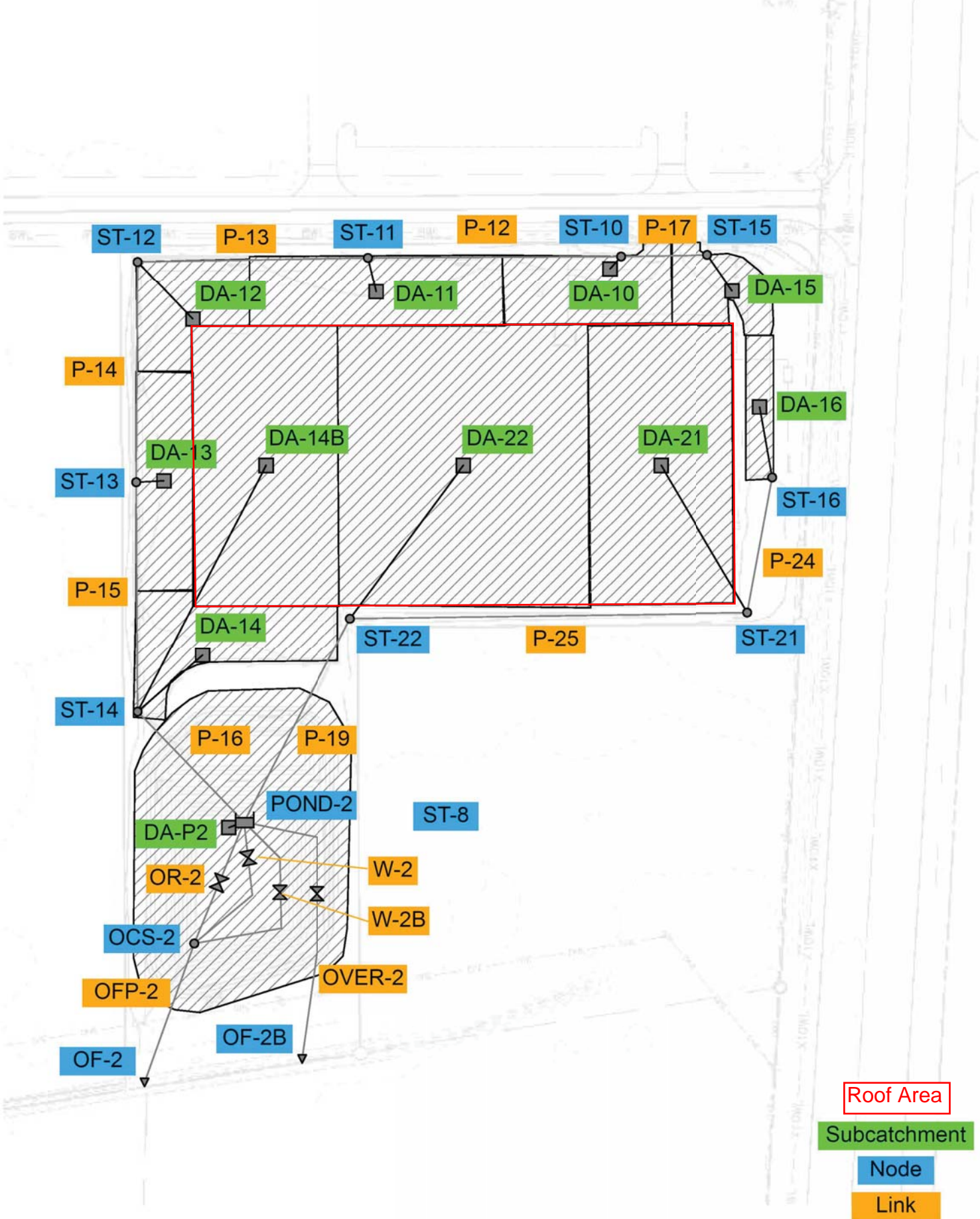
22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Ex West	Woods	(good)	B	3.464	55
	Woods	(good)	D	3.394	77
	Total Area / Weighted Curve Number			6.86	66
				====	==
Ex East	Woods	(good)	B	4.62	55
	Total Area / Weighted Curve Number			4.62	55
				====	==







# 1.5" STORM RESULTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)

\*\*\*\*\*  
 Analysis Options  
 \*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... YES  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surcharge Method ..... EXTRAN  
 Starting Date ..... 01/01/2022 00:00:00  
 Ending Date ..... 01/06/2022 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:06:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00  
 Routing Time Step ..... 20.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 1  
 Head Tolerance ..... 0.005000 ft

\*\*\*\*\*  
 Rainfall File Summary  
 \*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
L	01/01/2022	01/02/2022	5 min	241	0	0

\*\*\*\*\*

	Volume acre-feet	Depth inches
Runoff Quantity Continuity	-----	-----
Total Precipitation	1.176	1.500
Evaporation Loss	0.000	0.000
Infiltration Loss	0.231	0.294
Surface Runoff	0.984	1.255
Final Storage	0.024	0.030
Continuity Error (%)	-5.299	

\*\*\*\*\*

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Flow Routing Continuity	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.875	0.285
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.879	0.286
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	5.946	1.938
Final Stored Volume	6.051	1.972
Continuity Error (%)	-1.583	

\*\*\*\*\*  
 Highest Continuity Errors  
 \*\*\*\*\*

Node ST-13 (-22.61%)  
 Node ST-20 (12.02%)  
 Node ST-11 (-9.51%)  
 Node ST-4 (-7.67%)  
 Node ST-14 (-7.32%)

# 1.5" STORM RESULTS

\*\*\*\*\*  
 Time-Step Critical Elements  
 \*\*\*\*\*  
 Link OFP-1 (83.42%)  
 Link OFP-2 (12.42%)

\*\*\*\*\*  
 Highest Flow Instability Indexes  
 \*\*\*\*\*  
 Link P-17 (51)  
 Link P-16 (39)  
 Link P-15 (37)  
 Link P-14 (31)  
 Link P-12 (31)

\*\*\*\*\*  
 Most Frequent Nonconverging Nodes  
 \*\*\*\*\*  
 Node OF-1 (1.35%)  
 Node OF-2 (1.35%)  
 Node OF-1B (1.35%)  
 Node OF-2B (1.35%)  
 Node ST-11 (0.66%)

\*\*\*\*\*  
 Routing Time Step Summary  
 \*\*\*\*\*  
 Minimum Time Step : 0.98 sec  
 Average Time Step : 12.61 sec  
 Maximum Time Step : 20.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.27  
 % of Steps Not Converging : 1.35  
 Time Step Frequencies :  
     20.000 - 9.564 sec : 71.59 %  
     9.564 - 4.573 sec : 28.40 %  
     4.573 - 2.187 sec : 0.01 %  
     2.187 - 1.046 sec : 0.00 %  
     1.046 - 0.500 sec : 0.00 %

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10 <sup>6</sup> gal	Peak Runoff CFS	Runoff Coeff
DA-15	1.50	0.00	0.00	0.15	1.41	0.00	1.41	0.00	0.13	0.942
DA-10	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.23	1.043
DA-11	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.33	1.044
DA-12	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.20	1.042
DA-13	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.25	1.046
DA-14	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.26	1.038
DA-20	1.50	0.00	0.00	0.00	1.55	0.00	1.55	0.01	0.29	1.030
DA-6	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.44	1.044
DA-17	1.50	0.00	0.00	0.00	1.53	0.00	1.53	0.01	0.51	1.020
DA-7	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.36	1.043
DA-18	1.50	0.00	0.00	0.00	1.53	0.00	1.53	0.01	0.51	1.020
DA-9	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.27	1.037
DA-8	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.39	1.042
DA-5	1.50	0.00	0.00	0.00	1.55	0.00	1.55	0.01	0.27	1.036
DA-4	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.36	1.044
DA-3	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.37	1.042
DA-2	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.28	1.040
DA-1	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.01	0.35	1.041
DA-2B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.00	0.07	1.049
DA-1B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.29	1.049
DA-20B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.00	0.10	1.049
DA-17B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.46	1.049
DA-17C	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.46	1.049
DA-18B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.46	1.049
DA-18C	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.46	1.049
DA-5B	1.50	0.00	0.00	0.00	1.58	0.00	1.58	0.00	0.06	1.050
DA-8B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.01	0.32	1.049
DA-9B	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.00	0.07	1.049
DA-P1	1.50	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.000
DA-P2	1.50	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.01	0.001
DA-22	1.50	0.00	0.00	0.00	1.57	0.00	1.57	0.04	1.36	1.044
DA-21	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.02	0.69	1.037
DA-14B	1.50	0.00	0.00	0.00	1.56	0.00	1.56	0.02	0.74	1.037
DA-16	1.50	0.00	0.00	1.12	0.39	0.00	0.39	0.00	0.02	0.262

# 1.5" STORM RESULTS

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
ST-21	JUNCTION	1.21	1.49	9.99	0 16:38	1.49
ST-22	JUNCTION	2.71	2.99	9.99	0 16:44	2.99
OCS-1	JUNCTION	0.09	0.14	10.14	0 17:06	0.14
OCS-2	JUNCTION	0.08	0.13	9.63	0 16:41	0.13
ST-1	JUNCTION	1.04	1.35	10.55	0 16:51	1.35
ST-10	JUNCTION	0.91	1.19	9.99	0 16:31	1.18
ST-11	JUNCTION	1.71	1.99	9.99	0 16:37	1.99
ST-12	JUNCTION	2.51	2.79	9.99	0 16:43	2.79
ST-13	JUNCTION	3.31	3.59	9.99	0 16:43	3.59
ST-14	JUNCTION	4.21	4.49	9.99	0 16:42	4.49
ST-15	JUNCTION	0.61	0.89	9.99	0 16:31	0.88
ST-17	JUNCTION	1.04	1.37	10.57	0 12:13	1.35
ST-18	JUNCTION	1.04	1.35	10.55	0 16:55	1.35
ST-19	JUNCTION	1.74	2.77	11.27	0 03:08	2.05
ST-2	JUNCTION	1.94	2.25	10.55	0 17:03	2.25
ST-20	JUNCTION	1.94	2.69	10.99	0 03:08	2.25
ST-3	JUNCTION	2.84	3.15	10.55	0 17:03	3.15
ST-4	JUNCTION	3.84	4.15	10.55	0 17:03	4.15
ST-5	JUNCTION	4.74	5.05	10.55	0 17:09	5.05
ST-6	JUNCTION	3.04	3.35	10.55	0 16:58	3.35
ST-7	JUNCTION	3.84	4.15	10.55	0 17:04	4.15
ST-8	JUNCTION	1.24	1.55	10.55	0 17:07	1.55
ST-9	JUNCTION	4.74	5.05	10.55	0 17:04	5.05
ST-16	JUNCTION	0.71	0.99	9.99	0 16:38	0.99
OF-1	OUTFALL	0.07	0.13	9.97	0 17:06	0.13
OF-2	OUTFALL	0.05	0.10	9.50	0 16:41	0.10
OF-1B	OUTFALL	0.00	0.00	9.84	0 00:00	0.00
OF-2B	OUTFALL	0.00	0.00	9.40	0 00:00	0.00
POND-1	STORAGE	9.24	9.55	10.55	0 17:06	9.55
POND-2	STORAGE	9.21	9.49	9.99	0 16:41	9.49

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
ST-21	JUNCTION	0.69	0.70	0 12:11	0.0178	0.0215	1.250
ST-22	JUNCTION	1.36	1.93	0 12:11	0.0341	0.0586	-0.234
OCS-1	JUNCTION	0.00	0.15	0 17:06	0	0.173	-0.001
OCS-2	JUNCTION	0.00	0.10	0 16:41	0	0.113	0.005
ST-1	JUNCTION	0.64	0.64	0 12:11	0.0158	0.0175	0.073
ST-10	JUNCTION	0.23	0.40	0 12:10	0.00573	0.0138	0.284
ST-11	JUNCTION	0.33	0.74	0 12:10	0.00823	0.0233	-8.682
ST-12	JUNCTION	0.20	1.04	0 03:11	0.00499	0.0318	0.515
ST-13	JUNCTION	0.25	1.20	0 12:10	0.0061	0.0402	-18.443
ST-14	JUNCTION	1.00	2.50	0 03:11	0.0259	0.0843	-6.823
ST-15	JUNCTION	0.13	0.20	0 12:07	0.0031	0.00496	0.844
ST-17	JUNCTION	1.42	1.42	0 12:11	0.0356	0.0375	0.080
ST-18	JUNCTION	1.42	1.42	0 12:11	0.0356	0.0403	0.565
ST-19	JUNCTION	0.00	1.76	0 03:08	0	0.00354	-36.569
ST-2	JUNCTION	0.34	0.98	0 12:11	0.00863	0.0278	0.074
ST-20	JUNCTION	0.39	13.95	0 03:08	0.0101	0.0181	13.658
ST-3	JUNCTION	0.37	1.33	0 12:05	0.00926	0.0386	4.387
ST-4	JUNCTION	0.36	3.12	0 12:10	0.00908	0.0881	-7.126
ST-5	JUNCTION	0.33	3.46	0 12:10	0.00849	0.105	-3.426
ST-6	JUNCTION	0.44	2.44	0 12:11	0.011	0.0641	-0.473
ST-7	JUNCTION	0.36	2.81	0 12:11	0.00921	0.0746	-0.630
ST-8	JUNCTION	0.71	0.71	0 12:11	0.0174	0.0186	0.464
ST-9	JUNCTION	0.34	3.88	0 12:10	0.00866	0.113	-1.016
ST-16	JUNCTION	0.02	0.02	0 12:11	0.000469	0.00113	2.597
OF-1	OUTFALL	0.00	0.15	0 17:06	0	0.173	0.000
OF-2	OUTFALL	0.00	0.10	0 16:41	0	0.113	0.000
OF-1B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
OF-2B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
POND-1	STORAGE	0.00	7.27	0 12:10	7.27e-06	1.32	-0.150
POND-2	STORAGE	0.01	4.09	0 12:11	1.16e-05	0.902	-0.666



# 1.5" STORM RESULTS

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
ST-22	JUNCTION	120.00	0.986	1.514
ST-1	JUNCTION	40.00	0.353	1.447
ST-10	JUNCTION	23.47	0.187	2.513
ST-11	JUNCTION	119.72	0.486	2.514
ST-12	JUNCTION	120.00	0.786	2.514
ST-13	JUNCTION	119.99	0.586	2.514
ST-14	JUNCTION	120.00	1.486	2.514
ST-19	JUNCTION	120.00	1.767	0.733
ST-2	JUNCTION	120.00	0.753	1.447
ST-20	JUNCTION	120.00	1.692	1.008
ST-3	JUNCTION	120.00	1.152	1.448
ST-4	JUNCTION	120.00	0.752	1.448
ST-5	JUNCTION	120.00	2.052	1.448
ST-6	JUNCTION	120.00	0.953	1.447
ST-7	JUNCTION	120.00	1.152	1.448
ST-8	JUNCTION	11.75	0.052	1.448
ST-9	JUNCTION	120.00	1.052	1.448

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

No nodes were flooded.

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POND-1	155.580	52	0	0	166.044	56	0 17:06	1.27
POND-2	106.312	60	0	0	112.593	64	0 16:41	0.61

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OF-1	97.75	0.07	0.15	0.173
OF-2	97.77	0.04	0.10	0.113
OF-1B	0.00	0.00	0.00	0.000
OF-2B	0.00	0.00	0.00	0.000
System	48.88	0.11	0.25	0.286

# 1.5" STORM RESULTS

\*\*\*\*\*  
 Link Flow Summary  
 \*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
P-25	CONDUIT	0.62	0 12:11	0.21	0.29	0.87
OFFP-1	CONDUIT	0.15	0 17:06	1.68	0.01	0.07
OFFP-2	CONDUIT	0.10	0 16:41	1.36	0.01	0.06
P-10	CONDUIT	0.78	0 12:05	0.46	0.09	1.00
P-11	CONDUIT	3.88	0 12:05	0.55	0.05	1.00
P-12	CONDUIT	0.42	0 12:10	0.53	0.17	1.00
P-13	CONDUIT	0.75	0 12:10	0.42	0.09	1.00
P-14	CONDUIT	1.04	0 03:11	0.33	0.06	1.00
P-15	CONDUIT	2.49	0 03:11	0.35	0.05	1.00
P-16	CONDUIT	2.21	0 12:10	0.31	0.03	1.00
P-17	CONDUIT	0.22	0 12:08	0.30	0.08	0.94
P-19	CONDUIT	1.93	0 12:11	0.61	0.05	1.00
P-20	CONDUIT	1.63	0 12:05	1.00	0.19	0.96
P-21	CONDUIT	1.49	0 12:10	0.89	0.19	0.95
P-22	CONDUIT	12.79	0 03:08	16.29	5.03	1.00
P-23	CONDUIT	1.59	0 03:08	2.03	0.53	1.00
P-3	CONDUIT	0.64	0 12:11	0.81	0.24	1.00
P-4	CONDUIT	0.97	0 12:05	0.55	0.10	1.00
P-5	CONDUIT	1.34	0 12:11	0.43	0.07	1.00
P-6	CONDUIT	3.14	0 12:10	0.44	0.06	1.00
P-7	CONDUIT	3.45	0 12:10	0.49	0.05	1.00
P-8	CONDUIT	2.44	0 12:11	0.78	0.14	1.00
P-9	CONDUIT	2.81	0 12:11	0.40	0.06	1.00
P-24	CONDUIT	0.03	0 12:06	0.03	0.01	0.99
OR-2	ORIFICE	0.10	0 16:41			
OR-1	ORIFICE	0.15	0 17:06			
W-1A	WEIR	0.00	0 00:00			0.00
W-2A	WEIR	0.00	0 00:00			0.00
OVER-1	WEIR	0.00	0 00:00			0.00
W-1B	WEIR	0.00	0 00:00			0.00
W-2B	WEIR	0.00	0 00:00			0.00
OVER-2	WEIR	0.00	0 00:00			0.00

\*\*\*\*\*  
 Flow Classification Summary  
 \*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
P-25	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OFFP-1	1.00	0.00	0.00	0.00	0.44	0.55	0.00	0.00	0.00	0.00
OFFP-2	1.00	0.00	0.00	0.00	0.43	0.57	0.00	0.00	0.00	0.00
P-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-19	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-21	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-22	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-23	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-24	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

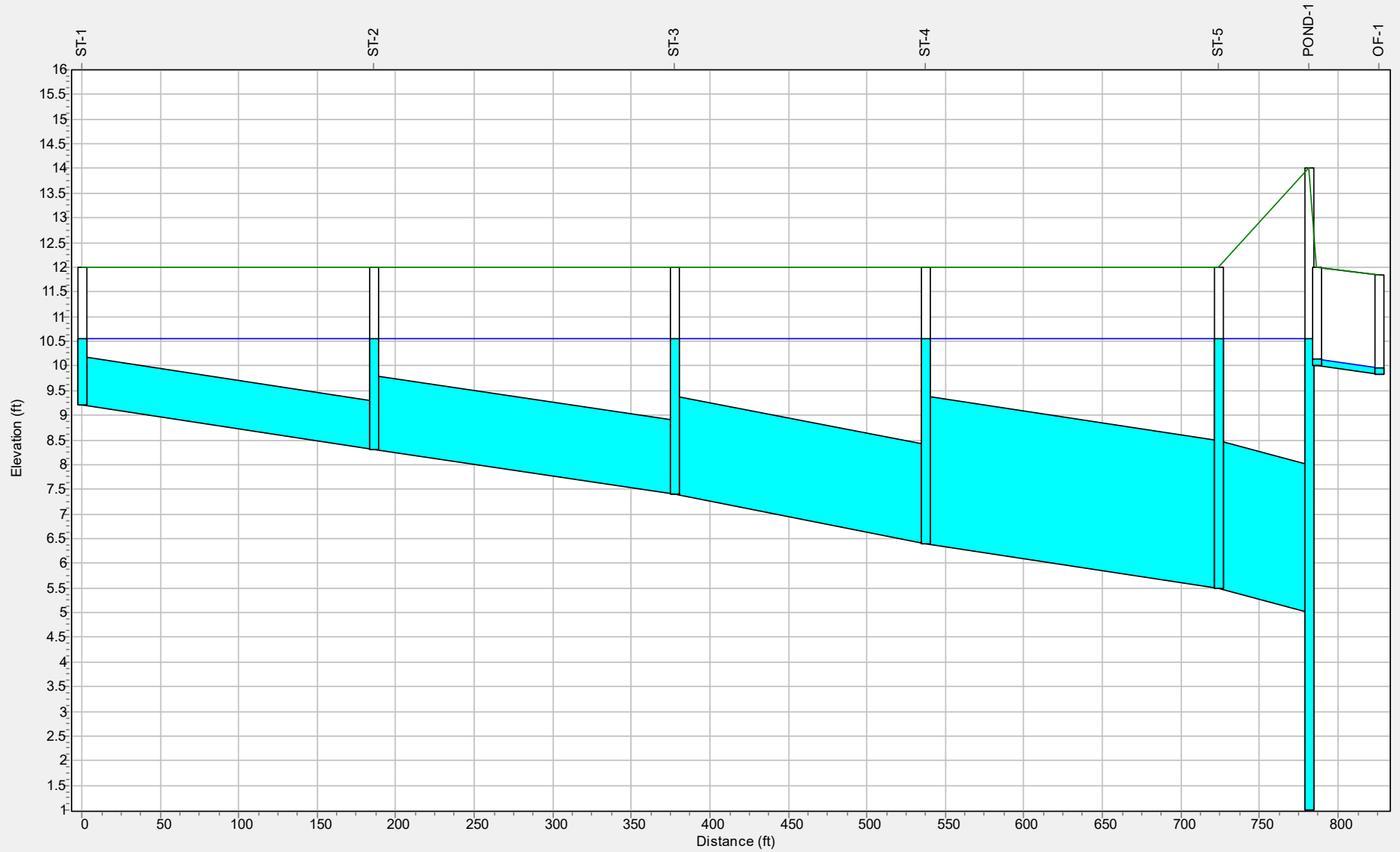
# 1.5" STORM RESULTS

\*\*\*\*\*  
 Conduit Surcharge Summary  
 \*\*\*\*\*

Conduit	Hours Full		----- Dnstream	Hours	
	----- Both Ends	Upstream		Above Full Normal Flow	Capacity Limited
P-25	0.01	0.01	120.00	0.01	0.01
P-10	11.74	11.74	120.00	0.01	0.01
P-11	120.00	120.00	120.00	0.01	0.01
P-12	23.47	23.47	120.00	0.01	0.01
P-13	119.42	119.42	120.00	0.01	0.01
P-14	120.00	120.00	120.00	0.01	0.01
P-15	119.99	119.99	120.00	0.01	0.01
P-16	120.00	120.00	120.00	0.01	0.01
P-17	0.01	0.01	23.47	0.01	0.01
P-19	120.00	120.00	120.00	0.01	0.01
P-20	0.01	0.01	120.00	0.01	0.01
P-21	0.01	0.01	120.00	0.01	0.01
P-22	120.00	120.00	120.00	0.01	0.03
P-23	120.00	120.00	120.00	0.01	0.01
P-3	39.99	39.99	120.00	0.01	0.01
P-4	120.00	120.00	120.00	0.01	0.01
P-5	120.00	120.00	120.00	0.01	0.01
P-6	120.00	120.00	120.00	0.01	0.01
P-7	120.00	120.00	120.00	0.01	0.01
P-8	120.00	120.00	120.00	0.01	0.01
P-9	120.00	120.00	120.00	0.01	0.01
P-24	0.01	0.01	120.00	0.01	0.01

Analysis begun on: Fri Jul 22 17:49:08 2022  
 Analysis ended on: Fri Jul 22 17:49:09 2022  
 Total elapsed time: 00:00:01

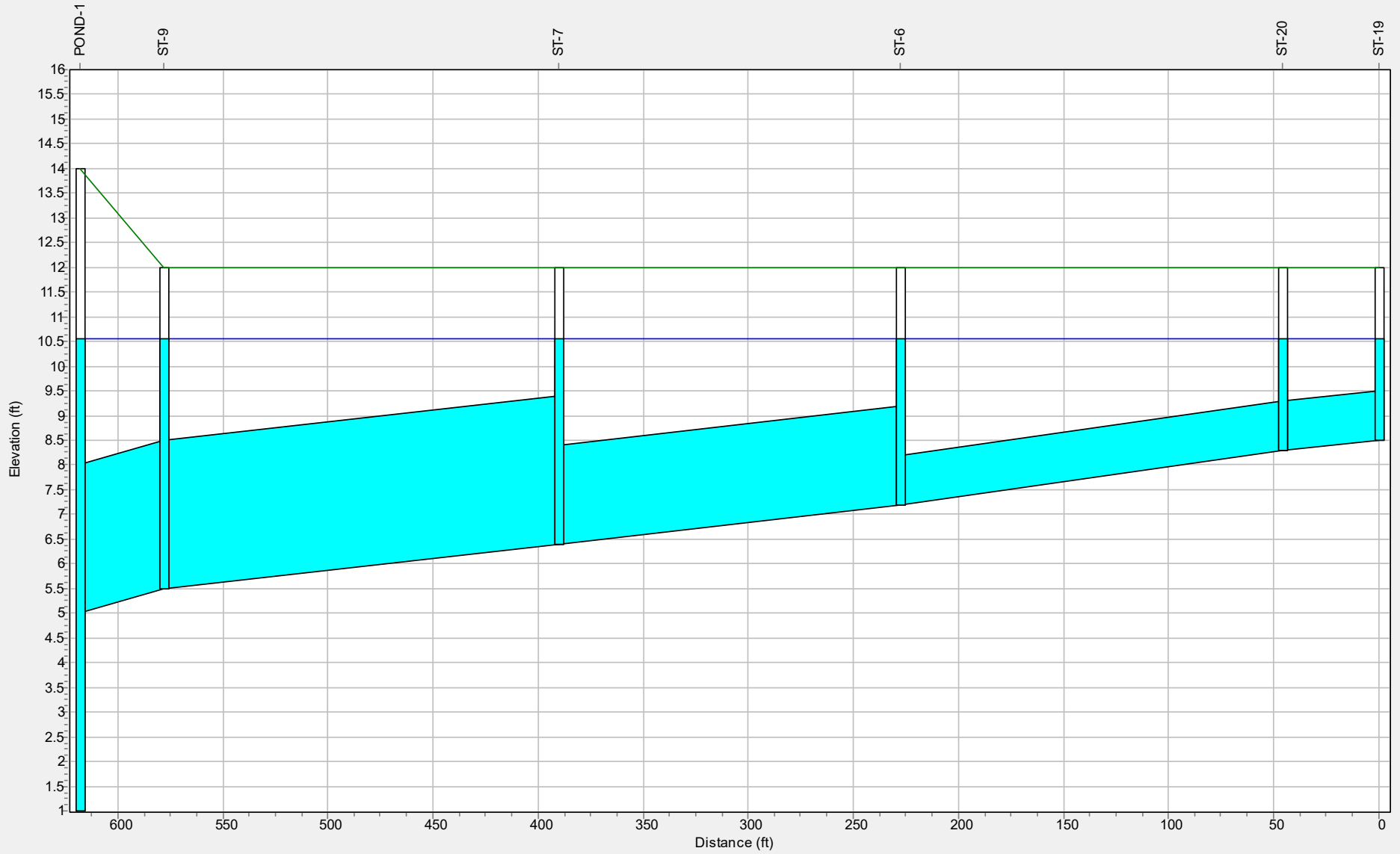
Water Elevation Profile: Node ST-1 - OF-1



01/01/2022 17:00:00

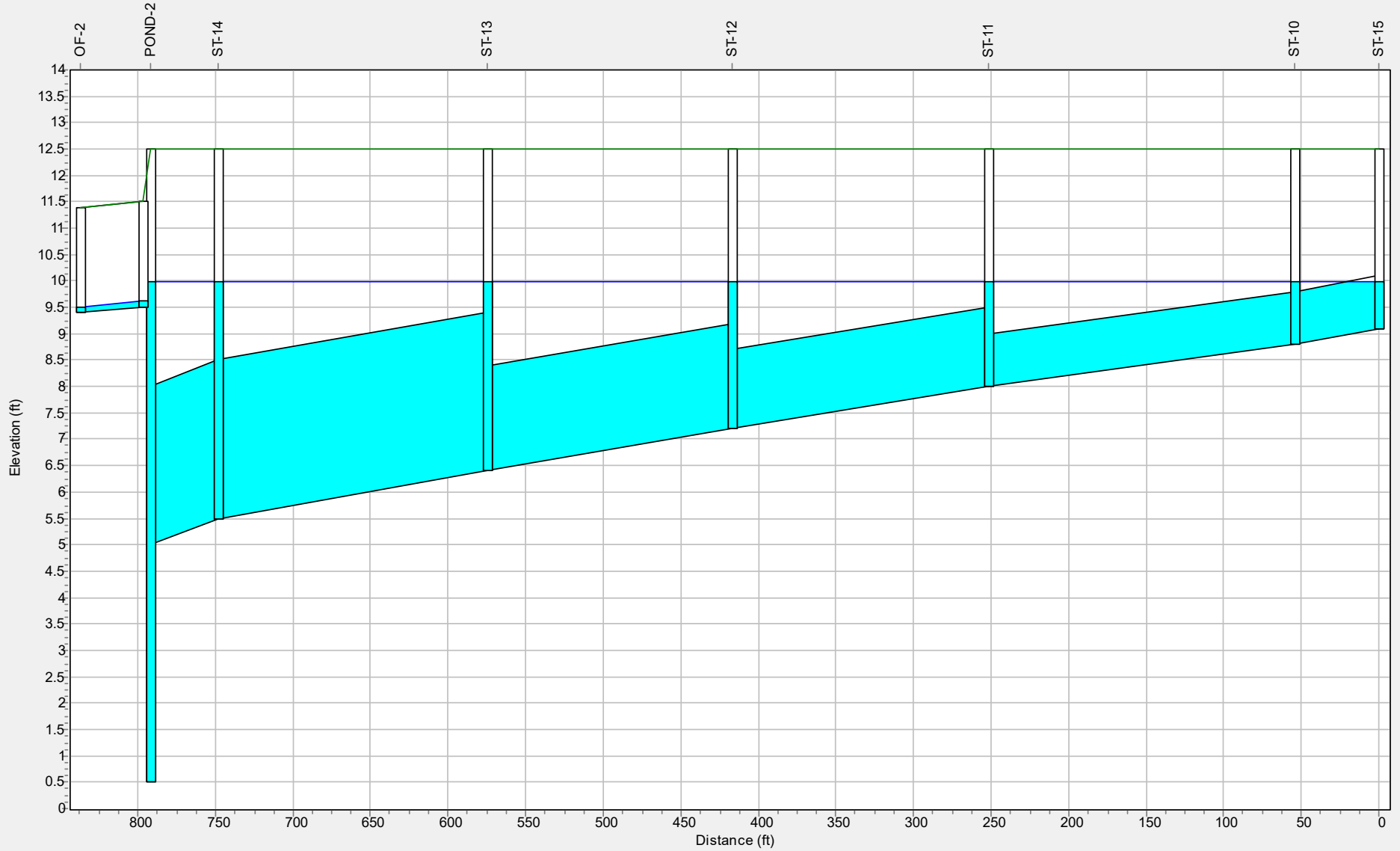


Water Elevation Profile: Node ST-19 - POND-1



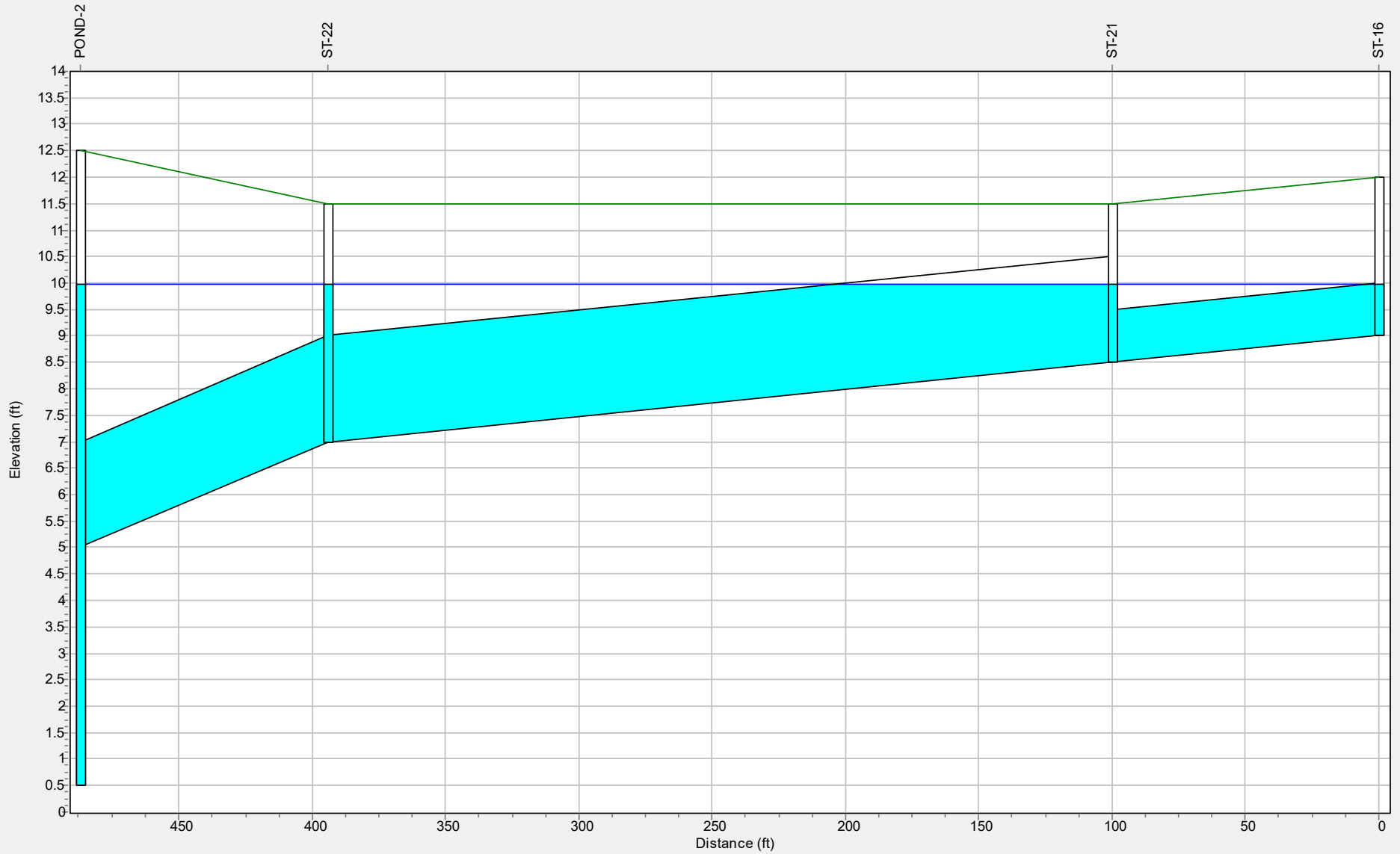
01/01/2022 17:00:00

### Water Elevation Profile: Node ST-15 - OF-2



01/01/2022 17:00:00

Water Elevation Profile: Node ST-16 - POND-2



01/01/2022 17:00:00

# 5-YR STORM RESULTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CFS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... YES  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surcharge Method ..... EXTRAN  
 Starting Date ..... 01/01/2022 00:00:00  
 Ending Date ..... 01/06/2022 00:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:06:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 01:00:00  
 Routing Time Step ..... 20.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 1  
 Head Tolerance ..... 0.005000 ft

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
L	01/01/2022	01/02/2022	5 min	241	0	0

	Volume acre-feet	Depth inches
Runoff Quantity Continuity	-----	-----
Total Precipitation .....	3.921	5.000
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.568	0.725
Surface Runoff .....	3.563	4.544
Final Storage .....	0.024	0.030
Continuity Error (%) .....	-5.969	

	Volume acre-feet	Volume 10 <sup>6</sup> gal
Flow Routing Continuity	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	3.044	0.992
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	2.990	0.974
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	5.946	1.938
Final Stored Volume .....	6.052	1.972
Continuity Error (%) .....	-0.568	

\*\*\*\*\*

Highest Continuity Errors

\*\*\*\*\*

Node ST-13 (-4.90%)  
 Node ST-14 (-2.01%)  
 Node ST-11 (-1.95%)

# 5-YR STORM RESULTS

\*\*\*\*\*  
 Time-Step Critical Elements  
 \*\*\*\*\*  
 Link OFP-1 (96.24%)  
 Link OFP-2 (2.22%)

\*\*\*\*\*  
 Highest Flow Instability Indexes  
 \*\*\*\*\*  
 Link P-17 (53)  
 Link P-16 (20)  
 Link P-15 (17)  
 Link P-14 (14)  
 Link P-12 (14)

\*\*\*\*\*  
 Most Frequent Nonconverging Nodes  
 \*\*\*\*\*  
 Node OF-1 (0.91%)  
 Node OF-2 (0.91%)  
 Node OF-1B (0.91%)  
 Node OF-2B (0.91%)  
 Node ST-11 (0.30%)

\*\*\*\*\*  
 Routing Time Step Summary  
 \*\*\*\*\*  
 Minimum Time Step : 1.87 sec  
 Average Time Step : 10.18 sec  
 Maximum Time Step : 20.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.16  
 % of Steps Not Converging : 0.91  
 Time Step Frequencies :  
     20.000 - 9.564 sec : 47.90 %  
     9.564 - 4.573 sec : 46.93 %  
     4.573 - 2.187 sec : 5.16 %  
     2.187 - 1.046 sec : 0.00 %  
     1.046 - 0.500 sec : 0.00 %

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10 <sup>6</sup> gal	Peak Runoff CFS	Runoff Coeff
DA-15	5.00	0.00	0.00	0.35	4.81	0.17	4.97	0.01	0.46	0.994
DA-10	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.02	0.77	1.068
DA-11	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.03	1.10	1.068
DA-12	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.02	0.66	1.067
DA-13	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.02	0.83	1.068
DA-14	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.03	0.88	1.066
DA-20	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.03	1.01	1.062
DA-6	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.04	1.47	1.068
DA-17	5.00	0.00	0.00	0.00	5.26	0.00	5.26	0.05	1.78	1.053
DA-7	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.04	1.23	1.068
DA-18	5.00	0.00	0.00	0.00	5.26	0.00	5.26	0.05	1.78	1.053
DA-9	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.03	0.93	1.066
DA-8	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.04	1.31	1.068
DA-5	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.03	0.92	1.065
DA-4	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.03	1.22	1.068
DA-3	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.04	1.23	1.068
DA-2	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.03	0.94	1.067
DA-1	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.03	1.18	1.067
DA-2B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.01	0.22	1.062
DA-1B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.03	0.98	1.062
DA-20B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.01	0.33	1.062
DA-17B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.04	1.52	1.062
DA-17C	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.04	1.52	1.062
DA-18B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.04	1.52	1.062
DA-18C	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.04	1.52	1.062
DA-5B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.01	0.21	1.062
DA-8B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.03	1.08	1.062
DA-9B	5.00	0.00	0.00	0.00	5.31	0.00	5.31	0.01	0.22	1.062
DA-P1	5.00	0.00	0.00	3.74	0.00	1.29	1.29	0.04	1.86	0.258
DA-P2	5.00	0.00	0.00	3.63	0.00	1.43	1.43	0.03	2.08	0.287
DA-22	5.00	0.00	0.00	0.00	5.34	0.00	5.34	0.13	4.57	1.069
DA-21	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.07	2.34	1.066
DA-14B	5.00	0.00	0.00	0.00	5.33	0.00	5.33	0.07	2.52	1.066
DA-16	5.00	0.00	0.00	2.68	1.33	1.13	2.47	0.00	0.20	0.493



5-YR STORM RESULTS

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
ST-21	JUNCTION	1.51	3.12	11.62	0 12:11	3.11
ST-22	JUNCTION	3.00	3.92	10.92	0 13:06	3.90
OCS-1	JUNCTION	0.15	0.58	10.58	0 12:53	0.58
OCS-2	JUNCTION	0.14	0.38	9.88	0 13:11	0.38
ST-1	JUNCTION	1.29	2.80	12.00	0 12:11	2.20
ST-10	JUNCTION	1.21	2.13	10.93	0 13:12	2.09
ST-11	JUNCTION	2.00	2.92	10.92	0 13:06	2.89
ST-12	JUNCTION	2.80	3.72	10.92	0 13:07	3.69
ST-13	JUNCTION	3.60	4.51	10.91	0 13:06	4.50
ST-14	JUNCTION	4.50	5.41	10.91	0 13:06	5.40
ST-15	JUNCTION	0.91	1.83	10.93	0 13:12	1.79
ST-17	JUNCTION	1.28	2.61	11.81	0 12:11	2.20
ST-18	JUNCTION	1.28	2.45	11.65	0 12:11	2.21
ST-19	JUNCTION	1.98	3.13	11.63	0 12:11	2.94
ST-2	JUNCTION	2.18	3.17	11.47	0 12:36	3.12
ST-20	JUNCTION	2.18	3.33	11.63	0 12:11	3.13
ST-3	JUNCTION	3.08	4.07	11.47	0 12:54	4.03
ST-4	JUNCTION	4.08	5.06	11.46	0 12:54	5.03
ST-5	JUNCTION	4.98	5.95	11.45	0 12:42	5.93
ST-6	JUNCTION	3.28	4.26	11.46	0 13:00	4.22
ST-7	JUNCTION	4.08	5.07	11.47	0 12:42	5.03
ST-8	JUNCTION	1.48	2.47	11.47	0 12:42	2.42
ST-9	JUNCTION	4.98	5.95	11.45	0 12:42	5.93
ST-16	JUNCTION	1.01	2.63	11.63	0 12:11	2.59
OF-1	OUTFALL	0.14	0.58	10.42	0 12:53	0.58
OF-2	OUTFALL	0.11	0.35	9.75	0 13:11	0.35
OF-1B	OUTFALL	0.00	0.00	9.84	0 00:00	0.00
OF-2B	OUTFALL	0.00	0.00	9.40	0 00:00	0.00
POND-1	STORAGE	9.48	10.43	11.43	0 12:53	10.43
POND-2	STORAGE	9.50	10.40	10.90	0 13:11	10.40

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
ST-21	JUNCTION	2.34	2.53	0 12:11	0.0584	0.0632	0.319
ST-22	JUNCTION	4.57	6.37	0 12:05	0.111	0.175	0.225
OCS-1	JUNCTION	0.00	2.86	0 12:53	0	0.602	-0.001
OCS-2	JUNCTION	0.00	1.03	0 13:11	0	0.372	0.001
ST-1	JUNCTION	2.16	2.16	0 12:11	0.0509	0.0517	0.007
ST-10	JUNCTION	0.77	1.22	0 12:11	0.0186	0.0323	-0.287
ST-11	JUNCTION	1.10	2.31	0 12:11	0.0267	0.0596	-1.914
ST-12	JUNCTION	0.66	2.96	0 12:11	0.0163	0.0773	0.151
ST-13	JUNCTION	0.83	3.79	0 12:05	0.0197	0.0981	-4.668
ST-14	JUNCTION	3.40	7.20	0 12:11	0.0849	0.192	-1.967
ST-15	JUNCTION	0.46	0.46	0 12:11	0.0103	0.0115	-0.723
ST-17	JUNCTION	4.83	4.83	0 12:11	0.115	0.116	0.025
ST-18	JUNCTION	4.83	4.83	0 12:11	0.115	0.117	0.057
ST-19	JUNCTION	0.00	1.36	0 00:48	0	0.00289	-0.271
ST-2	JUNCTION	1.16	3.31	0 12:05	0.028	0.0805	-0.244
ST-20	JUNCTION	1.33	1.33	0 12:11	0.033	0.0367	-0.353
ST-3	JUNCTION	1.23	4.53	0 12:05	0.0301	0.111	0.924
ST-4	JUNCTION	1.22	10.53	0 12:11	0.0294	0.257	-0.814
ST-5	JUNCTION	1.13	11.64	0 12:11	0.0277	0.288	-0.547
ST-6	JUNCTION	1.47	7.59	0 12:11	0.0356	0.186	0.000
ST-7	JUNCTION	1.23	8.80	0 12:11	0.0299	0.216	-0.002
ST-8	JUNCTION	2.39	2.39	0 12:11	0.0561	0.0567	0.082
ST-9	JUNCTION	1.15	12.30	0 12:11	0.0282	0.304	-0.364
ST-16	JUNCTION	0.20	0.20	0 12:11	0.00296	0.00354	-0.033
OF-1	OUTFALL	0.00	2.86	0 12:53	0	0.602	0.000
OF-2	OUTFALL	0.00	1.03	0 13:11	0	0.372	0.000
OF-1B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
OF-2B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
POND-1	STORAGE	1.86	25.85	0 12:11	0.0365	1.73	-0.016
POND-2	STORAGE	2.08	15.41	0 12:11	0.0274	1.15	-0.283

5-YR STORM RESULTS

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
ST-21	JUNCTION	10.02	1.121	0.000
ST-22	JUNCTION	120.00	1.924	0.576
ST-1	JUNCTION	64.03	1.800	0.000
ST-10	JUNCTION	51.82	1.128	1.572
ST-11	JUNCTION	119.79	1.421	1.579
ST-12	JUNCTION	120.00	1.716	1.584
ST-13	JUNCTION	120.00	1.506	1.594
ST-14	JUNCTION	120.00	2.413	1.587
ST-15	JUNCTION	28.03	0.831	1.569
ST-17	JUNCTION	20.72	1.108	0.692
ST-18	JUNCTION	20.73	0.948	0.852
ST-19	JUNCTION	120.00	2.128	0.372
ST-2	JUNCTION	120.00	1.674	0.526
ST-20	JUNCTION	120.00	2.328	0.372
ST-3	JUNCTION	120.00	2.066	0.534
ST-4	JUNCTION	120.00	1.657	0.543
ST-5	JUNCTION	120.00	2.952	0.548
ST-6	JUNCTION	120.00	1.860	0.540
ST-7	JUNCTION	120.00	2.065	0.535
ST-8	JUNCTION	33.72	0.966	0.534
ST-9	JUNCTION	120.00	1.949	0.551
ST-16	JUNCTION	34.68	1.633	0.367

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
ST-21	0.16	0.80	0 12:11	0.001	0.121
ST-1	0.01	0.02	0 12:11	0.000	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POND-1	163.948	55	0	0	196.705	66	0 12:53	2.86
POND-2	113.164	64	0	0	134.194	76	0 13:11	1.03

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OF-1	99.17	0.32	2.86	0.602
OF-2	99.09	0.18	1.03	0.372
OF-1B	0.00	0.00	0.00	0.000
OF-2B	0.00	0.00	0.00	0.000
System	49.56	0.51	3.88	0.974



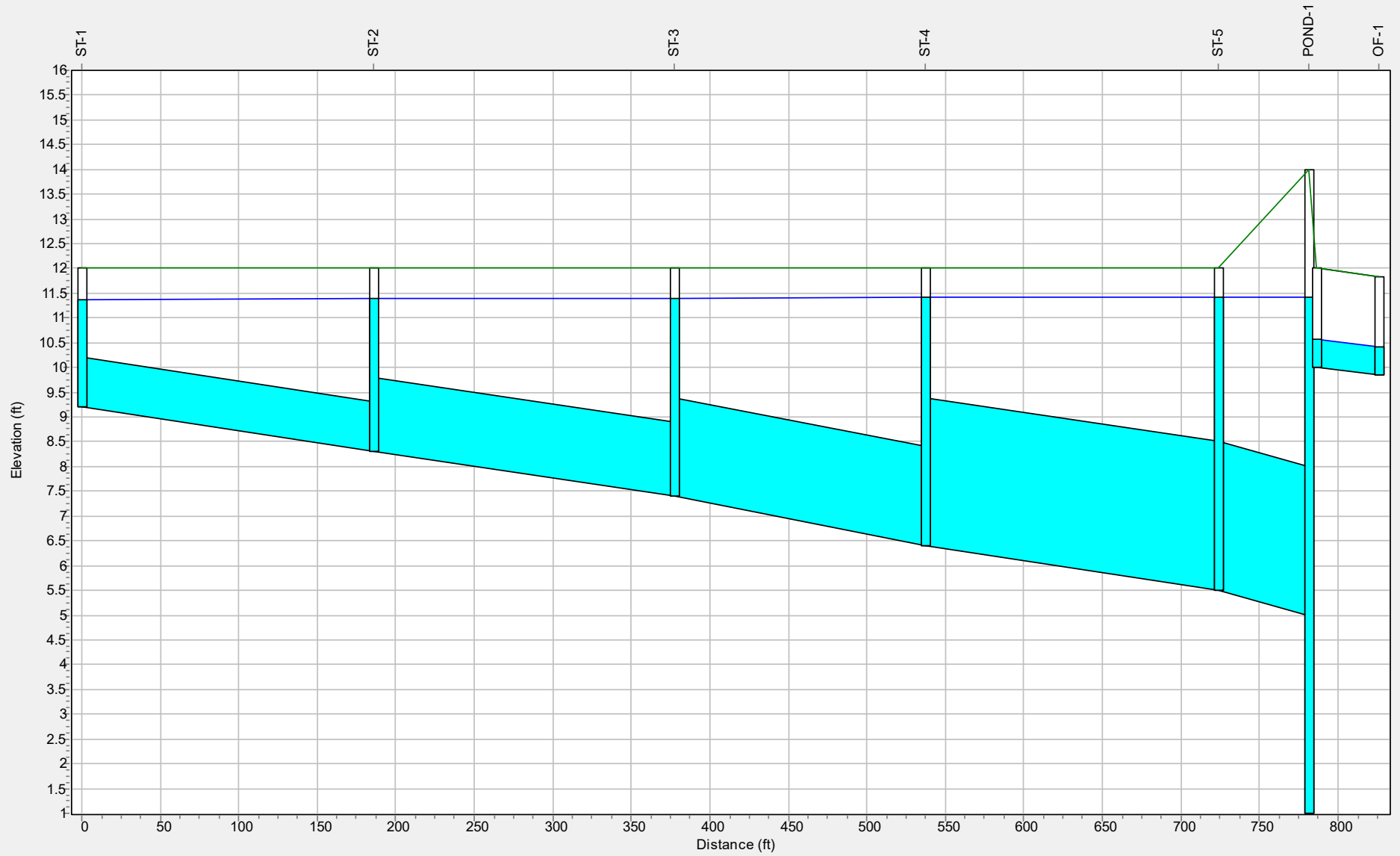
5-YR STORM RESULTS

\*\*\*\*\*  
 Conduit Surcharge Summary  
 \*\*\*\*\*

Conduit	Hours Full		----- Dnstream	Hours	
	----- Both Ends	Upstream		Above Full Normal Flow	Capacity Limited
P-25	10.02	10.02	120.00	0.01	0.01
P-10	33.71	33.71	120.00	0.01	0.01
P-11	120.00	120.00	120.00	0.01	0.01
P-12	51.80	51.80	120.00	0.01	0.01
P-13	119.63	119.63	120.00	0.01	0.01
P-14	120.00	120.00	120.00	0.01	0.01
P-15	120.00	120.00	120.00	0.01	0.01
P-16	120.00	120.00	120.00	0.01	0.01
P-17	27.92	27.92	51.80	0.01	0.01
P-19	120.00	120.00	120.00	0.01	0.01
P-20	20.72	20.72	120.00	0.01	0.01
P-21	20.73	20.73	120.00	0.01	0.01
P-22	120.00	120.00	120.00	0.01	0.02
P-23	120.00	120.00	120.00	0.01	0.01
P-3	64.01	64.01	120.00	0.01	0.01
P-4	120.00	120.00	120.00	0.01	0.01
P-5	120.00	120.00	120.00	0.01	0.01
P-6	120.00	120.00	120.00	0.01	0.01
P-7	120.00	120.00	120.00	0.01	0.01
P-8	120.00	120.00	120.00	0.01	0.01
P-9	120.00	120.00	120.00	0.01	0.01
P-24	34.68	34.68	120.00	0.01	0.01

Analysis begun on: Sun Jul 24 09:39:32 2022  
 Analysis ended on: Sun Jul 24 09:39:33 2022  
 Total elapsed time: 00:00:01

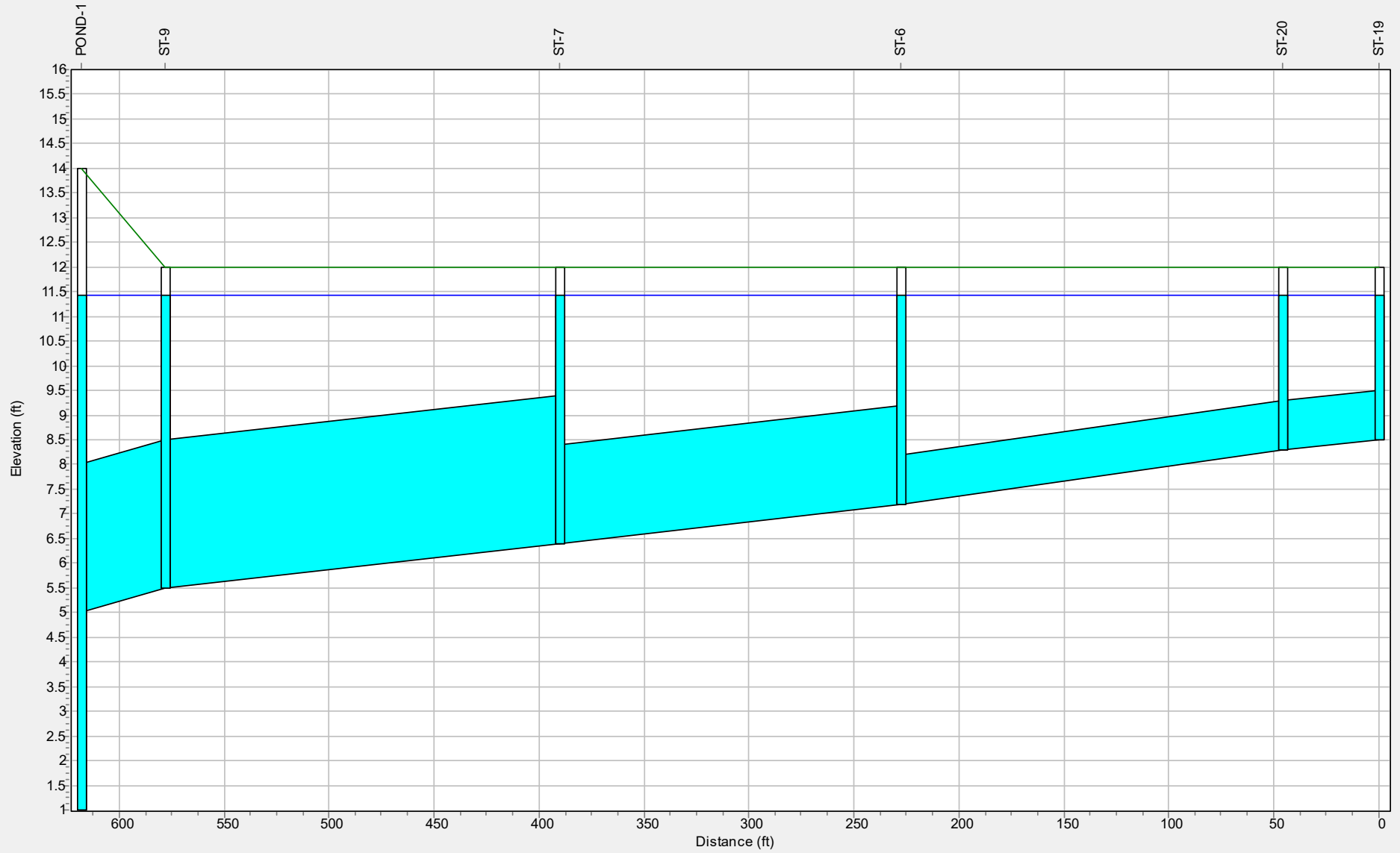
Water Elevation Profile: Node ST-1 - OF-1



01/01/2022 13:00:00

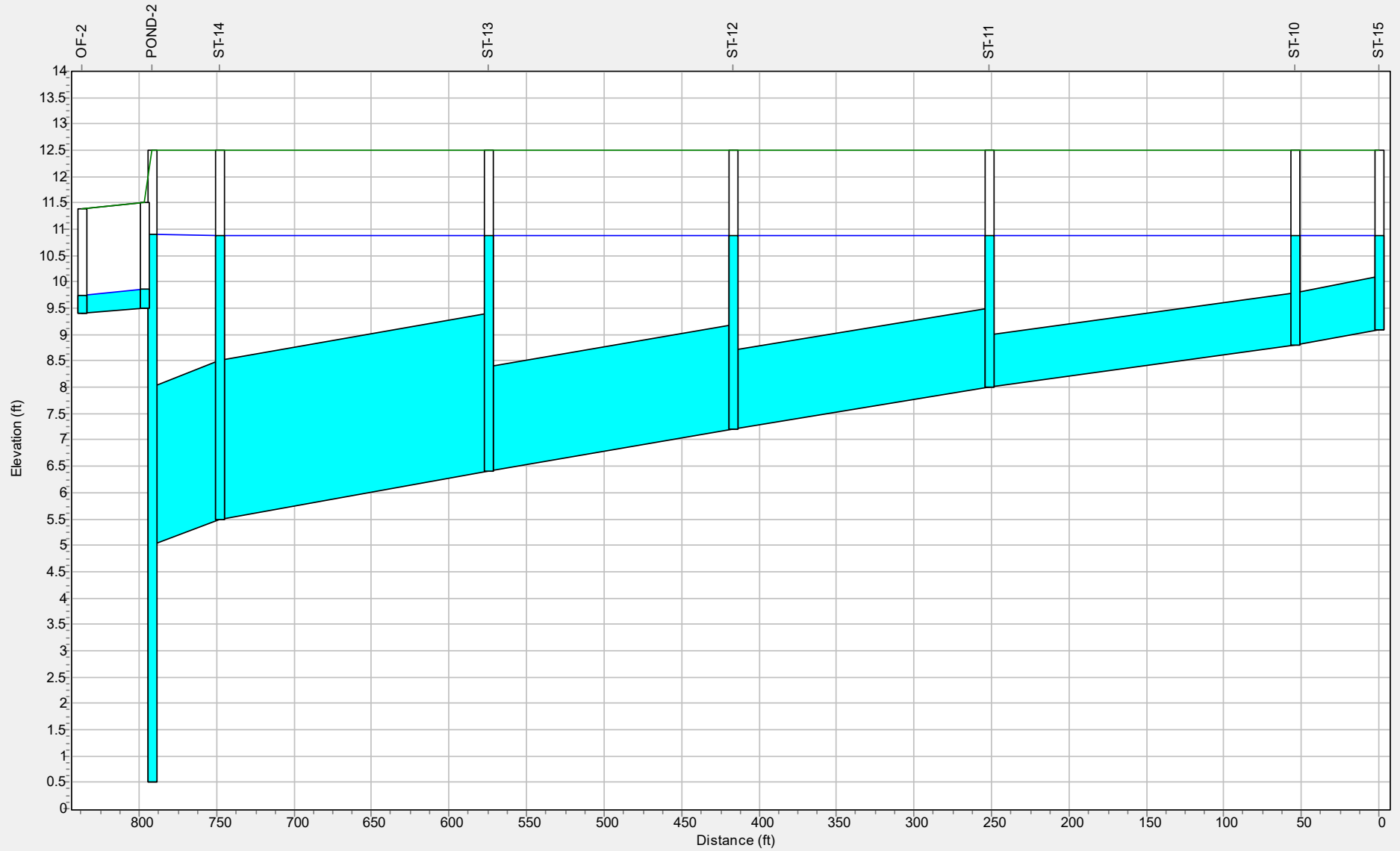


Water Elevation Profile: Node ST-19 - POND-1



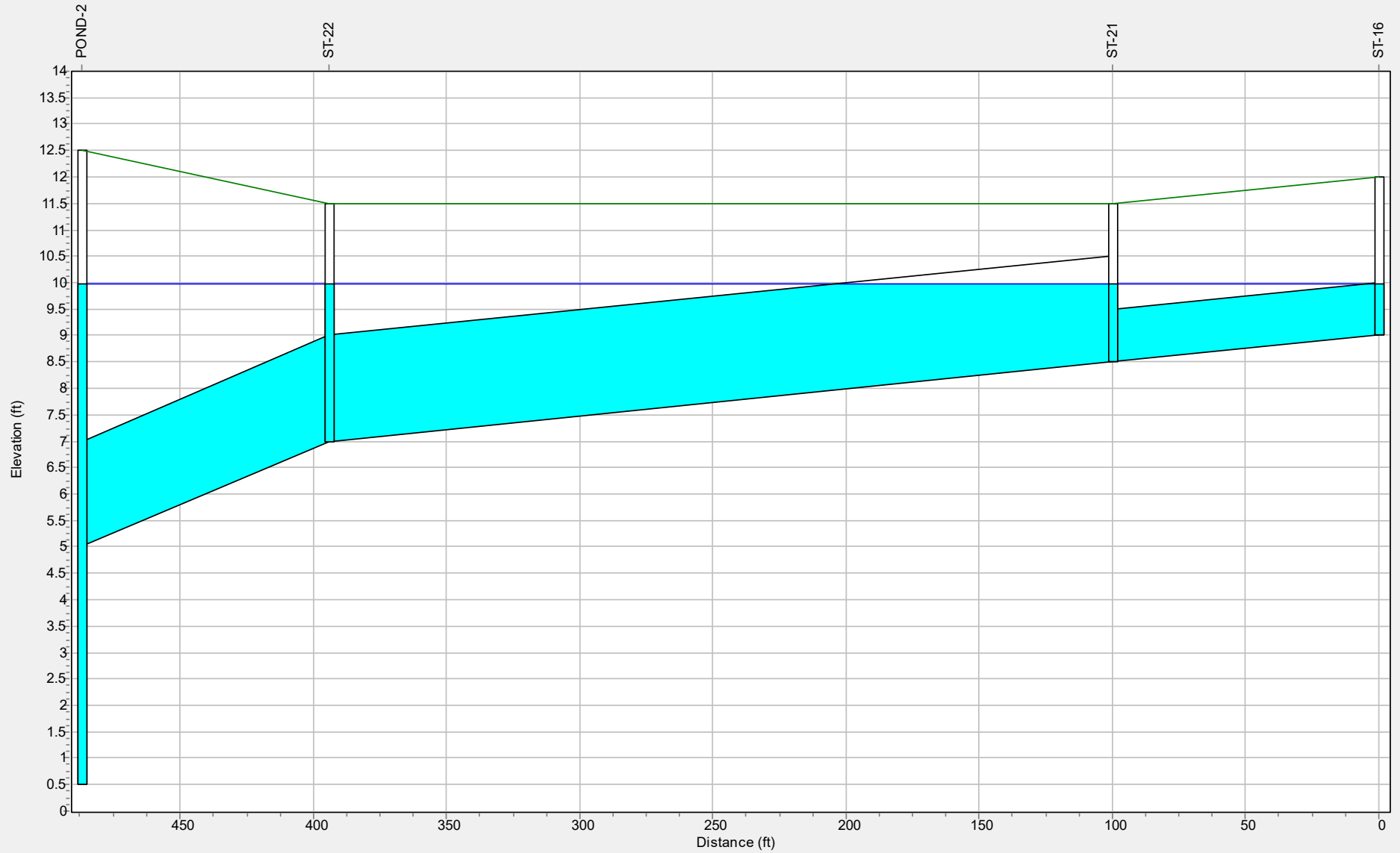
01/01/2022 13:00:00

### Water Elevation Profile: Node ST-15 - OF-2



01/01/2022 13:00:00

Water Elevation Profile: Node ST-16 - POND-2



01/01/2022 17:00:00

# 10-YR STORM RESULTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

```

Flow Units ..... CFS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO
  Flow Routing ..... YES
  Ponding Allowed ..... YES
  Water Quality ..... NO
Infiltration Method ..... HORTON
Flow Routing Method ..... DYNWAVE
Surcharge Method ..... EXTRAN
Starting Date ..... 01/01/2022 00:00:00
Ending Date ..... 01/06/2022 00:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:06:00
Wet Time Step ..... 00:05:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 20.00 sec
Variable Time Step ..... YES
Maximum Trials ..... 8
Number of Threads ..... 1
Head Tolerance ..... 0.005000 ft
  
```

\*\*\*\*\*

Rainfall File Summary

\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
L	01/01/2022	01/02/2022	5 min	241	0	0

\*\*\*\*\*

	Volume acre-feet	Depth inches
Runoff Quantity Continuity	-----	-----
Total Precipitation	4.706	6.000
Evaporation Loss	0.000	0.000
Infiltration Loss	0.647	0.825
Surface Runoff	4.317	5.505
Final Storage	0.024	0.030
Continuity Error (%)	-6.005	

\*\*\*\*\*

	Volume acre-feet	Volume 10^6 gal
Flow Routing Continuity	-----	-----
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	3.666	1.195
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	3.600	1.173
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	5.946	1.938
Final Stored Volume	6.051	1.972
Continuity Error (%)	-0.401	

\*\*\*\*\*

Highest Continuity Errors

\*\*\*\*\*

```

Node ST-13 (-3.79%)
Node ST-11 (-1.42%)
Node ST-14 (-1.36%)
  
```

# 10-YR STORM RESULTS

\*\*\*\*\*  
 Time-Step Critical Elements  
 \*\*\*\*\*  
 Link OFP-1 (96.06%)  
 Link OFP-2 (2.43%)

\*\*\*\*\*  
 Highest Flow Instability Indexes  
 \*\*\*\*\*  
 Link P-17 (51)  
 Link P-16 (19)  
 Link P-15 (16)  
 Link P-14 (14)  
 Link P-12 (14)

\*\*\*\*\*  
 Most Frequent Nonconverging Nodes  
 \*\*\*\*\*  
 Node OF-1 (0.97%)  
 Node OF-2 (0.97%)  
 Node OF-1B (0.97%)  
 Node OF-2B (0.97%)  
 Node ST-11 (0.39%)

\*\*\*\*\*  
 Routing Time Step Summary  
 \*\*\*\*\*  
 Minimum Time Step : 3.51 sec  
 Average Time Step : 9.99 sec  
 Maximum Time Step : 20.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.18  
 % of Steps Not Converging : 0.97  
 Time Step Frequencies :  
     20.000 - 9.564 sec : 46.43 %  
     9.564 - 4.573 sec : 46.25 %  
     4.573 - 2.187 sec : 7.32 %  
     2.187 - 1.046 sec : 0.00 %  
     1.046 - 0.500 sec : 0.00 %

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10 <sup>6</sup> gal	Peak Runoff CFS	Runoff Coeff
DA-15	6.00	0.00	0.00	0.40	5.78	0.22	5.99	0.01	0.55	0.999
DA-10	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.03	0.92	1.069
DA-11	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.04	1.32	1.069
DA-12	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.02	0.80	1.070
DA-13	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.03	0.99	1.069
DA-14	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.03	1.05	1.068
DA-20	6.00	0.00	0.00	0.00	6.39	0.00	6.39	0.03	1.21	1.064
DA-6	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.05	1.76	1.069
DA-17	6.00	0.00	0.00	0.00	6.34	0.00	6.34	0.06	2.14	1.056
DA-7	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.04	1.47	1.069
DA-18	6.00	0.00	0.00	0.00	6.34	0.00	6.34	0.06	2.14	1.056
DA-9	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.03	1.12	1.068
DA-8	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.04	1.57	1.069
DA-5	6.00	0.00	0.00	0.00	6.40	0.00	6.40	0.03	1.10	1.067
DA-4	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.04	1.46	1.069
DA-3	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.04	1.48	1.069
DA-2	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.03	1.13	1.069
DA-1	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.04	1.42	1.069
DA-2B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.01	0.26	1.062
DA-1B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.03	1.18	1.062
DA-20B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.01	0.39	1.062
DA-17B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.05	1.83	1.062
DA-17C	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.05	1.83	1.062
DA-18B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.05	1.83	1.062
DA-18C	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.05	1.83	1.062
DA-5B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.01	0.26	1.062
DA-8B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.04	1.30	1.062
DA-9B	6.00	0.00	0.00	0.00	6.37	0.00	6.37	0.01	0.27	1.061
DA-P1	6.00	0.00	0.00	4.25	0.00	1.79	1.79	0.05	2.61	0.299
DA-P2	6.00	0.00	0.00	4.14	0.00	1.94	1.94	0.04	2.76	0.323
DA-22	6.00	0.00	0.00	0.00	6.42	0.00	6.42	0.16	5.48	1.069
DA-21	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.08	2.81	1.068
DA-14B	6.00	0.00	0.00	0.00	6.41	0.00	6.41	0.09	3.03	1.068
DA-16	6.00	0.00	0.00	3.08	1.60	1.51	3.11	0.00	0.25	0.519



10-YR STORM RESULTS

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
ST-21	JUNCTION	1.55	3.41	11.91	0 12:11	3.40
ST-22	JUNCTION	3.04	4.12	11.12	0 12:48	4.08
OCS-1	JUNCTION	0.17	0.75	10.75	0 12:41	0.75
OCS-2	JUNCTION	0.15	0.53	10.03	0 12:47	0.53
ST-1	JUNCTION	1.32	2.83	12.03	0 12:11	2.81
ST-10	JUNCTION	1.24	2.46	11.26	0 12:11	2.27
ST-11	JUNCTION	2.04	3.13	11.13	0 12:48	3.08
ST-12	JUNCTION	2.84	3.92	11.12	0 12:36	3.88
ST-13	JUNCTION	3.64	4.72	11.12	0 12:48	4.69
ST-14	JUNCTION	4.54	5.61	11.11	0 12:48	5.59
ST-15	JUNCTION	0.94	2.17	11.27	0 12:11	1.97
ST-17	JUNCTION	1.31	3.09	12.29	0 12:11	2.38
ST-18	JUNCTION	1.31	2.83	12.03	0 12:11	2.40
ST-19	JUNCTION	2.01	3.50	12.00	0 12:11	3.11
ST-2	JUNCTION	2.21	3.70	12.00	0 12:12	3.31
ST-20	JUNCTION	2.21	3.70	12.00	0 12:11	3.31
ST-3	JUNCTION	3.11	4.30	11.70	0 12:12	4.22
ST-4	JUNCTION	4.11	5.27	11.67	0 12:36	5.22
ST-5	JUNCTION	5.01	6.15	11.65	0 12:36	6.13
ST-6	JUNCTION	3.31	4.52	11.72	0 12:11	4.40
ST-7	JUNCTION	4.11	5.26	11.66	0 12:36	5.22
ST-8	JUNCTION	1.51	2.66	11.66	0 12:48	2.62
ST-9	JUNCTION	5.01	6.15	11.65	0 12:36	6.13
ST-16	JUNCTION	1.05	2.92	11.92	0 12:11	2.89
OF-1	OUTFALL	0.16	0.75	10.59	0 12:41	0.75
OF-2	OUTFALL	0.12	0.50	9.90	0 12:47	0.50
OF-1B	OUTFALL	0.00	0.00	9.84	0 00:00	0.00
OF-2B	OUTFALL	0.00	0.00	9.40	0 00:00	0.00
POND-1	STORAGE	9.51	10.63	11.63	0 12:41	10.63
POND-2	STORAGE	9.54	10.59	11.09	0 12:47	10.59

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
ST-21	JUNCTION	2.81	3.05	0 12:11	0.0697	0.0752	0.226
ST-22	JUNCTION	5.48	7.23	0 12:11	0.132	0.208	0.207
OCS-1	JUNCTION	0.00	4.65	0 12:41	0	0.725	-0.000
OCS-2	JUNCTION	0.00	2.09	0 12:47	0	0.448	0.000
ST-1	JUNCTION	2.60	2.60	0 12:11	0.0606	0.0613	-0.246
ST-10	JUNCTION	0.92	1.47	0 12:11	0.0222	0.0379	-0.363
ST-11	JUNCTION	1.32	2.78	0 12:11	0.0318	0.0706	-1.403
ST-12	JUNCTION	0.80	3.58	0 12:11	0.0194	0.0913	-0.440
ST-13	JUNCTION	0.99	4.57	0 12:11	0.0234	0.116	-3.650
ST-14	JUNCTION	4.09	8.66	0 12:11	0.101	0.225	-1.340
ST-15	JUNCTION	0.55	0.55	0 12:11	0.0123	0.0135	-0.556
ST-17	JUNCTION	5.80	5.80	0 12:11	0.137	0.138	-0.013
ST-18	JUNCTION	5.80	5.80	0 12:11	0.137	0.139	0.055
ST-19	JUNCTION	0.00	0.14	0 12:06	0	0.00315	-1.645
ST-2	JUNCTION	1.39	3.50	0 12:05	0.0334	0.0956	0.112
ST-20	JUNCTION	1.60	1.60	0 12:11	0.0394	0.0436	0.084
ST-3	JUNCTION	1.48	4.97	0 12:05	0.0359	0.132	0.395
ST-4	JUNCTION	1.46	12.19	0 12:05	0.0351	0.305	-0.511
ST-5	JUNCTION	1.36	13.51	0 12:05	0.0331	0.34	-0.369
ST-6	JUNCTION	1.76	9.11	0 12:11	0.0424	0.221	0.048
ST-7	JUNCTION	1.47	10.58	0 12:11	0.0357	0.257	-0.084
ST-8	JUNCTION	2.87	2.87	0 12:11	0.0668	0.0675	0.017
ST-9	JUNCTION	1.39	14.85	0 12:11	0.0337	0.362	0.575
ST-16	JUNCTION	0.25	0.25	0 12:11	0.00373	0.00432	0.239
OF-1	OUTFALL	0.00	4.65	0 12:41	0	0.725	0.000
OF-2	OUTFALL	0.00	2.09	0 12:47	0	0.448	0.000
OF-1B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
OF-2B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
POND-1	STORAGE	2.61	30.96	0 12:11	0.0507	1.86	-0.049
POND-2	STORAGE	2.76	18.61	0 12:11	0.037	1.23	-0.247

# 10-YR STORM RESULTS

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
ST-21	JUNCTION	11.42	1.410	0.000
ST-22	JUNCTION	120.00	2.120	0.380
ST-1	JUNCTION	65.16	1.829	0.000
ST-10	JUNCTION	53.23	1.460	1.240
ST-11	JUNCTION	119.79	1.635	1.365
ST-12	JUNCTION	120.00	1.921	1.379
ST-13	JUNCTION	120.00	1.717	1.383
ST-14	JUNCTION	120.00	2.610	1.390
ST-15	JUNCTION	29.19	1.174	1.226
ST-17	JUNCTION	21.56	1.593	0.207
ST-18	JUNCTION	21.56	1.332	0.468
ST-19	JUNCTION	120.00	2.500	0.000
ST-2	JUNCTION	120.00	2.200	0.000
ST-20	JUNCTION	120.00	2.700	0.000
ST-3	JUNCTION	120.00	2.296	0.304
ST-4	JUNCTION	120.00	1.872	0.328
ST-5	JUNCTION	120.00	3.154	0.346
ST-6	JUNCTION	120.00	2.123	0.277
ST-7	JUNCTION	120.00	2.261	0.339
ST-8	JUNCTION	34.81	1.161	0.339
ST-9	JUNCTION	120.00	2.153	0.347
ST-16	JUNCTION	36.02	1.921	0.079

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Ponded Depth Feet
ST-21	0.38	1.29	0 12:11	0.002	0.410
ST-1	0.09	0.75	0 12:11	0.001	0.029
ST-19	0.01	0.01	0 12:11	0.000	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 ft3	Avg Pc Full	Evap Pc Loss	Exfil Pc Loss	Maximum Volume 1000 ft3	Max Pc Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POND-1	164.956	55	0	0	203.909	69	0 12:41	4.65
POND-2	113.982	65	0	0	138.909	79	0 12:47	2.09

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pc	Avg Flow CFS	Max Flow CFS	Total Volume 10^6 gal
OF-1	99.23	0.42	4.65	0.725
OF-2	99.19	0.24	2.09	0.448
OF-1B	0.00	0.00	0.00	0.000
OF-2B	0.00	0.00	0.00	0.000
System	49.61	0.67	6.71	1.173

10-YR STORM RESULTS

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CFS	Time of Max Occurrence days hr:min	Maximum  Veloc  ft/sec	Max/ Full Flow	Max/ Full Depth
P-25	CONDUIT	1.86	0 12:06	0.59	0.89	1.00
OFP-1	CONDUIT	4.65	0 12:41	4.31	0.30	0.38
OFP-2	CONDUIT	2.09	0 12:47	3.25	0.17	0.26
P-10	CONDUIT	2.87	0 12:11	1.62	0.35	1.00
P-11	CONDUIT	14.99	0 12:11	2.12	0.19	1.00
P-12	CONDUIT	1.49	0 12:11	1.90	0.61	1.00
P-13	CONDUIT	2.79	0 12:11	1.58	0.35	1.00
P-14	CONDUIT	3.59	0 12:11	1.14	0.21	1.00
P-15	CONDUIT	4.60	0 12:11	0.65	0.09	1.00
P-16	CONDUIT	8.66	0 12:11	1.23	0.11	1.00
P-17	CONDUIT	0.58	0 12:05	0.74	0.20	1.00
P-19	CONDUIT	7.22	0 12:11	2.30	0.20	1.00
P-20	CONDUIT	5.80	0 12:11	3.28	0.67	1.00
P-21	CONDUIT	5.80	0 12:11	3.28	0.74	1.00
P-22	CONDUIT	0.15	0 12:05	0.19	0.06	1.00
P-23	CONDUIT	1.68	0 12:05	2.14	0.56	1.00
P-3	CONDUIT	2.50	0 12:05	3.19	0.93	1.00
P-4	CONDUIT	3.50	0 12:05	1.98	0.37	1.00
P-5	CONDUIT	4.97	0 12:05	1.58	0.26	1.00
P-6	CONDUIT	12.15	0 12:05	1.72	0.24	1.00
P-7	CONDUIT	13.49	0 12:05	1.91	0.20	1.00
P-8	CONDUIT	9.12	0 12:11	2.90	0.53	1.00
P-9	CONDUIT	10.62	0 12:11	1.50	0.21	1.00
P-24	CONDUIT	0.25	0 12:11	0.31	0.07	1.00
OR-2	ORIFICE	0.17	0 13:30			
OR-1	ORIFICE	0.22	0 13:11			
W-1A	WEIR	3.94	0 12:41			0.38
W-2A	WEIR	1.28	0 12:47			0.84
OVER-1	WEIR	0.00	0 00:00			0.00
W-1B	WEIR	0.49	0 12:41			0.09
W-2B	WEIR	0.64	0 12:47			0.16
OVER-2	WEIR	0.00	0 00:00			0.00

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
P-25	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
OFP-1	1.00	0.00	0.00	0.00	0.57	0.43	0.00	0.00	0.03	0.00
OFP-2	1.00	0.00	0.00	0.00	0.66	0.33	0.00	0.00	0.00	0.00
P-10	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-11	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-13	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-14	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-17	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-19	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-21	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-22	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-23	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-24	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

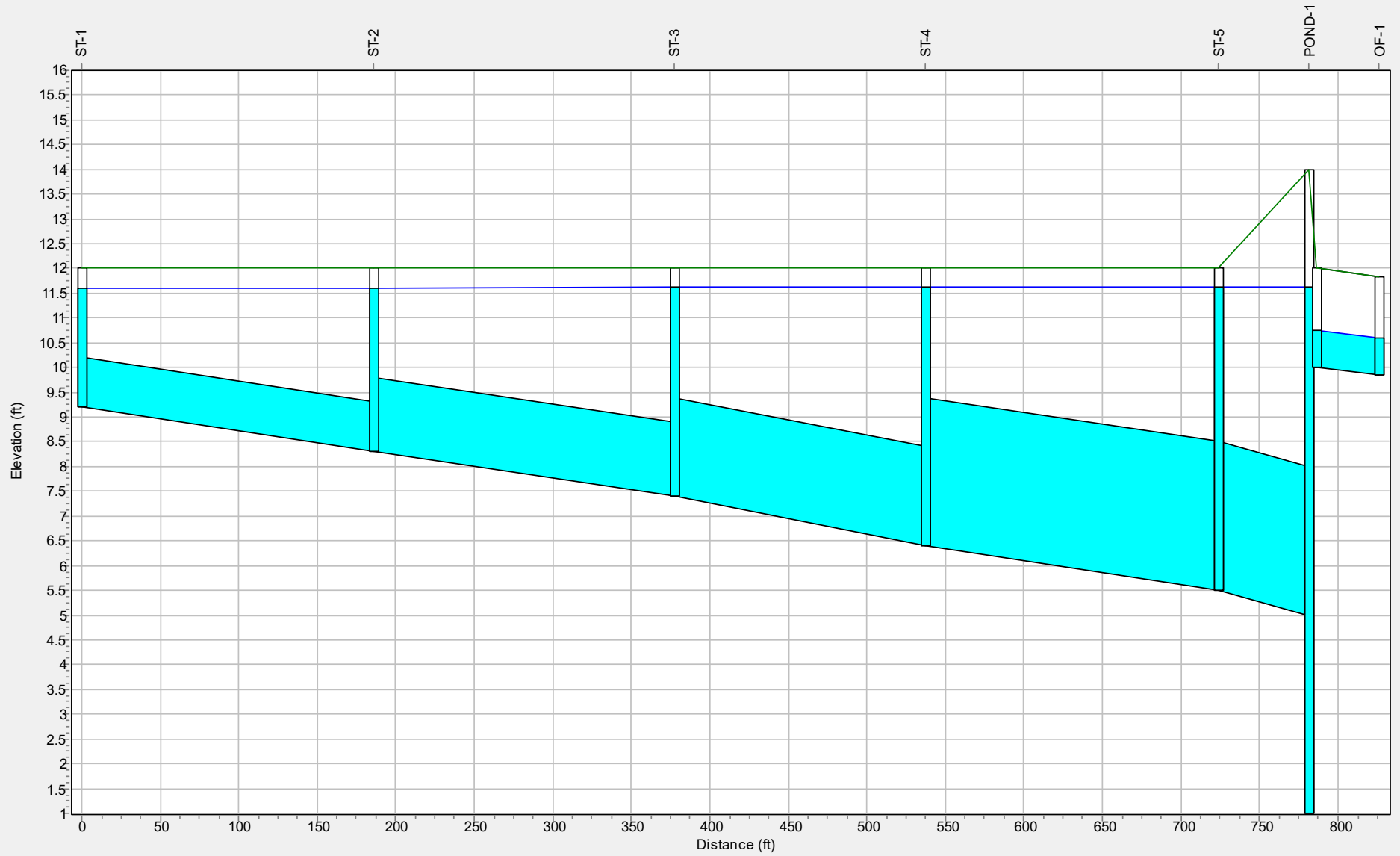
# 10-YR STORM RESULTS

\*\*\*\*\*  
 Conduit Surcharge Summary  
 \*\*\*\*\*

Conduit	Hours Full			Hours	
	----- Both Ends	Upstream	----- Dnstream	Above Full Normal Flow	Capacity Limited
P-25	11.41	11.41	120.00	0.01	0.01
P-10	34.80	34.80	120.00	0.01	0.01
P-11	120.00	120.00	120.00	0.01	0.01
P-12	53.22	53.22	120.00	0.01	0.01
P-13	119.63	119.63	120.00	0.01	0.01
P-14	120.00	120.00	120.00	0.01	0.01
P-15	120.00	120.00	120.00	0.01	0.01
P-16	120.00	120.00	120.00	0.01	0.01
P-17	29.12	29.12	53.22	0.01	0.01
P-19	120.00	120.00	120.00	0.01	0.01
P-20	21.56	21.56	120.00	0.01	0.01
P-21	21.56	21.56	120.00	0.01	0.01
P-22	120.00	120.00	120.00	0.01	0.01
P-23	120.00	120.00	120.00	0.01	0.01
P-3	65.14	65.14	120.00	0.01	0.01
P-4	120.00	120.00	120.00	0.01	0.01
P-5	120.00	120.00	120.00	0.01	0.01
P-6	120.00	120.00	120.00	0.01	0.01
P-7	120.00	120.00	120.00	0.01	0.01
P-8	120.00	120.00	120.00	0.01	0.01
P-9	120.00	120.00	120.00	0.01	0.01
P-24	36.01	36.01	119.99	0.01	0.01

Analysis begun on: Sun Jul 24 09:45:53 2022  
 Analysis ended on: Sun Jul 24 09:45:54 2022  
 Total elapsed time: 00:00:01

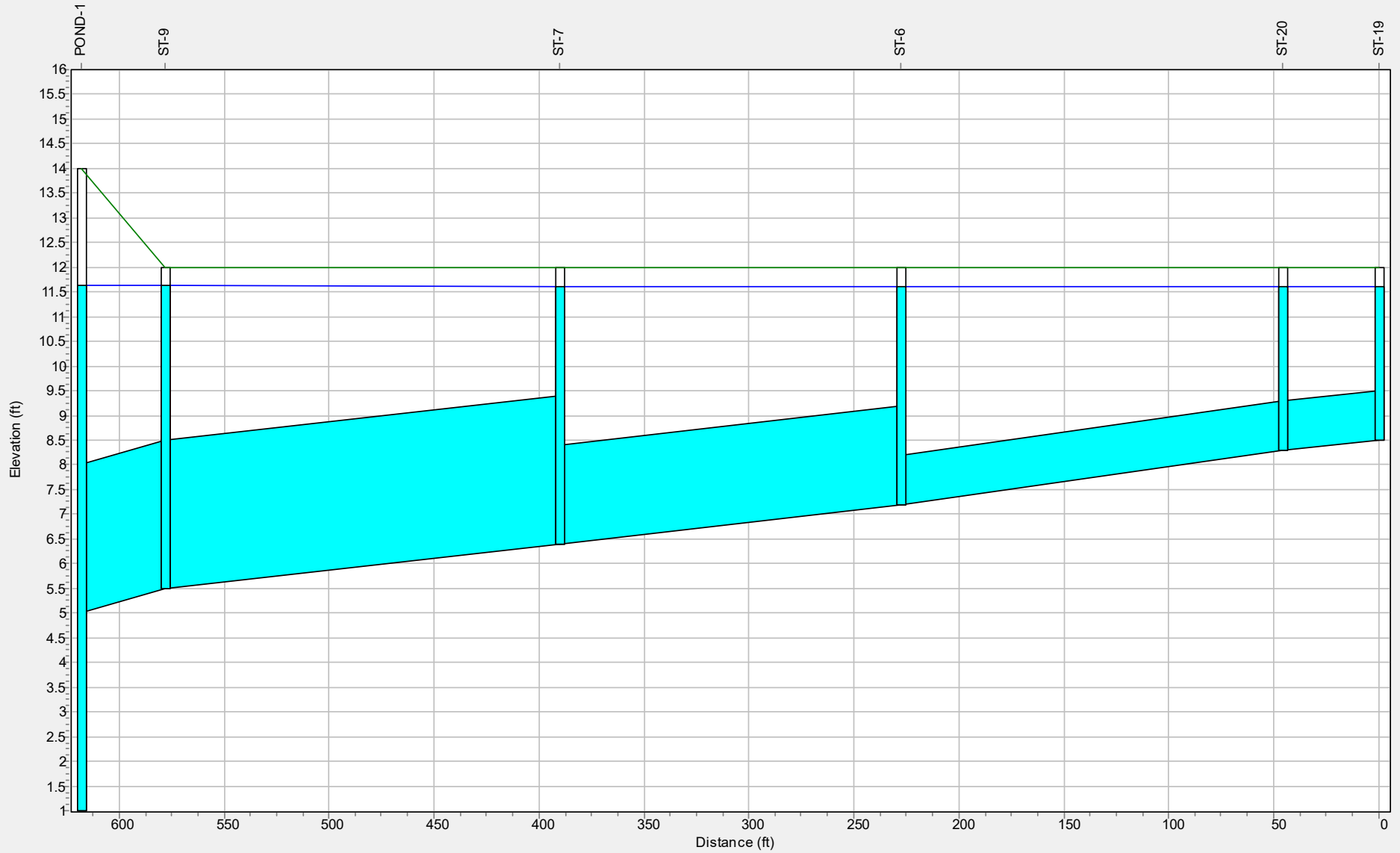
Water Elevation Profile: Node ST-1 - OF-1



01/01/2022 12:42:00

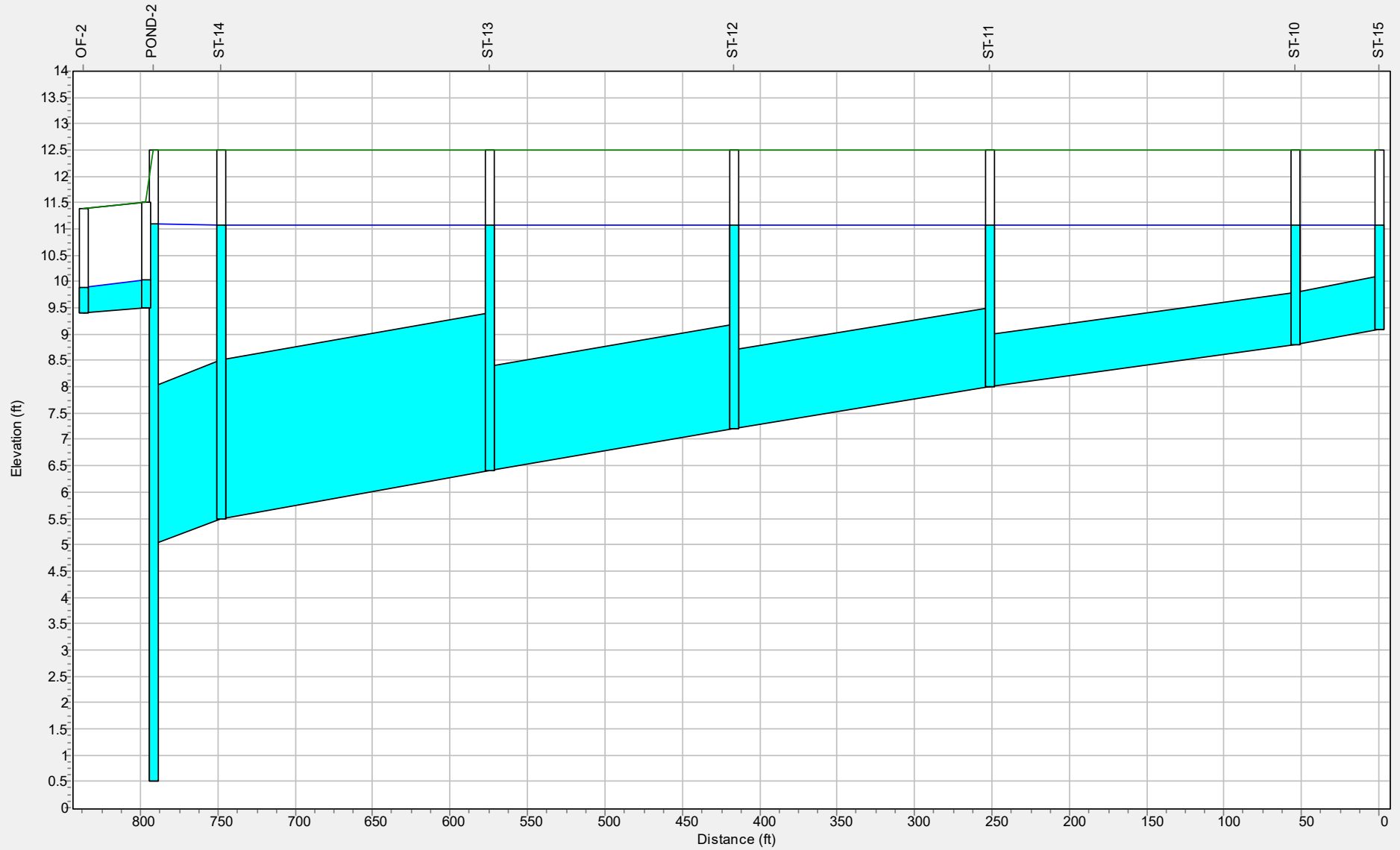


Water Elevation Profile: Node ST-19 - POND-1



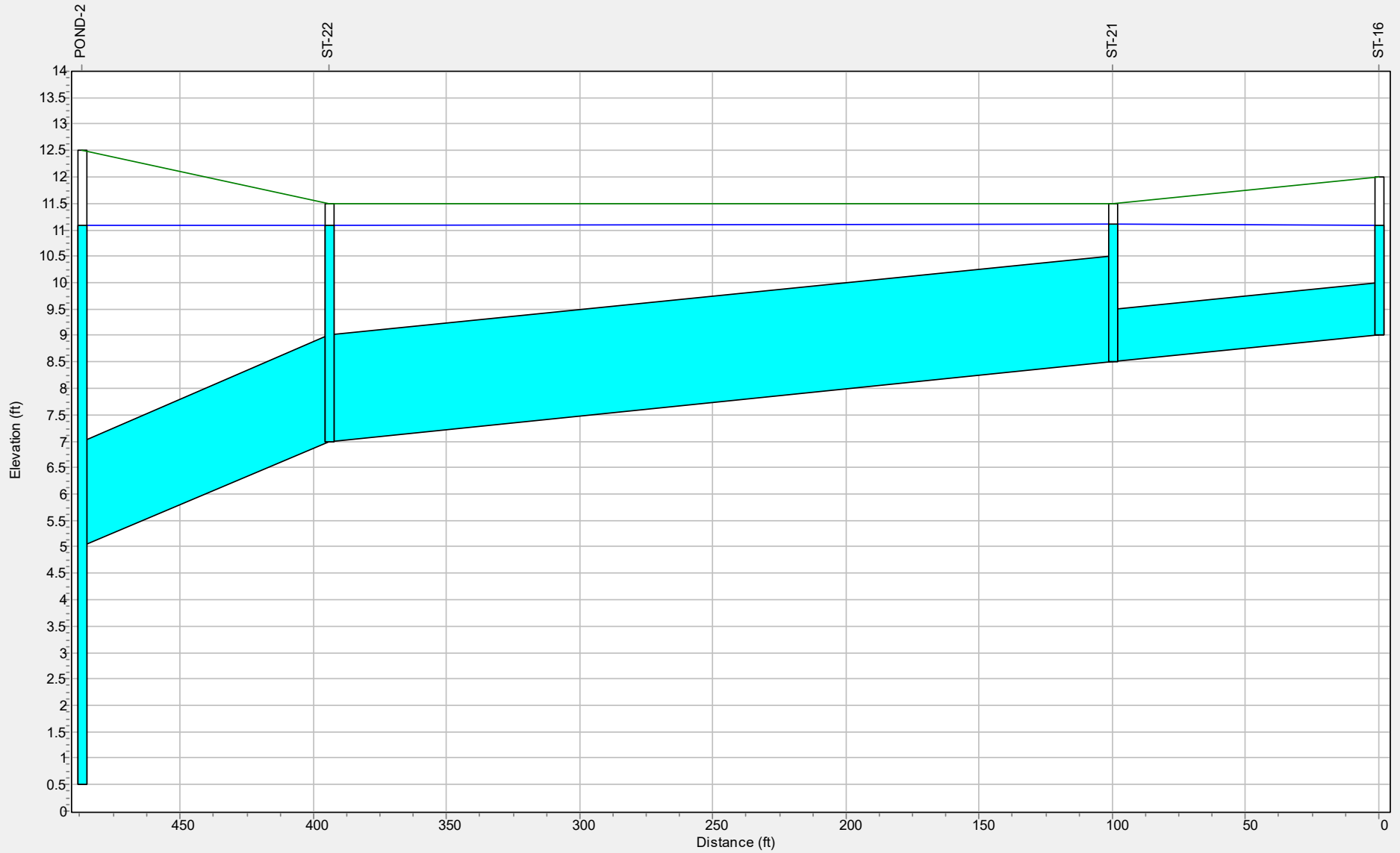
01/01/2022 12:42:00

Water Elevation Profile: Node ST-15 - OF-2



01/01/2022 12:42:00

### Water Elevation Profile: Node ST-16 - POND-2



01/01/2022 12:42:00

25-YR STORM RESULTS

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.0)

\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CFS  
Process Models:  
  Rainfall/Runoff ..... YES  
  RDII ..... NO  
  Snowmelt ..... NO  
  Groundwater ..... NO  
  Flow Routing ..... YES  
  Ponding Allowed ..... YES  
  Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Surcharge Method ..... EXTRAN  
Starting Date ..... 01/01/2022 00:00:00  
Ending Date ..... 01/06/2022 00:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:06:00  
Wet Time Step ..... 00:05:00  
Dry Time Step ..... 01:00:00  
Routing Time Step ..... 20.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.005000 ft

\*\*\*\*\*  
Rainfall File Summary  
\*\*\*\*\*

Station ID	First Date	Last Date	Recording Frequency	Periods w/Precip	Periods Missing	Periods Malfunc.
L	01/01/2022	01/02/2022	5 min	241	0	0

\*\*\*\*\*

	Volume acre-feet	Depth inches
Runoff Quantity Continuity	-----	-----
Total Precipitation .....	5.780	7.370
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.748	0.953
Surface Runoff .....	5.357	6.831
Final Storage .....	0.024	0.030
Continuity Error (%) .....	-6.023	

\*\*\*\*\*

	Volume acre-feet	Volume 10^6 gal
Flow Routing Continuity	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	4.515	1.471
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	4.447	1.449
Flooding Loss .....	0.000	0.000
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	5.946	1.938
Final Stored Volume .....	6.047	1.971
Continuity Error (%) .....	-0.324	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*  
Node ST-13 (-2.70%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*  
Link OFF-1 (96.69%)  
Link OFF-2 (2.13%)

25-YR STORM RESULTS

\*\*\*\*\*  
 Highest Flow Instability Indexes  
 \*\*\*\*\*  
 Link P-17 (50)  
 Link P-16 (19)  
 Link P-15 (16)  
 Link P-14 (14)  
 Link P-12 (13)

\*\*\*\*\*  
 Most Frequent Nonconverging Nodes  
 \*\*\*\*\*  
 Node OF-1 (0.97%)  
 Node OF-2 (0.97%)  
 Node OF-1B (0.97%)  
 Node OF-2B (0.97%)  
 Node ST-11 (0.30%)

\*\*\*\*\*  
 Routing Time Step Summary  
 \*\*\*\*\*  
 Minimum Time Step : 2.98 sec  
 Average Time Step : 9.77 sec  
 Maximum Time Step : 20.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.18  
 % of Steps Not Converging : 0.97  
 Time Step Frequencies :  
 20.000 - 9.564 sec : 44.75 %  
 9.564 - 4.573 sec : 46.13 %  
 4.573 - 2.187 sec : 9.13 %  
 2.187 - 1.046 sec : 0.00 %  
 1.046 - 0.500 sec : 0.00 %

\*\*\*\*\*  
 Subcatchment Runoff Summary  
 \*\*\*\*\*

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Imperv Runoff in	Perv Runoff in	Total Runoff in	Total Runoff 10 <sup>6</sup> gal	Peak Runoff CFS	Runoff Coeff
DA-15	7.37	0.00	0.00	0.47	7.10	0.29	7.39	0.02	0.68	1.003
DA-10	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.03	1.13	1.070
DA-11	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.05	1.62	1.070
DA-12	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.03	0.98	1.070
DA-13	7.37	0.00	0.00	0.00	7.88	0.00	7.88	0.03	1.22	1.069
DA-14	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.04	1.29	1.070
DA-20	7.37	0.00	0.00	0.00	7.86	0.00	7.86	0.04	1.49	1.067
DA-6	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.06	2.16	1.070
DA-17	7.37	0.00	0.00	0.00	7.81	0.00	7.81	0.08	2.65	1.060
DA-7	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.05	1.81	1.070
DA-18	7.37	0.00	0.00	0.00	7.81	0.00	7.81	0.08	2.65	1.060
DA-9	7.37	0.00	0.00	0.00	7.88	0.00	7.88	0.04	1.38	1.070
DA-8	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.06	1.93	1.070
DA-5	7.37	0.00	0.00	0.00	7.88	0.00	7.88	0.04	1.35	1.070
DA-4	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.05	1.80	1.070
DA-3	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.05	1.82	1.070
DA-2	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.04	1.38	1.070
DA-1	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.05	1.74	1.070
DA-2B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.01	0.32	1.061
DA-1B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.04	1.45	1.061
DA-20B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.01	0.48	1.061
DA-17B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.06	2.25	1.061
DA-17C	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.06	2.25	1.061
DA-18B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.06	2.25	1.061
DA-18C	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.06	2.25	1.061
DA-5B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.01	0.31	1.061
DA-8B	7.37	0.00	0.00	0.00	7.82	0.00	7.82	0.05	1.60	1.061
DA-9B	7.37	0.00	0.00	0.00	7.81	0.00	7.81	0.01	0.33	1.060
DA-P1	7.37	0.00	0.00	4.90	0.00	2.54	2.54	0.07	3.73	0.344
DA-P2	7.37	0.00	0.00	4.80	0.00	2.68	2.68	0.05	3.70	0.364
DA-22	7.37	0.00	0.00	0.00	7.89	0.00	7.89	0.19	6.74	1.070
DA-21	7.37	0.00	0.00	0.00	7.88	0.00	7.88	0.10	3.45	1.070
DA-14B	7.37	0.00	0.00	0.00	7.88	0.00	7.88	0.11	3.73	1.070
DA-16	7.37	0.00	0.00	3.57	1.97	2.07	4.04	0.01	0.31	0.548

25-YR STORM RESULTS

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Reported Max Depth Feet
ST-21	JUNCTION	1.59	3.68	12.18	0 12:14	3.64
ST-22	JUNCTION	3.07	4.34	11.34	0 12:36	4.29
OCS-1	JUNCTION	0.19	1.00	11.00	0 12:35	1.00
OCS-2	JUNCTION	0.17	0.76	10.26	0 12:35	0.76
ST-1	JUNCTION	1.35	2.94	12.14	0 12:11	2.93
ST-10	JUNCTION	1.28	2.95	11.75	0 12:11	2.46
ST-11	JUNCTION	2.07	3.37	11.37	0 12:30	3.28
ST-12	JUNCTION	2.87	4.14	11.34	0 12:36	4.09
ST-13	JUNCTION	3.67	4.93	11.33	0 12:35	4.90
ST-14	JUNCTION	4.57	5.83	11.33	0 12:35	5.81
ST-15	JUNCTION	0.98	2.67	11.77	0 12:11	2.16
ST-17	JUNCTION	1.35	3.31	12.51	0 12:11	2.59
ST-18	JUNCTION	1.35	3.30	12.50	0 12:11	2.60
ST-19	JUNCTION	2.05	3.57	12.07	0 12:12	3.57
ST-2	JUNCTION	2.25	3.70	12.00	0 12:24	3.50
ST-20	JUNCTION	2.25	3.75	12.05	0 12:11	3.72
ST-3	JUNCTION	3.15	4.57	11.97	0 12:24	4.42
ST-4	JUNCTION	4.15	5.53	11.93	0 12:24	5.43
ST-5	JUNCTION	5.05	6.38	11.88	0 12:30	6.36
ST-6	JUNCTION	3.35	4.76	11.96	0 12:06	4.61
ST-7	JUNCTION	4.15	5.50	11.90	0 12:30	5.43
ST-8	JUNCTION	1.55	2.89	11.89	0 12:30	2.83
ST-9	JUNCTION	5.05	6.39	11.89	0 12:36	6.37
ST-16	JUNCTION	1.09	3.21	12.21	0 12:12	3.19
OF-1	OUTFALL	0.17	1.00	10.84	0 12:35	1.00
OF-2	OUTFALL	0.14	0.73	10.13	0 12:35	0.73
OF-1B	OUTFALL	0.00	0.00	9.84	0 00:00	0.00
OF-2B	OUTFALL	0.00	0.00	9.40	0 00:00	0.00
POND-1	STORAGE	9.55	10.87	11.87	0 12:35	10.87
POND-2	STORAGE	9.57	10.81	11.31	0 12:35	10.81

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 gal	Total Inflow Volume 10^6 gal	Flow Balance Error Percent
ST-21	JUNCTION	3.45	3.73	0 12:05	0.085	0.0925	0.231
ST-22	JUNCTION	6.74	8.49	0 12:11	0.161	0.253	0.132
OCS-1	JUNCTION	0.00	7.89	0 12:35	0	0.897	0.000
OCS-2	JUNCTION	0.00	4.28	0 12:35	0	0.553	-0.000
ST-1	JUNCTION	3.19	3.19	0 12:11	0.0737	0.0741	-0.016
ST-10	JUNCTION	1.13	1.79	0 12:11	0.027	0.0451	-0.192
ST-11	JUNCTION	1.62	3.41	0 12:11	0.0387	0.0845	-0.848
ST-12	JUNCTION	0.98	4.38	0 12:11	0.0236	0.109	-0.577
ST-13	JUNCTION	1.22	5.59	0 12:11	0.0285	0.139	-2.629
ST-14	JUNCTION	5.02	10.60	0 12:05	0.124	0.269	-0.986
ST-15	JUNCTION	0.68	0.68	0 12:11	0.0151	0.0161	-0.708
ST-17	JUNCTION	7.14	7.14	0 12:11	0.167	0.168	-0.050
ST-18	JUNCTION	7.14	7.14	0 12:11	0.167	0.168	0.028
ST-19	JUNCTION	0.00	0.52	0 12:11	0	0.00369	-2.921
ST-2	JUNCTION	1.71	3.39	0 12:05	0.0407	0.115	0.056
ST-20	JUNCTION	1.97	2.21	0 12:05	0.0481	0.0527	0.057
ST-3	JUNCTION	1.82	5.20	0 12:05	0.0438	0.159	0.272
ST-4	JUNCTION	1.80	14.08	0 12:05	0.0427	0.37	-0.133
ST-5	JUNCTION	1.67	15.72	0 12:05	0.0403	0.41	-0.211
ST-6	JUNCTION	2.16	10.46	0 12:05	0.0516	0.269	-0.116
ST-7	JUNCTION	1.81	12.26	0 12:05	0.0435	0.312	0.046
ST-8	JUNCTION	3.53	3.53	0 12:11	0.0812	0.0815	0.063
ST-9	JUNCTION	1.70	17.45	0 12:05	0.041	0.436	0.056
ST-16	JUNCTION	0.31	1.26	0 12:11	0.00483	0.00641	0.260
OF-1	OUTFALL	0.00	7.89	0 12:35	0	0.897	0.000
OF-2	OUTFALL	0.00	4.28	0 12:35	0	0.553	0.000
OF-1B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
OF-2B	OUTFALL	0.00	0.00	0 00:00	0	0	0.000 gal
POND-1	STORAGE	3.73	35.56	0 12:05	0.0717	2.02	-0.005
POND-2	STORAGE	3.70	22.73	0 12:11	0.0511	1.33	-0.215



25-YR STORM RESULTS

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Feet	Min. Depth Below Rim Feet
ST-21	JUNCTION	12.60	1.676	0.000
ST-22	JUNCTION	120.00	2.336	0.164
ST-1	JUNCTION	66.67	1.944	0.000
ST-10	JUNCTION	54.72	1.947	0.753
ST-11	JUNCTION	119.83	1.875	1.125
ST-12	JUNCTION	120.00	2.141	1.159
ST-13	JUNCTION	120.00	1.933	1.167
ST-14	JUNCTION	120.00	2.829	1.171
ST-15	JUNCTION	30.49	1.667	0.733
ST-17	JUNCTION	22.74	1.815	0.000
ST-18	JUNCTION	22.75	1.800	0.000
ST-19	JUNCTION	120.00	2.565	0.000
ST-2	JUNCTION	120.00	2.200	0.000
ST-20	JUNCTION	120.00	2.752	0.000
ST-3	JUNCTION	120.00	2.575	0.025
ST-4	JUNCTION	120.00	2.131	0.069
ST-5	JUNCTION	120.00	3.384	0.116
ST-6	JUNCTION	120.00	2.364	0.036
ST-7	JUNCTION	120.00	2.497	0.103
ST-8	JUNCTION	36.15	1.395	0.105
ST-9	JUNCTION	120.00	2.385	0.115
ST-16	JUNCTION	37.39	2.207	0.000

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CFS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 gal	Maximum Poned Depth Feet
ST-21	0.68	2.03	0 12:05	0.004	0.676
ST-1	0.39	1.83	0 12:11	0.003	0.144
ST-17	0.03	0.76	0 12:11	0.000	0.015
ST-18	0.01	0.03	0 12:11	0.000	0.000
ST-19	0.13	0.52	0 12:11	0.001	0.065
ST-20	0.12	0.44	0 12:11	0.001	0.052
ST-16	0.32	1.26	0 12:11	0.002	0.207

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
POND-1	166.148	56	0	0	212.474	71	0 12:35	7.89
POND-2	114.792	65	0	0	144.448	82	0 12:35	4.28



25-YR STORM RESULTS

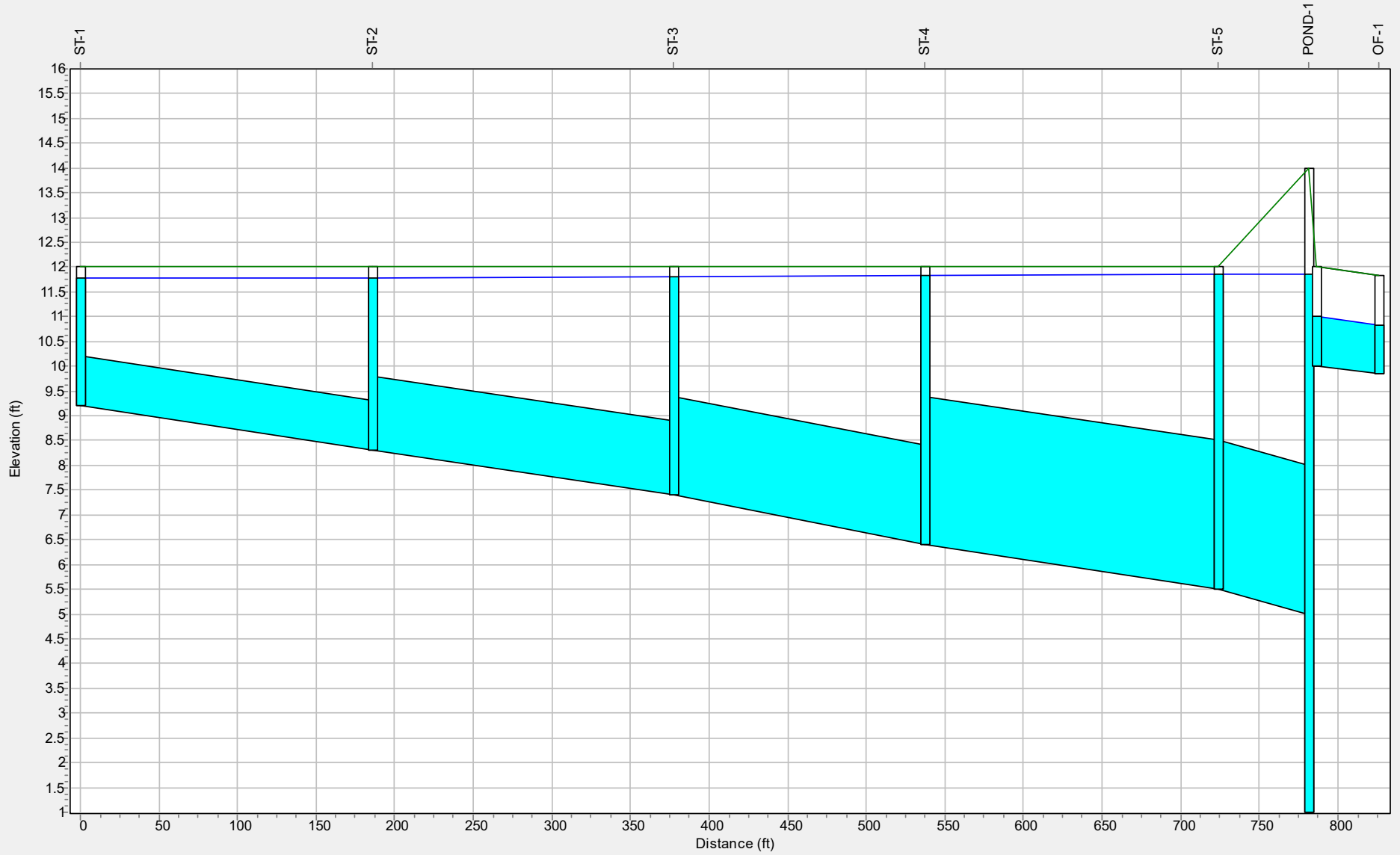
P-20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-21	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-22	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-23	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-3	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-4	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-5	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-6	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-7	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-8	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
P-24	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00

\*\*\*\*\*  
 Conduit Surcharge Summary  
 \*\*\*\*\*

Conduit	Hours Full			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
P-25	12.59	12.59	120.00	0.01	0.01
P-10	36.14	36.14	120.00	0.01	0.01
P-11	120.00	120.00	120.00	0.01	0.01
P-12	54.70	54.70	120.00	0.01	0.01
P-13	119.69	119.69	120.00	0.01	0.01
P-14	120.00	120.00	120.00	0.01	0.01
P-15	120.00	120.00	120.00	0.01	0.01
P-16	120.00	120.00	120.00	0.01	0.01
P-17	30.41	30.41	54.70	0.01	0.01
P-19	120.00	120.00	120.00	0.01	0.01
P-20	22.74	22.74	120.00	0.01	0.01
P-21	22.75	22.75	120.00	0.01	0.01
P-22	120.00	120.00	120.00	0.01	0.01
P-23	120.00	120.00	120.00	0.01	0.01
P-3	66.65	66.65	120.00	0.01	0.01
P-4	120.00	120.00	120.00	0.01	0.01
P-5	120.00	120.00	120.00	0.01	0.01
P-6	120.00	120.00	120.00	0.01	0.01
P-7	120.00	120.00	120.00	0.01	0.01
P-8	120.00	120.00	120.00	0.01	0.01
P-9	120.00	120.00	120.00	0.01	0.01
P-24	37.39	37.39	119.99	0.01	0.01

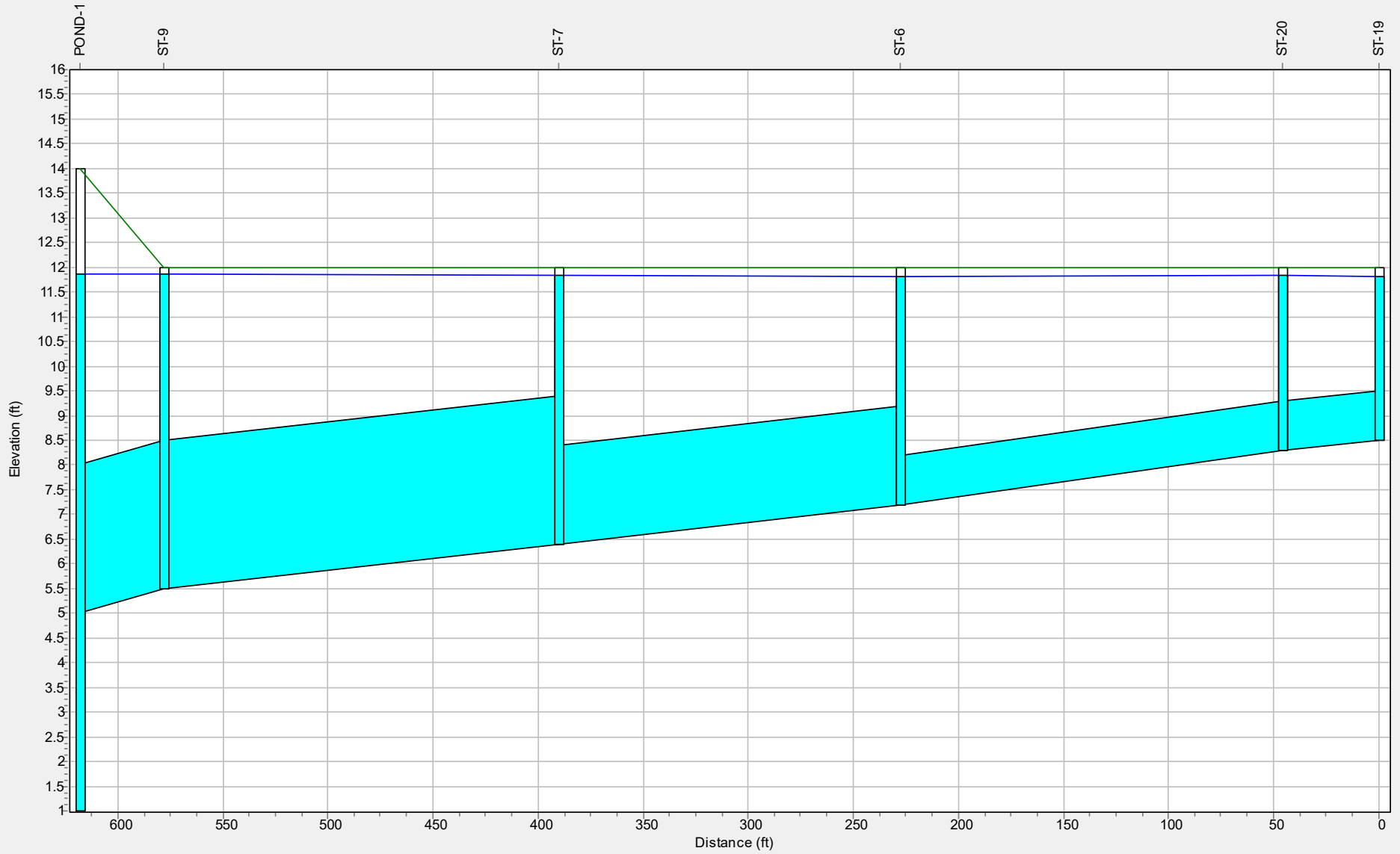
Analysis begun on: Sun Jul 24 09:50:06 2022  
 Analysis ended on: Sun Jul 24 09:50:07 2022  
 Total elapsed time: 00:00:01

Water Elevation Profile: Node ST-1 - OF-1



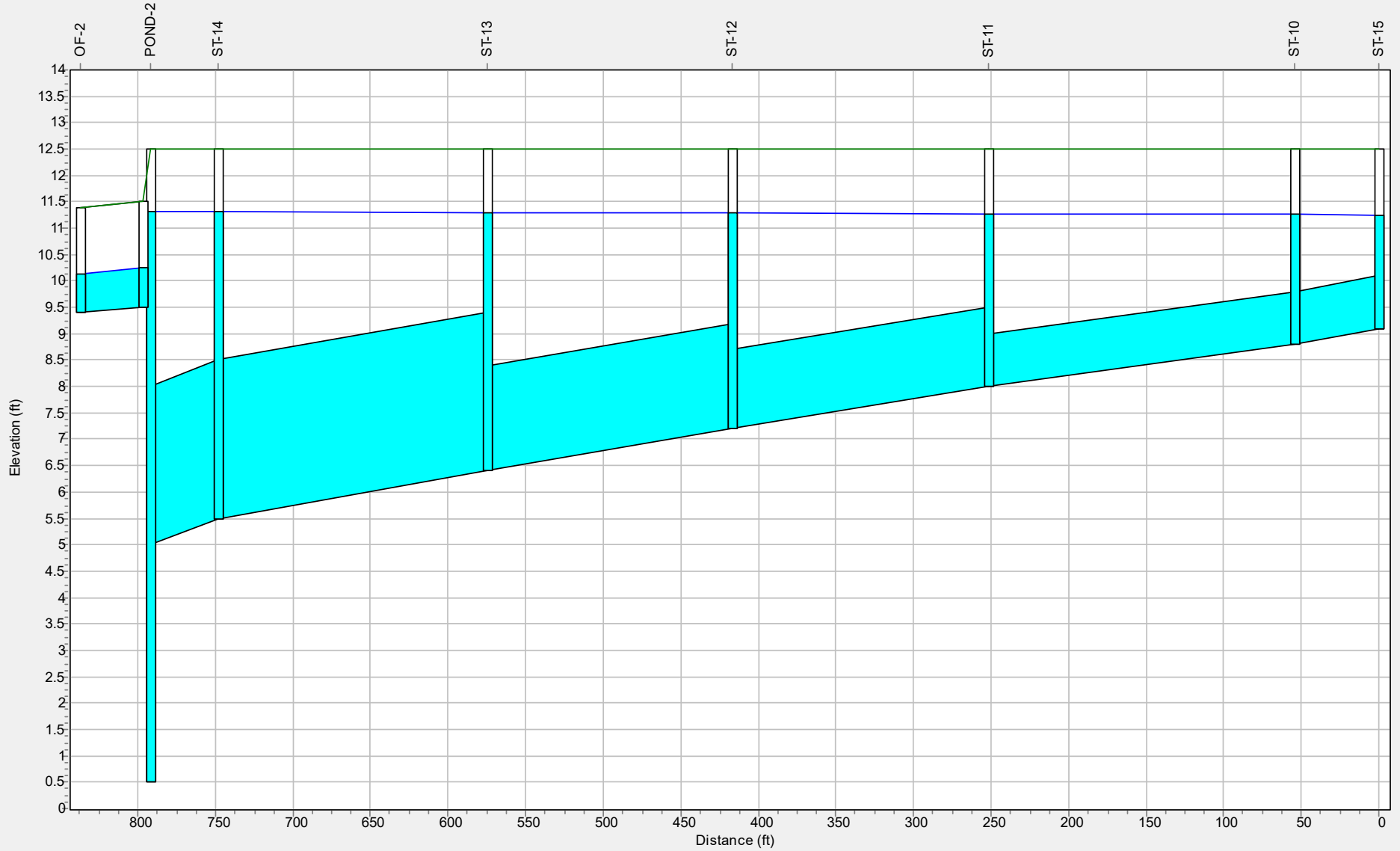
01/01/2022 12:36:00

Water Elevation Profile: Node ST-19 - POND-1



01/01/2022 12:36:00

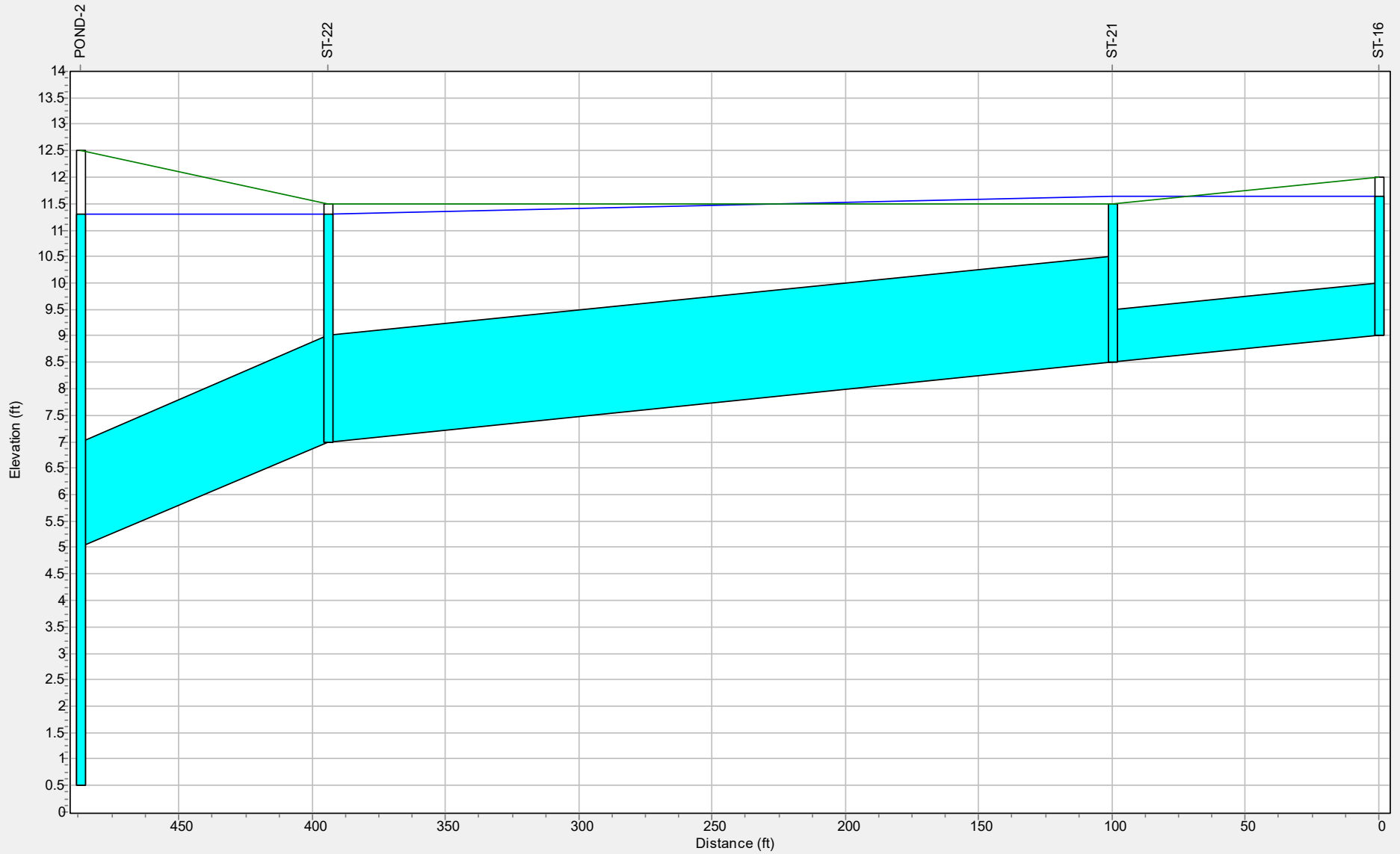
### Water Elevation Profile: Node ST-15 - OF-2



01/01/2022 12:36:00



Water Elevation Profile: Node ST-16 - POND-2



01/01/2022 12:36:00

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Storm Data

Rainfall Depth by Rainfall Return Period

1-Yr (in)	1.5-Yr (in)	2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	100-Yr (in)
1.0	1.5	4.0	5.0	6.0	7.37	9.9

Storm Data Source: User-provided custom storm data  
Rainfall Distribution Type: Type III  
Dimensionless Unit Hydrograph: <standard>

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Hydrograph Peak/Peak Time Table

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

-----  
SUBAREAS

Post Undet	.00	1.43	2.61	3.94	5.93	9.93
n/a	12.13	12.13	12.13	12.12	12.12	

REACHES

OUTLET	.00	1.43	2.61	3.94	5.93	9.93
--------	-----	------	------	------	------	------

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
-----							
Post Undet SHEET	50	0.0100	0.150				0.111
						Time of Concentration	.111 =====

BLR

22012  
Pinnacle Storage Grandy  
Currituck NOAA-C County, North Carolina

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
Post Undet	Open space; grass cover > 75%	(good) B	1.96	61
Total Area / Weighted Curve Number			1.96 ====	61 ==

Pre-Development			
Storm	Drainage Area Runoff (cfs)		
	West	East	Total*
1.5"	0.00	0.00	<b>0.00</b>
2-YR	4.14	1.06	<b>5.19</b>
5-YR	6.94	2.38	<b>9.31</b>
10-YR	10.04	4.04	<b>14.07</b>
25-YR	14.59	6.66	<b>21.22</b>
100-YR	23.53	12.18	<b>35.61</b>

Post-Development				
Storm	Drainage Area Runoff (cfs)			
	Pond 1**	Pond 2**	Undet.	Total
1.5"	0.15	0.10	0	<b>0.25</b>
2-YR	1.63	0.59	1.43	<b>3.65</b>
5-YR	2.68	1.01	2.61	<b>6.30</b>
10-YR	4.69	2.00	3.94	<b>10.63</b>
25-YR	7.90	4.08	5.93	<b>17.91</b>
100-YR	14.69	10.10	9.93	<b>34.72</b>

Pre-dev rates reference WinTR-55 data provided in this Appendix.  
 Post-dev rates reference SWMM model data (ponds) and TR-55 data (undetained flow) provided in this Appendix.

\* Total pre-development discharge reflects WinTR-55 totals accounting for peak staggering. Post-development totals, conservatively, do not take this into account.

\*\* SWMM maximum flow rate total for link OFP-1 (outfall discharge pipe) + OVER-1 (overflow weir) for Pond 1, or OFP-2 + OVER-2 for Pond 2.

# APPENDIX B

---

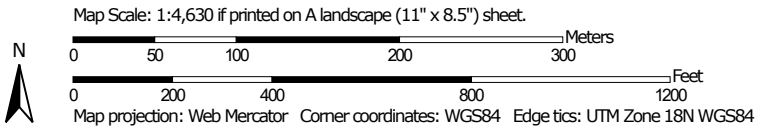
**USDA NRCS WEB SOIL SURVEY DATA**



Hydrologic Soil Group—Currituck County, North Carolina




Soil Map may not be valid at this scale.




## MAP LEGEND

### Area of Interest (AOI)









 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons





 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines


 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available


### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

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

Soil Survey Area: Currituck County, North Carolina  
 Survey Area Data: Version 21, Jan 21, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Oct 19, 2017

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

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Mu	Munden loamy sand	B	30.5	72.1%
No	Nimmo loamy sand	A/D	8.8	20.8%
Pt	Portsmouth fine sandy loam	B/D	3.0	7.1%
<b>Totals for Area of Interest</b>			<b>42.3</b>	<b>100.0%</b>

### Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# APPENDIX C

---

**USGS QUAD MAP**

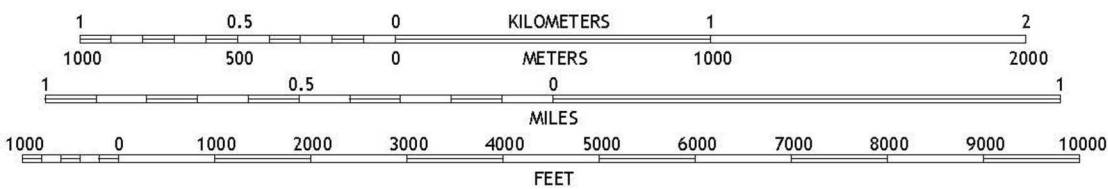


# QUAD MAP SITE LOCATION FOR PINNACLE STORAGE GRANDY



QUADRANGLE LOCATION

SCALE 1:24 000



CONTOUR INTERVAL 5 FEET  
NORTH AMERICAN VERTICAL DATUM OF 1988

1	2	
3	4	
5	6	7

- 1 Coinjock
- 2 Mossey Islands
- 3 Camden Point
- 4 Martin Point
- 5 Albemarle Sound 2
- 6 Point Harbor
- 7 Kitty Hawk

ADJOINING QUADRANGLES

# APPENDIX D

---

**FEMA FIRMETTE**



# National Flood Hazard Layer FIRMMette



75°52'28"W 36°13'19"N



## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

- |                                    |  |  |
|------------------------------------|--|--|
| <b>SPECIAL FLOOD HAZARD AREAS</b>  |  | Without Base Flood Elevation (BFE)<br><i>Zone A, V, A99</i>  |
|                                    |  | With BFE or Depth <i>Zone AE, AO, AH, VE, AR</i>   |
|                                    |  | Regulatory Floodway  |
| <b>OTHER AREAS OF FLOOD HAZARD</b> |  | 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile <i>Zone X</i> |
|                                    |  | Future Conditions 1% Annual Chance Flood Hazard <i>Zone X</i>  |
|                                    |  | Area with Reduced Flood Risk due to Levee. See Notes. <i>Zone X</i>  |
|                                    |  | Area with Flood Risk due to Levee <i>Zone D</i>  |
| <b>OTHER AREAS</b>                 |  | NO SCREEN Area of Minimal Flood Hazard <i>Zone X</i>   |
|                                    |  | Effective LOMRs  |
| <b>GENERAL STRUCTURES</b>          |  | Area of Undetermined Flood Hazard <i>Zone D</i>  |
|                                    |  | Channel, Culvert, or Storm Sewer   |
|                                    |  | Levee, Dike, or Floodwall  |
| <b>OTHER FEATURES</b>              |  | 20.2 Cross Sections with 1% Annual Chance Water Surface Elevation  |
|                                    |  | 17.5 Coastal Transect  |
|                                    |  | Base Flood Elevation Line (BFE)  |
|                                    |  | Limit of Study   |
|                                    |  | Jurisdiction Boundary  |
|                                    |  | Coastal Transect Baseline  |
| <b>MAP PANELS</b>                  |  | Digital Data Available   |
|                                    |  | No Digital Data Available  |
|                                    |  | Unmapped   |
|                                    |  | The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.                                     |



75°51'51"W 36°12'50"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/8/2022 at 9:57 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# APPENDIX E

---

## PRECIPITATION DATA



**NOAA Atlas 14, Volume 2, Version 3**  
**Location name: Grandy, North Carolina, USA\***  
**Latitude: 36.2185°, Longitude: -75.8694°**  
**Elevation: 12.17 ft\*\***



\* source: ESRI Maps  
 \*\* source: USGS

**POINT PRECIPITATION FREQUENCY ESTIMATES**

G.M. Bonnin, D. Martin, B. Lin, T. Parzybok, M.Yekta, and D. Riley

NOAA, National Weather Service, Silver Spring, Maryland

[PF tabular](#) | [PF graphical](#) | [Maps & aerials](#)

**PF tabular**

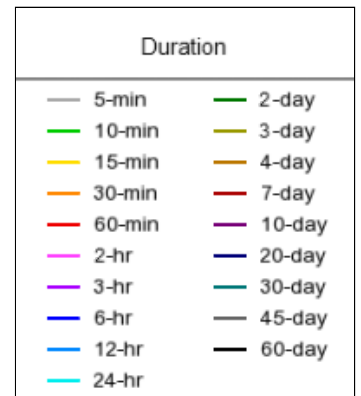
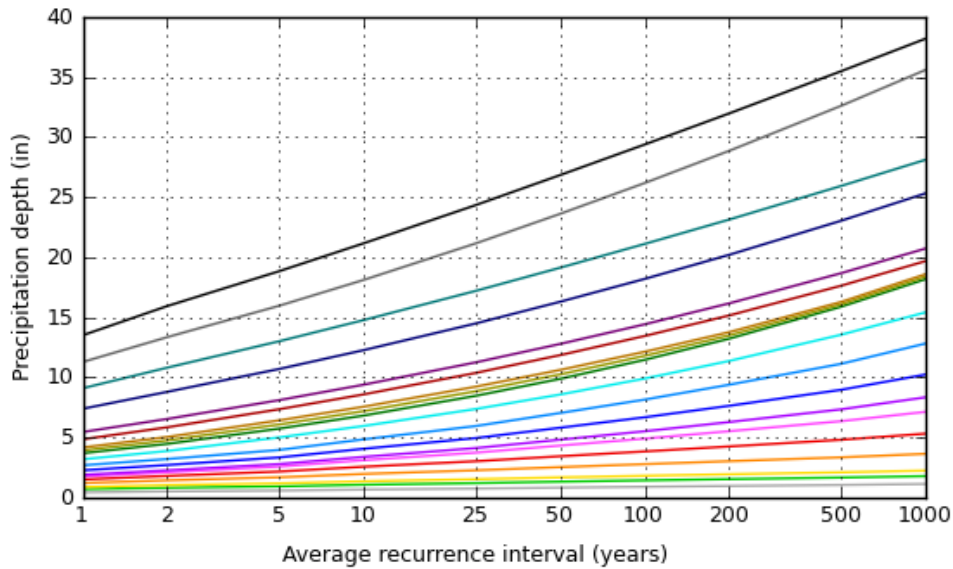
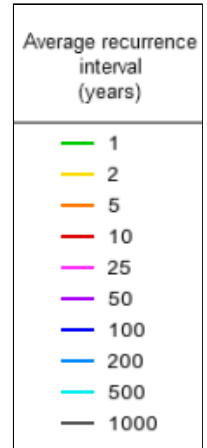
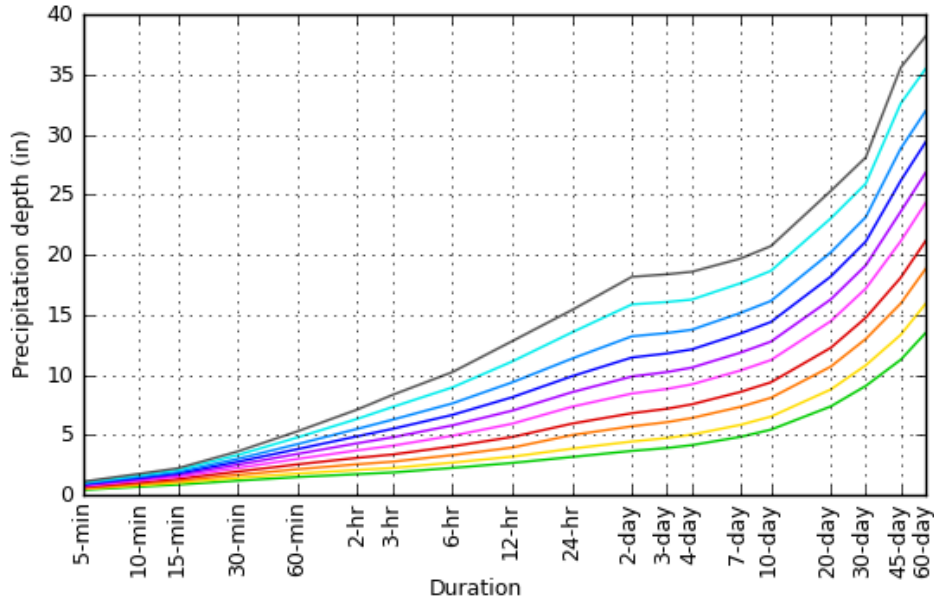
<b>PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)<sup>1</sup></b>										
<b>Duration</b>	<b>Average recurrence interval (years)</b>									
	<b>1</b>	<b>2</b>	<b>5</b>	<b>10</b>	<b>25</b>	<b>50</b>	<b>100</b>	<b>200</b>	<b>500</b>	<b>1000</b>
<b>5-min</b>	<b>0.445</b> (0.405-0.491)	<b>0.520</b> (0.473-0.572)	<b>0.589</b> (0.537-0.648)	<b>0.675</b> (0.612-0.741)	<b>0.761</b> (0.686-0.834)	<b>0.837</b> (0.753-0.918)	<b>0.907</b> (0.812-0.995)	<b>0.976</b> (0.868-1.07)	<b>1.06</b> (0.934-1.16)	<b>1.14</b> (0.997-1.25)
<b>10-min</b>	<b>0.711</b> (0.647-0.785)	<b>0.832</b> (0.757-0.915)	<b>0.944</b> (0.859-1.04)	<b>1.08</b> (0.979-1.19)	<b>1.21</b> (1.09-1.33)	<b>1.33</b> (1.20-1.46)	<b>1.44</b> (1.29-1.58)	<b>1.55</b> (1.38-1.70)	<b>1.68</b> (1.48-1.84)	<b>1.80</b> (1.57-1.97)
<b>15-min</b>	<b>0.889</b> (0.809-0.981)	<b>1.05</b> (0.951-1.15)	<b>1.19</b> (1.09-1.31)	<b>1.37</b> (1.24-1.50)	<b>1.54</b> (1.39-1.69)	<b>1.69</b> (1.52-1.85)	<b>1.82</b> (1.63-2.00)	<b>1.95</b> (1.74-2.14)	<b>2.11</b> (1.86-2.31)	<b>2.25</b> (1.97-2.48)
<b>30-min</b>	<b>1.22</b> (1.11-1.35)	<b>1.44</b> (1.31-1.59)	<b>1.70</b> (1.54-1.86)	<b>1.98</b> (1.79-2.17)	<b>2.28</b> (2.05-2.50)	<b>2.54</b> (2.29-2.79)	<b>2.79</b> (2.50-3.06)	<b>3.04</b> (2.70-3.33)	<b>3.36</b> (2.96-3.68)	<b>3.65</b> (3.19-4.01)
<b>60-min</b>	<b>1.52</b> (1.38-1.68)	<b>1.81</b> (1.65-1.99)	<b>2.17</b> (1.98-2.39)	<b>2.58</b> (2.34-2.83)	<b>3.03</b> (2.73-3.32)	<b>3.45</b> (3.10-3.78)	<b>3.85</b> (3.44-4.21)	<b>4.26</b> (3.79-4.67)	<b>4.81</b> (4.25-5.28)	<b>5.33</b> (4.66-5.86)
<b>2-hr</b>	<b>1.76</b> (1.59-1.96)	<b>2.11</b> (1.91-2.34)	<b>2.58</b> (2.33-2.86)	<b>3.12</b> (2.81-3.44)	<b>3.74</b> (3.36-4.12)	<b>4.33</b> (3.86-4.76)	<b>4.91</b> (4.36-5.40)	<b>5.53</b> (4.88-6.08)	<b>6.36</b> (5.57-7.01)	<b>7.14</b> (6.19-7.87)
<b>3-hr</b>	<b>1.90</b> (1.71-2.12)	<b>2.28</b> (2.05-2.53)	<b>2.80</b> (2.52-3.11)	<b>3.40</b> (3.05-3.77)	<b>4.12</b> (3.68-4.57)	<b>4.82</b> (4.28-5.33)	<b>5.52</b> (4.88-6.10)	<b>6.29</b> (5.51-6.93)	<b>7.34</b> (6.37-8.10)	<b>8.35</b> (7.17-9.21)
<b>6-hr</b>	<b>2.28</b> (2.06-2.54)	<b>2.72</b> (2.46-3.03)	<b>3.35</b> (3.02-3.73)	<b>4.07</b> (3.66-4.52)	<b>4.95</b> (4.43-5.49)	<b>5.82</b> (5.17-6.43)	<b>6.69</b> (5.91-7.38)	<b>7.64</b> (6.69-8.42)	<b>8.97</b> (7.76-9.89)	<b>10.2</b> (8.77-11.3)
<b>12-hr</b>	<b>2.69</b> (2.42-3.02)	<b>3.21</b> (2.89-3.60)	<b>3.97</b> (3.56-4.44)	<b>4.85</b> (4.34-5.42)	<b>5.96</b> (5.29-6.63)	<b>7.04</b> (6.21-7.82)	<b>8.16</b> (7.13-9.05)	<b>9.39</b> (8.12-10.4)	<b>11.1</b> (9.48-12.3)	<b>12.8</b> (10.8-14.2)
<b>24-hr</b>	<b>3.19</b> (2.94-3.48)	<b>3.88</b> (3.58-4.24)	<b>5.01</b> (4.61-5.47)	<b>5.96</b> (5.47-6.50)	<b>7.37</b> (6.71-8.01)	<b>8.58</b> (7.74-9.32)	<b>9.90</b> (8.86-10.7)	<b>11.4</b> (10.1-12.4)	<b>13.6</b> (11.8-14.8)	<b>15.4</b> (13.2-16.9)
<b>2-day</b>	<b>3.70</b> (3.39-4.04)	<b>4.47</b> (4.11-4.90)	<b>5.74</b> (5.27-6.28)	<b>6.83</b> (6.25-7.45)	<b>8.46</b> (7.68-9.22)	<b>9.88</b> (8.89-10.7)	<b>11.5</b> (10.2-12.5)	<b>13.2</b> (11.6-14.4)	<b>15.9</b> (13.7-17.4)	<b>18.2</b> (15.4-20.0)
<b>3-day</b>	<b>3.93</b> (3.63-4.29)	<b>4.76</b> (4.39-5.20)	<b>6.09</b> (5.61-6.63)	<b>7.20</b> (6.61-7.83)	<b>8.85</b> (8.06-9.61)	<b>10.3</b> (9.27-11.1)	<b>11.8</b> (10.6-12.8)	<b>13.5</b> (11.9-14.7)	<b>16.1</b> (14.0-17.6)	<b>18.4</b> (15.7-20.2)
<b>4-day</b>	<b>4.17</b> (3.86-4.54)	<b>5.05</b> (4.68-5.50)	<b>6.43</b> (5.94-6.99)	<b>7.57</b> (6.97-8.21)	<b>9.23</b> (8.43-10.0)	<b>10.6</b> (9.64-11.5)	<b>12.1</b> (10.9-13.2)	<b>13.8</b> (12.2-15.0)	<b>16.3</b> (14.2-17.8)	<b>18.6</b> (16.0-20.4)
<b>7-day</b>	<b>4.86</b> (4.50-5.26)	<b>5.85</b> (5.43-6.35)	<b>7.35</b> (6.81-7.97)	<b>8.59</b> (7.93-9.30)	<b>10.4</b> (9.52-11.2)	<b>11.9</b> (10.8-12.8)	<b>13.4</b> (12.2-14.6)	<b>15.2</b> (13.6-16.5)	<b>17.6</b> (15.5-19.2)	<b>19.7</b> (17.1-21.6)
<b>10-day</b>	<b>5.46</b> (5.10-5.87)	<b>6.55</b> (6.12-7.04)	<b>8.11</b> (7.56-8.72)	<b>9.40</b> (8.74-10.1)	<b>11.2</b> (10.4-12.1)	<b>12.8</b> (11.8-13.7)	<b>14.4</b> (13.1-15.5)	<b>16.2</b> (14.6-17.4)	<b>18.7</b> (16.6-20.3)	<b>20.7</b> (18.2-22.6)
<b>20-day</b>	<b>7.39</b> (6.95-7.88)	<b>8.80</b> (8.27-9.39)	<b>10.7</b> (10.0-11.4)	<b>12.3</b> (11.5-13.1)	<b>14.5</b> (13.5-15.4)	<b>16.3</b> (15.1-17.4)	<b>18.2</b> (16.7-19.4)	<b>20.2</b> (18.4-21.6)	<b>23.0</b> (20.7-24.8)	<b>25.3</b> (22.4-27.4)
<b>30-day</b>	<b>9.10</b> (8.58-9.67)	<b>10.8</b> (10.2-11.5)	<b>13.0</b> (12.3-13.8)	<b>14.8</b> (13.9-15.7)	<b>17.2</b> (16.1-18.3)	<b>19.1</b> (17.8-20.3)	<b>21.1</b> (19.5-22.5)	<b>23.1</b> (21.3-24.7)	<b>25.9</b> (23.6-27.9)	<b>28.1</b> (25.4-30.3)
<b>45-day</b>	<b>11.3</b> (10.6-12.0)	<b>13.3</b> (12.6-14.2)	<b>16.0</b> (15.0-17.0)	<b>18.1</b> (17.0-19.2)	<b>21.1</b> (19.8-22.5)	<b>23.6</b> (21.9-25.1)	<b>26.2</b> (24.2-27.9)	<b>28.8</b> (26.4-30.8)	<b>32.6</b> (29.5-34.9)	<b>35.6</b> (31.9-38.3)
<b>60-day</b>	<b>13.5</b> (12.8-14.3)	<b>15.9</b> (15.1-16.9)	<b>18.8</b> (17.8-19.9)	<b>21.2</b> (20.0-22.4)	<b>24.3</b> (22.9-25.8)	<b>26.8</b> (25.1-28.4)	<b>29.4</b> (27.4-31.2)	<b>32.0</b> (29.6-34.0)	<b>35.5</b> (32.5-37.9)	<b>38.2</b> (34.7-41.0)

<sup>1</sup> Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

[Back to Top](#)

**PF graphical**

PDS-based depth-duration-frequency (DDF) curves  
 Latitude: 36.2185°, Longitude: -75.8694°

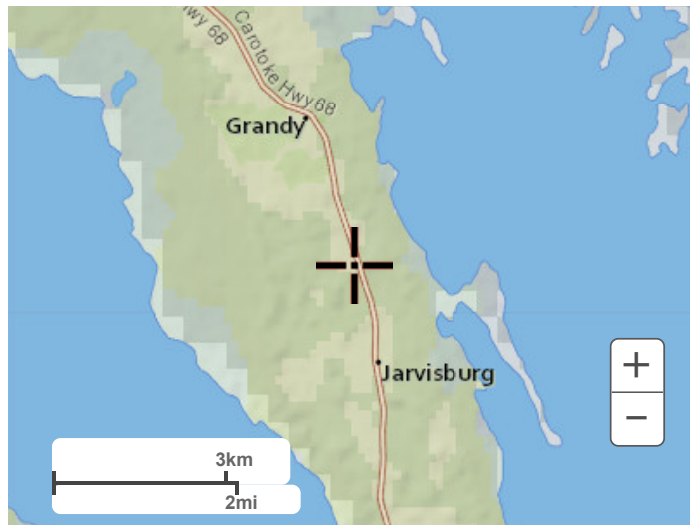


[Back to Top](#)

**Maps & aerials**

**Small scale terrain**





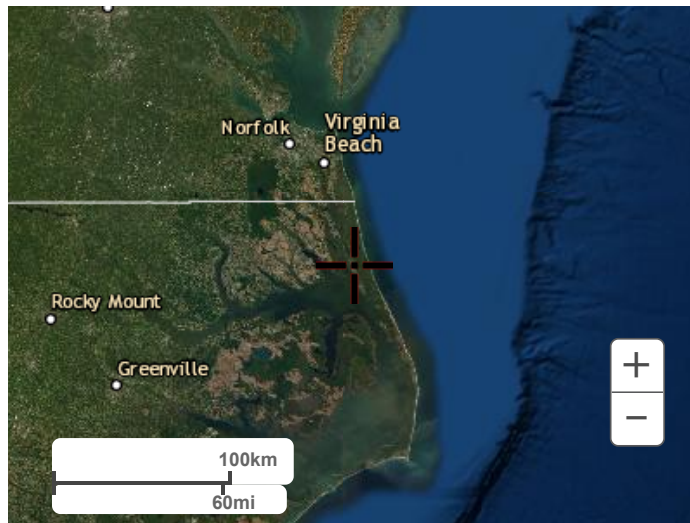
Large scale terrain



Large scale map



Large scale aerial



[Back to Top](#)

---

[US Department of Commerce](#)  
[National Oceanic and Atmospheric Administration](#)  
[National Weather Service](#)  
[National Water Center](#)  
1325 East West Highway  
Silver Spring, MD 20910  
Questions?: [HDSC.Questions@noaa.gov](mailto:HDSC.Questions@noaa.gov)

[Disclaimer](#)

# APPENDIX F

---

## **CURRENT PROPERTY DEED**

TRANSFER TAX AMOUNT 13,400.00 AK  
DATE/COLLECTOR 5-11-2005 AKS

Doc ID: 000890510003 Type: CRP  
Recorded: 05/11/2005 at 04:05:45 PM  
Fee Amt: \$16,100.00 Page 1 of 3  
Excise Tax: \$2,680.00  
Currituck County, NC  
Charlene Y Dowdy Register of Deeds  
BK **864** PG **279-281**

501

Tax Collector Certification That No Delinquent Taxes  
Are Due, Date 5-11-05 By AKS: Certification  
expires Jan. 6<sup>th</sup> of the year following certification date.

**NORTH CAROLINA GENERAL WARRANTY DEED**

Excise Tax: \$ 2,680.00

Parcel Identifier No. 0108-006-052F-0000 Verified by \_\_\_\_\_ County on the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_  
By: \_\_\_\_\_

Mail/Box to: John A. Mauney, Attorney at Law

This instrument was prepared by: Wheless & Wheless, PLLC, 101 S. Virginia Dare Road, Manteo, NC 27954

Brief description for the Index: LT 45 ACRES, CARATOKE HWY, JARVISBURG, NC,

THIS DEED made this 2nd day of May, 2005, by and between

**GRANTOR**

Grange, LLC  
A Florida Limited Liability Company  
P.O. Box 1909  
Manteo, NC 27954

**GRANTEE**

Robert F. Harrell and wife,  
Deloris U. Harrell and  
Fred D. Suter and wife,  
Terry D. Suter  
Post Office Drawer 758  
Nags Head, NC 27959

The designation Grantor and Grantee as used herein shall include said parties, their heirs, successors, and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH, that the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey unto the Grantee in fee simple, all that certain lot or parcel of land situated in the City of Jarvisburg, \_\_\_\_\_ Township, Currituck County, North Carolina and more particularly described as follows:

See attached Exhibit "A"

The property hereinabove described was acquired by Grantor by instrument recorded in Book 492 page 894.

A map showing the above described property is recorded in Plat Book PC H page 248.

NC Bar Association Form No. L-3 © 1976, Revised © 1977, 2002  
Printed by Agreement with the NC Bar Association - 1981 SoftPro Corporation, 333 E. Six Forks Rd., Raleigh, NC 27609



## Exhibit "A"

BEGINNING at an existing monument, a control corner, located in the Western edge of that 120' right of way of US highway 158, said point being located South 13 deg. 32 min. 32 sec. West 242.42 feet from a PK nail located in the 120' right of way of US Highway 158, said point also marking the North East corner of lands now or formerly owned by Lawrence L. Futz, Jr.; running thence along the Northern line of the Futz property and properties owned now or formerly by Gilbert Kuper and Margaret J. Shope, South 67 deg. 43 min. 18 sec. West 2,521.77 feet to existing monument located in the Eastern line of property now or formerly owned by the C.C. Garrenton Heirs, thence proceeding North 20 deg. 48 min. 15 sec. West 71.11 feet to an existing monument located in the South East corner of properties now or formerly owned by Lloyd Joseph Smith and proceeding along the Eastern line of properties now or formerly owned by Lloyd Joseph Smith and Robin S. Edmonson, North 26 deg. 32 min. 44 sec. West 382.80 feet to existing monument located in the southeast corner of lands now or formerly owned by Michael Wayne Willis; thence proceeding along the eastern line of the Willis lands and the lands now or formerly owned by Timothy E. Leahey, North 06 deg. 04 min. 04 sec. East 371.29 feet to existing monument thence proceeding the following courses and distances along the Eastern line of properties now or formerly owned by Donnie Ashworth and properties now or formerly owned by Raymond J. Moore, North 06 deg. 13 min. 55 sec. East 51.44 feet to an existing monument, thence North 05 deg. 39 min. 38 sec. East 67.58 feet to existing monument thence North 00 deg. 02 min. 40 sec. East 60.65 feet to a set iron rebar, a corner thence from said point along the Southern line of properties retained by Grange, LLC North 76 deg. 56 min. 57 sec. East 1,261.65 feet to a set iron rebar located in the Western edge of a temporary cul-de-sac containing a 50' private right of way for Grange Drive, thence from said point proceeding in a line which runs through the middle of private right of way for Grange Drive North 76 deg. 18 min. 17 sec. East 1,180.56 feet to a set iron rebar located in the Western edge of that 120' right of way of US Highway 158 thence from said point along and with the Western edge of the 120' right of way of US Highway 158 South 10 deg. 33 min. 11 sec. East a distance of 51.31 feet to existing monument, also in the Western edge of that 120' right of way of US Highway 158, thence following the curve of said western edge of said highway a chord length of 288.97 feet and a chord bearing South 10 deg. 27 min. 40 sec. East to an existing monument and the Western edge of said highway thence South 09 deg. 09 min. 20 sec. East 233.11 feet to the point and place of BEGINNING, said property having a total area of 1,938,463 square feet or approximately 44.50 acres, the property herein described is delineated on that certain recombination survey for Fred Suter, Robert Harrell and Uli Bennowitz prepared by Hyman & Robey, P.C., Land Surveyors, dated April 29, 2005 and recorded in Plat Cabinet I, Slide 153, of the Currituck County Public Registry.

FURTHERMORE, THERE IS CONVEYED HEREWITH by the Grantor in favor of Grantee, its successors and assigns, a non-exclusive easement for the use of such portions of Grange Drive (a private right of way having a 50' width, including the temporary cul-de-sac) that lie on the retained lands of Grantor (specifically those lands of Grantor that lie North of the lands conveyed above) for pedestrian and vehicular access and for the installation, maintenance and repair of utilities and landscaping.

THERE IS RESERVED FROM THIS CONVEYANCE a non-exclusive easement in favor of Grantor, its successors and assigns, for the use of such portions of Grange Drive (a private right of way having a 50' width, including the temporary cul-de-sac) that lie on the lands conveyed to Grantee above for pedestrian and vehicular access and for the installation, maintenance and repair of utilities and landscaping.

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

And the Grantor covenants with the Grantee, that Grantor is seized of the premises in fee simple, has the right to convey the same in fee simple, that title is marketable and free and clear of all encumbrances, and that Grantor will warrant and defend the title against the lawful claims of all persons whomsoever, other than the following exceptions: 1. Easements and Restrictions of Record

IN WITNESS WHEREOF, the Grantor has duly executed the foregoing as of the day and year first above written.

Grange, LLC \_\_\_\_\_ (SEAL)  
 (Entity Name)

By: [Signature] \_\_\_\_\_ (SEAL)  
 Title: Member/Manager

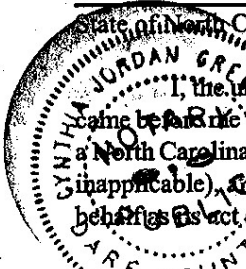
By: \_\_\_\_\_ (SEAL)  
 Title: \_\_\_\_\_

By: \_\_\_\_\_ (SEAL)  
 Title: \_\_\_\_\_

State of North Carolina - County of \_\_\_\_\_

I, the undersigned Notary Public of the County and State aforesaid, certify that \_\_\_\_\_ personally appeared before me this day and acknowledged the due execution of the foregoing instrument for the purposes therein expressed. Witness my hand and Notarial stamp or seal this \_\_\_\_\_ day of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_ Notary Public



State of North Carolina - County of Currituck

I, the undersigned Notary Public of the County and State aforesaid, certify that Uli Bennewitz personally appeared before me this day and acknowledged that he is the Member/Manager of Grange, LLC a North Carolina or \_\_\_\_\_ corporation/limited liability company/general partnership/limited partnership (strike through the inapplicable), and that by authority duly given and as the act of such entity, he signed the foregoing instrument in its name on its behalf as its act and deed. Witness my hand and Notarial stamp or seal, this 3rd day of May, 2005

My Commission Expires: 9-15-07 Cynthia Jordan Gregory  
 Notary Public

State of North Carolina - County of \_\_\_\_\_

I, the undersigned Notary Public of the County and State aforesaid, certify that \_\_\_\_\_

Witness my hand and Notarial stamp or seal, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

My Commission Expires: \_\_\_\_\_ Notary Public

The foregoing Certificate(s) of Cynthia Jordan Gregory, Notary of Dare Co, NC is/are certified to be correct. This instrument and this certificate are duly registered at the date and time and in the Book and Page shown on the first page hereof.

By: Chadler Y Dawley Register of Deeds for Currituck County  
Angella K [Signature] Deputy/Assistant - Register of Deeds

# APPENDIX G

---

**NC SECRETARY OF STATE CORPORATION SEARCH INFO**

• File an Annual Report/Amend an Annual Report • Upload a PDF Filing • Order a Document Online • Add Entity to My Email Notification List • View Filings • Print a Pre-Populated Annual Report form • Print an Amended a Annual Report form

## Limited Liability Company

### Legal Name

Pinnacle Storage of Grandy, LLC

## Information

**SosId:** 2457058

**Status:** Current-Active ⓘ

**Date Formed:** 7/22/2022

**Citizenship:** Domestic

**Annual Report Due Date:** April 15th

**CurrentAnnual Report Status:**

**Registered Agent:** High, Robert M

## Addresses

### Mailing

324 Greenville Avenue  
Wilmington, NC 28403-3514

### Principal Office

324 Greenville Avenue  
Wilmington, NC 28403-3514

### Reg Office

324 Greenville Avenue  
Wilmington, NC 28403-3514

### Reg Mailing

324 Greenville Avenue  
Wilmington, NC 28403-3514

## Company Officials

All LLCs are managed by their managers pursuant to N.C.G.S. 57D-3-20.

### Member

Robert M High  
324 Greenville Avenue  
Wilmington NC 28403-3514

**Major Site Plan Submittal Checklist**

Staff will use the following checklist to determine the completeness of your application within ten business days of submittal. Please make sure all of the listed items are included. Staff shall not process an application for further review until it is determined to be complete.

## Major Site Plan Submittal Checklist

Date Received: 6-22-23

TRC Date: \_\_\_\_\_

Project Name: Harrell Sutter Tract (Pinnacle-Grandy)

Applicant/Property Owner: \_\_\_\_\_

Major Site Plan Submittal Checklist		
1	Complete Major Site Plan application	X
2	Application fee (\$.10 per square foot of gross floor area or \$400 minimum)	X
3	Site plan	X
4	Landscape plan	X
5	Exterior Lighting plan	X
6	Major Stormwater Management plan and Form SW-002	X
7	Architectural elevations, if applicable	
8	ARHS Construction Improvements Permit OR if connecting to existing wastewater system, a letter of commitment from owner of centralized sewer provider and letter from DWQ indicating the existing plant has sufficient capacity to serve the development at the time of site plan approval.	X
9	NCDEQ stormwater permit application (if 10,000sf or more of built upon area).	X
10	NCDEQ Erosion and Sedimentation Control permit application (if one acre or more of land disturbance).	X
11	NCDOT Street and Driveway Access Permit Application and Encroachment Agreement	X
12	2 copies of plans	X
13	2 hard copies of ALL documents	X
14	1 PDF digital copy of all plans AND documents (ex. Compact Disk – e-mail not acceptable)	X

**For Staff Only**

**Pre-application Conference**

Pre-application Conference was held on \_\_\_\_\_ and the following people were present:

\_\_\_\_\_  
\_\_\_\_\_

**Comments**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Major Stormwater Plan Form SW-002

**OFFICIAL USE ONLY:**

Permit Number: \_\_\_\_\_  
Date Filed: \_\_\_\_\_  
Date Approved: \_\_\_\_\_

**Contact Information**

<b>APPLICANT:</b>	<b>PROPERTY OWNER:</b>
Name: Robert High Development, LLC	Name: Robert R. & Deloris U. Harrell Fred D & Terry D. Sutter
Address: 324 Greenville Avenue Wilmington, NC 28403	Address: PO Box 758 Nags Head, NC 27959
Telephone: 910-790-9490	Telephone: _____
E-Mail Address: robert@roberthighdevelopment.com	E-Mail Address: _____

**Property Information**

Physical Street Address: 6828 Caratoke Highway, Grandy, NC 27939  
Parcel Identification Number(s): 0108-000-052M-0000  
FEMA Flood Zone Designation: \_\_\_\_\_

**Request**

Project Description: Flex Space  
Total land disturbance activity: 523,160 sf      Calculated volume of BMPs: 212,983 cfsf  
Maximum lot coverage: 324,999 sf      Proposed lot coverage: 330,598 sf

**TYPE OF REQUEST**

- Major subdivision (10-year, 24-hour rate)
- Major site plan (5-year, 24-hour rate)

**METHOD USED TO CALCULATE PEAK DISCHARGE**

- Rational Method
- NRCS Method (TR-55 and TR-20)
- Simple volume calculation for small sites (less than 10 acres)
- Alternative stormwater runoff storage analysis
- Downstream drainage capacity analysis

I hereby authorize county officials to enter my property for purposes of determining compliance. All information submitted and required as part of this process shall become public record.

\_\_\_\_\_  
Property Owner(s)/Applicant

5/23/23  
\_\_\_\_\_  
Date



**Certificate**

22 The major stormwater plan shall contain the following certificate:

I, Robert Herrell owner/agent hereby certify the information included on this and attached pages is true and correct to the best of my knowledge.

On the plan entitled \_\_\_\_\_, stormwater drainage improvements shall be installed according to these plans and specifications and approved by Currituck County. Yearly inspections are required as part of the stormwater plan. The owner is responsible for all maintenance required. Currituck County assumes no responsibility for the design, maintenance, or performance of the stormwater improvements.

Date: 7/23/23 Owner/Agent: [Signature]

**Major Stormwater Plan Submittal Checklist**

Staff will use the following checklist to determine the completeness of your application. Please make sure all of the listed items are included. Staff shall not process an application for further review until it is determined to be complete.

## Major Stormwater Plan Form SW-002 Submittal Checklist

Date Received: \_\_\_\_\_

Project Name: Pinnacle Storage Grandy

Applicant/Property Owner: Robert High Development, LLC

Major Stormwater Plan Form SW-002 Submittal Checklist		
1	Completed Major Stormwater Plan Form SW-002	X
2	Completed Rational Method Form SW-003 or NRCS Method Form SW-004	X
3	Stormwater plan	X
4	NCDENR permit applications, if applicable	X
5	3 copies of plans	X
6	3 hard copies of ALL documents	X
7	1 PDF digital copy of all plans AND documents (ex. Compact Disk - e-mail not acceptable)	X

**Comments**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



## Currituck County Mainland Water Capacity Availability Form

### County Contact Information

Will Rumsey, Utilities Manager  
444 Maple Road  
Maple, NC 27956

Phone: 252.232.2769  
Fax: 252.453.3721

Website: <https://co.currituck.nc.us/departments/water/>

### Request

This request is for:

- Single Family Residence
- Residential Development
- Non-residential

### Owner Information

Name(s): Robert R. & Deloris U. Harrell and Fred D. & Terry D. Suter

Mailing Address: PO Box 758, Nags Head, NC 27959

E-Mail Address:

Phone Number:

### Applicant Information (if different from Owner)

Name(s): Robert High Development, LLC

Mailing Address: 324 Greenville Ave., Wilmington, NC 28403

E-Mail Address: robert@roberthighdevelopment.com

Phone Number: 910-790-9490



Parcel Information

PIN(s): 0108-000-052M-0000

Street Address: 6828 Caratoke Highway

Project Information

Name of Project: Pinnacle-Grandy

Number of Units: 4 Projected Daily Project Demand (gpd): 100

Anticipated Water Access Date: 2023

Applicant's Signature

I declare, that to the best of my knowledge, the information provided herein is true, correct, and complete.

DocuSigned by: Bobby Harwell REALTOR

5/23/2023

Property Owner/Applicant Signature

Date

Note: Water connection and/or developmental fees are due at building permit application. See the Currituck County Master Fee Schedule for rates. https://co.currituck.nc.us/master-fee-schedule/

For Office Use Only

Water capacity is available for this project.

Water capacity is not available for this project.

Utilities Manager

Date

County Manager

Date

This capacity availability is valid for one year from approval date.