Emergency Action Plan (EAP)

FAWN LAKE DAM

DCR Inventory Number: 177009

Located in Spotsylvania County, Virginia

HIGH SPECIAL HAZARD CLASSIFICATION

FAWN LAKE COMMUNITY ASSOCIATION, INC.

11300 Longstreet Drive
Spotsylvania County, VA 22551
Main Gate: (540) 972-0394

Prepared By:

A. Morton Thomas and Associates, Inc.

100 Gateway Centre Pkwy, Suite 140
Richmond, VA 23235
(804) 276-6231

September 2, 2025

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1.0 CERTIFICATIONS

Certification by Owner/Operator:

I certify that a copy of this plan has been filed with the Spotsylvania County Office of Emergency Management. Also, that a copy of this form has been filed with the Virginia Department of Emergency Management (VDEM); that this plan shall be adhered to during the life of the project; and that the information contained herein is current to the best of my knowledge.

Signed: Ronald M. Bishop President

Owner's Signature — Print Name and Title

The 22 day of August, 20 2025.

Certification by Preparer:

I certify that a copy of this plan has been developed in accordance with the requirements of *State of Virginia Code 4VAC50-20-175 Emergency Action Plan (EAP) for High and Significant Hazard Potential Impounding Structures* based on currently available information and the results of the Inundation Study; and that the information contained herein is accurate and current to the best of my knowledge.

Signed:

Preparer's Signature — Don Rissmeyer, P.E. Print Name and Title

The 22nd day of August, 20 25.

2.0 EAP OVERVIEW

The following flow chart shall be used to assess emergency conditions and determine the Emergency Level that will direct subsequent notification and response actions:

Step 1 Emergency Condition Detection	Event Detection See Section 5.1		
Step 2 Emergency Level	Assess Situation Determine Emergency Level See Section 5.2		
	Emergency Level 1 Non-Emergency Incident Slowly Developing Situation See Section 5.2	**Emergency Level 2** Potential dam failure situation Rapidly developing situation See Section 5.2	**Emergency Level 3** Urgent Dam failure is imminent or in progress See Section 5.2
Step 3 Notification and Communication	**Level 1** Notification List See Section 3.0	**Level 2** Notification List See Section 3.0	**Level 3** Notification List See Section 3.0
Step 4 Expected Actions	Inspect Dam Every 12 Hours: Monitor and Listen to Weather Forecast	Inspect Dam Every 4 Hours: Notify Emergency Responders	Constant Inspection of Dam: Continuous Contact with Emergency Responders
Step 5 Termination and Follow Up	Termination of Monitoring Conditions at the Dam. Proceed to Evaluate Damages and Plan for Repairs		

3.0 NOTIFICATION AND COMMUNICATION

Notification

After the emergency level has been determined, the people on the following notification charts for the appropriate emergency level shall be notified immediately.

Communication

Emergency Level 1 – Non-emergency, Slowly Developing

The dam owner or operator should contact the dam owner's designated engineer (Don Rissmeyer, P.E., 804-916-9476) to describe the current situation, and request technical assistance on the next step to take (See Notification Chart on Page 5).

Emergency Level 2 – Emergency Event, Potential Dam Failure Situation; Rapidly Developing

The dam owner or operator should contact Spotsylvania County Emergency Management Division and the dam owner's designated engineer, describe the current situation, and request technical assistance on the next step to take (see Notification Chart on Page 6). The following message may be used to help describe the emergency situation to the Spotsylvania County Emergency Management Division personnel:

"This is _____ (Identify yourself: Name and Position) _____ .

We have an emergency condition at Fawn Lake Dam, Inventory No. 177009, located on Greenfield Creek which discharges into the Po River in Spotsylvania County, Virginia.

We have activated the Emergency Action Plan for this dam and are currently under Emergency Level 2.

Briefly describe the situation (e.g. water levels are close to the dam crest, a sinkhole appeared on the dam, etc.).

We are implementing predetermined actions to respond to a rapidly developing situation that could result in dam failure.

Please prepare to evacuate the low-lying portions of Greenfield Creek and the Po River below Fawn Lake Dam. Reference the evacuation maps in your copy of the Emergency Action Plan.

We will advise you when the situation is resolved or if the situation gets worse.
I can be contacted at the following number: _____. If you cannot reach me, please call the following alternate number: _____."

Emergency Level 3 – Urgent Event; Dam Failure Appears Imminent or is in Progress

The dam owner or operator should contact Spotsylvania County Emergency Management Division and the dam owner's designated engineer, describe the current situation, and request technical assistance on the next step to take (see Notification Chart on Page 7). The following message may be used to help describe the emergency situation to the Spotsylvania County Emergency Management Division personnel:

1. Call the Spotsylvania County Emergency Management Division's dispatch center. Be sure to say, "This is an emergency." They will call other authorities and the media and begin the evacuation. The following message may be used to help describe the emergency situation to the Spotsylvania County Emergency Management Division:

"This is an emergency. This is _____ (Identify yourself: Name and Position) ___.

Fawn Lake Dam, Inventory No. 177009, located on Greenfield Creek which discharges into the Po River in Spotsylvania County, Virginia is failing. The downstream area must be evacuated immediately. Repeat, Fawn Lake Dam, Inventory No. 177009, is failing; evacuate the area along low-lying portions Greenfield Creek and the Po River below Fawn Lake Dam.

We have activated the Emergency Action Plan for this dam and are currently under Emergency Level 3. Reference the evacuation maps in your copy of the Emergency Action Plan.

I can be contacted at the following number: _____. If you cannot reach me, please call the following alternate number: _____."

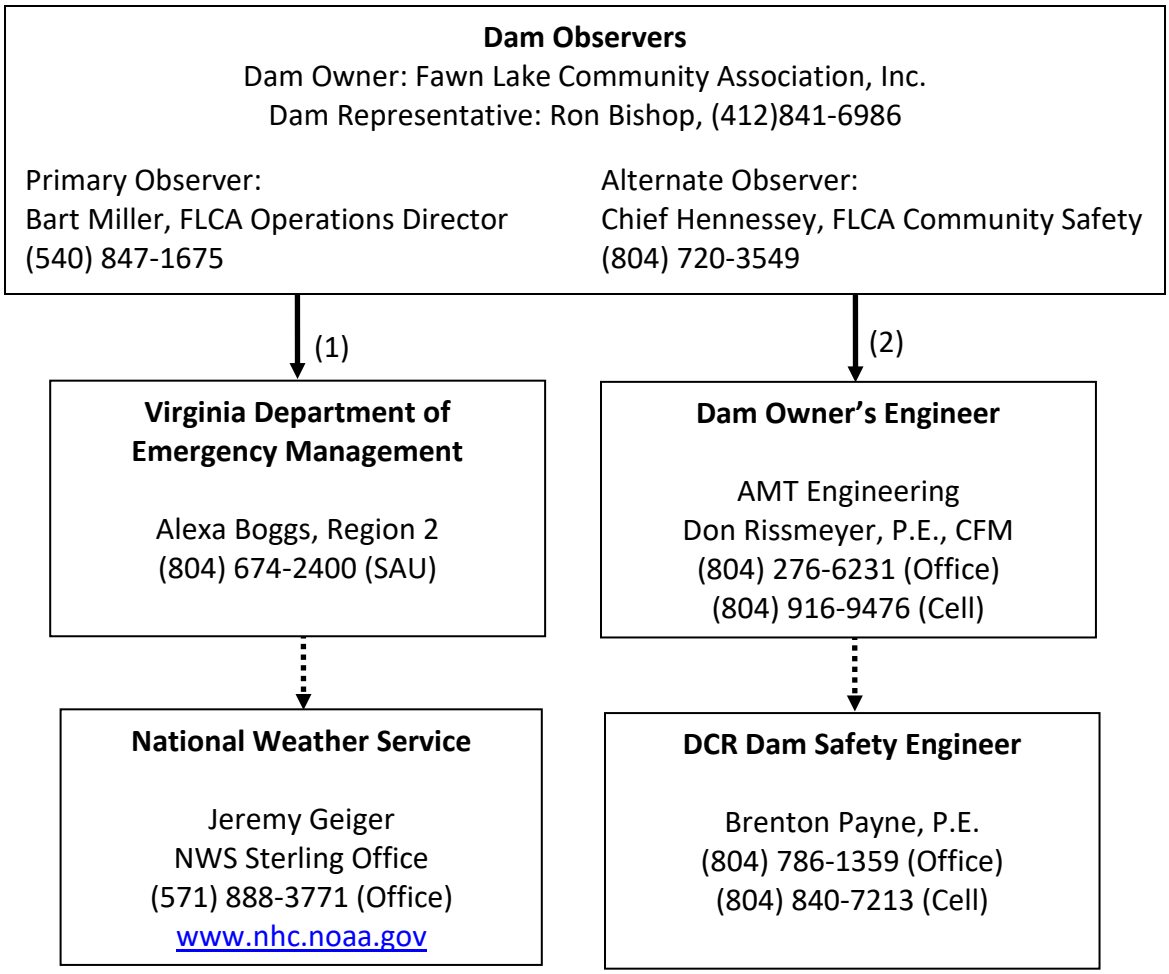
2. Do whatever is necessary to bring people in immediate danger (anyone on the dam, downstream from the dam, boating on the reservoir, or evacuees) to safety if directed by the Spotsylvania County Emergency Management Division.

3. Keep in frequent contact with the Spotsylvania County Emergency Management Division to keep them up to date on the condition of the dam. They will tell you how you can help/handle the emergency.

4. If all means of communication are lost: (1) try to get to another radio or telephone that works, and/or (2) get someone else to try to re-establish communications. If these means fail, handle the immediate problems as well as you can, and periodically try to re-establish contact with the Spotsylvania County Emergency Management Division.

Emergency Level 1 Notifications

Non-emergency, Slowly Developing, or Rainfall is to Exceed 5.9 Inches in 6-Hours, 6.3 Inches in 12-Hours, or 6.7 Inches in 24-Hours; or 0.5' below Emergency Spillway (338.5') and rising.



Note:
1, 2, etc., denotes call sequence

Legend:
Calls by Operator
Second Level Calls

Emergency Level 2 Notifications

Emergency Event, Potential Dam Failure Situation Rapidly Developing; Rainfall is to Exceed 9.6 Inches in 6-Hours, 10.6 Inches in 12-Hours, or 12.2 Inches in 24-Hours; or Predetermined Trigger Pool Elevation of 1 Foot of flow in the Emergency Spillway (340') and rising.

Dam Observers
Dam Owner: Fawn Lake Community Association, Inc.
Dam Representative: Ron Bishop, (412)841-6986

Primary Observer:
Bart Miller, FLCA Operations Director
(540) 847-1675

Alternate Observer:
Chief Hennessey, FLCA Community Safety
(804) 720-3549

(1)

Spotsylvania County Emergency Management Division
Donald Willis
911
or
(540) 507-7904 (Office)
(540) 455-2637 (Cell)

Spotsylvania County Sheriff's Office
911
or
(540) 507-7200

Virginia State Police Division 2 Area 5 Office
(540) 681-2625

(2)

Virginia Department of Emergency Management

Alexa Boggs, Region 2
(804) 674-2400 (SAU)

National Weather Service

Jeremy Geiger
NWS Sterling Office
(571) 888-3771 (Office)
www.nhc.noaa.gov

(3)

Dam Owner's Engineer

AMT Engineering
Don Rissmeyer, P.E., CFM
(804) 276-6231 (Office)
(804) 916-9476 (Cell)

DCR Dam Safety Engineer

Brenton Payne, P.E.
(804) 786-1359 (Office)
(804) 840-7213 (Cell)

Note:
1, 2, etc., denotes call sequence
Legend:
Calls by Operator →
Second Level Calls ⇢

See Communications, Section 4.0, for Pre-scripted Messages

See Emer. Services Contacts for contact information and for back-ups to the persons shown above and other emergency personnel

Emergency Level 3 Notifications

Urgent Event: Dam Failure Appears Imminent or is in Progress; Rainfall is to Exceed 12.4 Inches in 6-Hours, 14.6 Inches in 12-Hours, or 17.0 Inches in 24-Hours; or Significant Flow in the Principal Spillway; or Predetermined Trigger Pool Elevation of 2 feet of flow in the Emergency Spillway (341') and rising.

Dam Observers
Dam Owner: Fawn Lake Community Association, Inc.
Dam Representative: Ron Bishop, (412)841-6986

Primary Observer:
Bart Miller, FLCA Operations Director
(540) 847-1675

Alternate Observer:
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Calls by Operator →
Second Level Calls ⇢

See Communications, Section 4.0, for Pre-scripted Messages

See Emer. Services Contacts for contact information and for back-ups to the persons shown above and other emergency personnel

Emergency Services & Other Contacts

Agency / Organization	Principal Contact & Email Address	Address	Office Telephone Number	Alternate Telephone Number
Owner's Engineer	Don Rissmeyer, P.E., CFM drissmeyer@amtengineering.com	100 Gateway Centre Pkwy, Ste 140, Richmond, VA 23235	804-956-4609 (O)	804-916-9476 (M)
Spotsylvania County Emergency Management Division	Donald Willis Emergency Management Coordinator dwillis@spotsylvania.va.us	9119 Dean Ridings Lane, 2nd Floor, Spotsylvania, VA 22553	540-507-7904 (O) 540-455-2637 (M)	540-582-7100 (or 911)
Spotsylvania County Fire Company / Rescue Station 7	Engine and Battalion Chief	10501 Orange Plank Rd, Spotsylvania, VA 22553	540-507-7970 (O)	540-507-7971
Spotsylvania County Sheriff's Office	Roger L. Harris Sheriff sheriff@spotsylvania.va.us	9119 Dean Ridings Ln, Spotsylvania, VA 22553	540-507-7200 (O)	540-582-7115 (or 911)
Virginia DCR Dam Safety Region 2	Brenton Payne, P.E. Brenton.Payne@dcr.virginia.gov	600 E. Main Street, 24th Floor, Richmond, VA 23219	804-786-1359 (O)	804-840-7213 (M)
Virginia Dam Safety Director	Mark Killgore, P.E. Mark.killgore@dcr.virginia.gov	600 E. Main Street, 24th Floor, Richmond, VA 23219	804-625-3977 (O)	804-371-2630 (M)
Virginia State Police	Division 2 Area 5 Office Area05@vsp.virginia.gov	3804 Loren Drive, Fredericksburg, VA 22408	804-750-8778	540-681-2625
VDOT Fredericksburg Residency	Kyle S. Bates, P.E. fredericksburginfo@vdot.virginia.gov	86 Deacon Road, Fredericksburg, VA 22405	540-899-4447	540-907-6055
Virginia Department of Emergency Management Region 2	Alexa Boggs, CRC Alexa.boggs@vdem.virginia.gov	13206 Lovers Lane, Culpeper, VA 22701	804-674-2400	Emergency: 211
NOAA/National Weather Service	Jeremy Geiger Jeremy.Geiger@noaa.gov	Sterling Office www.nhc.noaa.gov	(571) 888-3441	n/a

4.0 BASIC EAP DATA

4.1 Statement of Purpose

An Emergency Action Plan (EAP) for High and Significant Hazard Potential Impounding Structures is required for this dam to mitigate property damage or loss of life in the event of a dam failure, whether a "Sunny Day" breach or a breach due to overtopping during a larger flood event.

4.2 Potential Impacted Area

See Inundation Maps (Appendix C) for the locations and information about the following public roadways that may be flooded if the dam should fail. Included on the inundation maps found in Appendix C are the estimated times for the flood wave to travel from the dam to these inundated locations. We recommend the preparation of evacuation maps for public road crossings and impacted parcels in future updates to this EAP. A list of impacted dwellings and roadways is included in Appendix D.

Impacted Public Roadways

Below is a table of public impacted roadways. Private roadways, downstream dams, and other impacted properties are not included in this table. See Appendix D for additional information on impacted roadways.

Table 1: Impacted Public Roadways

Roadway	Approximate Distance Downstream From Fawn Lake Dam (miles)	Notes
Catharpin Road (Rte. 612)	2.05	
West Catharpin Road (Rte. 608)	3.52	*Backwater*
Mill Pond Road (Rte. 649)	4.41	
Robert E. Lee Drive (Rte. 608)	7.40	
Lake Anna Parkway (Rte. 648)/ Old Block House Lane (Rte. 208)	10.80	
Courthouse Road (Rte. 208)	14.5	
Jefferson Davis Hwy (US Route 1)	18.15	
South Roxbury Mill Road (Rte. 632)	19.0	
Interstate 95 over the Po River	20.5	

4.3 Project Description

Fawn Lake Dam is located on Greenfield Creek in Spotsylvania County, Virginia. The dam is owned by the Fawn Lake Community Association, Inc.

Dam Inventory Number – 177009 (Legacy #17709)
Certificate Type – Six-Year, Special Operations and Maintenance Permit
Spillway Capacity – 65% PMF (60% Required)
Type of Dam – Earthfill
Drainage Area – 4.14 square miles
Length – 2,230 feet

Total Height – 63 feet	Top of Dam El – 343 feet
Normal Pool Height – 55 feet	Normal Pool El – 335.5 feet
Maximum Capacity – 7,472 acre-ft	Maximum Area – 312 acres
Normal Capacity – 5,113 acre-ft	Normal Area – 285 acres
Size Classification – Medium	Hazard Classification – High, Special

The design plans for the dam are available in the DSIS database (177009_DAMDSGPLNP_19731102) (Virginia Dam Safety Inventory System) as well as the toe drain construction plans. Reduced size drawings of both sets of plans are also provided in Appendix G.

Directions to Fawn Lake Dam

Fawn Lake Dam is situated approximately 15 miles northwest of Spotsylvania Courthouse in Spotsylvania, Virginia. (See Site Vicinity Map – Appendix B). An unimproved access road traverses the dam crest. Fawn Lake Parkway wraps around the perimeter of the lake providing primary and secondary access ways from the left and right abutment. The Fawn Lake Marina is located at the left abutment area. Access to the Fawn Lake Dam site is through the FLCA main gate on Orange Plank Road (SR 621).

From Fredericksburg, Virginia:	**From Culpeper, Virginia:**
19 miles (40 Minutes)	26 miles (40 Minutes)

Outlet Works (from previous reports)

Principal Spillway

- *Riser: NRCS Hammerhead, cast-in-place concrete with a weir crest at EL. 335.5 ft.*
- *Conduit: 36-inch diameter prestressed concrete spillway conduit supported by cast-in-place anti-seep collars along the length and a concrete cradle at the downstream end.*

Emergency Spillway

- *Two hundred feet wide vegetated earth channel with a control elevation of 339.0 ft.*
- *Spillway control section is within the asphalt roadway.*

Mid-Level Drain

- *The mid-level drain is a 10-inch diameter knife gate valve with an invert at elevation 325.5 ft. This valve is primarily used to supply a downstream cattle farm with water when the lake level drops below the normal pool elevation. This valve is operated hydraulically from a control panel mounted on the upstream berm adjacent to the PSW tower. The hydraulic pump can be operated with the 12V marine battery in the control box which is kept charged by a solar panel or by hand pump methods.*

Low-Level Drain

- *The low-level drain is located approximately 112 feet upstream of the PSW tower. It has a 30-inch diameter knife gate valve located at elevation 284.0 ft. The same hydraulic pump can be used to lower the lake level in the same control box. It can initially lower the lake at the normal pool elevation ~13 inches on the first day, with the rate decreasing as the pool elevation decreases. While it is recommended to limit the draw down rate to 6 inches per day, when compared to the potential risk of downstream loss of life and damage due to a dam breach, any limited damage on the upstream slope of the embankment would be considered acceptable and repairable.*

Inundation Zone

A breach analysis of the Fawn Lake Dam and mapping of the downstream inundation zone were completed by Dewberry & Davis in March of 2010. The analysis extended from the Fawn Lake Dam to a point approximately 1.6 miles downstream of Interstate 95 and approximately 1.6 miles upstream of the confluence of the Po and Ni Rivers. The inundation zone ends approximately 23 miles downstream of the dam at the confluence of the Po and Ni Rivers. Inundation maps showing the area that would be inundated by a sunny day breach and a PMF breach as well as failure flood profiles for the floodplain to the point of 1' convergence are included in Appendix C.

Residences Affected by a Breach or Major Flooding

Based on our analysis, there are 11 residences that may be affected by floodwater during a sunny day breach and 85 residences (as well as several camping lots along the river at Indian Acres Campground) that may be affected by a PMF breach. A listing of structures affected by a sunny day breach and a PMF breach is included in Appendix D.

Public Roadways Affected

There are 31 roadways including 8 public roadways that are expected to be submerged or partially submerged during a PMF Breach. Their locations are included in Appendix D. Additional contact names for the VDOT Fredericksburg Residency are provided below.

Giovanni Esposito, Assistant Residency Administrator: (804) 929-3605
Duane Shifflett, Maintenance Operations Manager: (540) 907-8634

Tony Morton, Chancellor AHQ Superintendent: *(540) 408-4881*
Daniel Shifflett, Chancellor AHQ Supervisor: *(540) 907-6294*

Impoundments

There are two impoundments located within the main channel of the Po River, downstream of Fawn Lake Dam. These include Wright's Pond Dam (177014), located near Mill Pond Road (SR 649), and Stanard's Mill Dam (177021), located just upstream of South Roxbury Mill Road (SR 632). The dam at Wright's Pond will be overtopped during a dam breach. This dam should be inspected when the water recedes and prior to opening Mill Pond Road to traffic.

Several other State Regulated Dams are located adjacent to the Po River, downstream of Fawn Lake Dam; however, Fawn Lake Dam is not part of their contributing drainage areas. The watersheds for these dams are included in the dam break inundation zone study for the impacted area below Fawn Lake Dam. These dams include the following:

- *Wright's Pond Dam (177014) - Low*
- *Stanard's Mill Dam (177021) - Low*
- *Spotsylvania County Dam #9 (177036) - Undetermined*
- *Spotsylvania County Dam #10, Jennings Pond Dam (177013) - Undetermined*
- *The Laurels Dam (177027) - High*
- *Gordons Dam (177005) - Low*
- *Spotsylvania County Dam #11 (177038) - Undetermined*
- *Indian Acres Dam (177018) – High*

Critical Facilities

No known critical facilities, such as hospitals, rescue and relief facilities, water supply facilities, or hazardous waste facilities are in the hazard area.

In the previous EAP table-top exercises, it was noted that Lake Anna Parkway (VA-208) is a Significant Route for accessing the Lake Anna Nuclear Station. Other roadways are shown as VDOT Primary Evacuation Routes including Catharpin Road (SR 612), Mill Pond Road (SR 649), Robert E. Lee Drive (SR 608), Lake Anna Parkway (VA-208), and Courthouse Road (VA-208). Jefferson Davis Highway (US-1) and Interstate 95 (I-95) are listed by VDOT as "Corridors of Statewide Significance: Washington to North Carolina Corridor".

5.0 EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

5.1 Event Detection

This step describes the detection of an emergency event and provides information to assist the dam operator in determining the appropriate emergency level for the event.

Emergency events may be detected by:

- Observations at or near the dam by government personnel, landowners, visitors, or public.
- Earthquakes felt or reported in the vicinity of the dam.
- Forewarning of conditions (for example, a severe weather or flash flood forecast).

5.2 Emergency Level Definitions

Once an emergency event is detected or reported, the dam observer or his alternate is responsible for classifying the event into one of the following three emergency levels:

Emergency Level 1 – Non-emergency, slowly developing:
This situation is unusual from normal conditions but has not yet threatened the operation or structural integrity of the dam, but possibly could if it continues to develop. The dam owner's technical representatives should be contacted to investigate the situation and recommend actions. The condition of the dam should be closely monitored, especially during storm events, to detect any development of a potential or imminent dam failure situation. The Spotsylvania County Emergency Management Division office should be informed if it is determined that the conditions may possibly develop into worse conditions that may require emergency actions.

Emergency Level 2 – Potential dam failure situation, rapidly developing:
This situation may eventually lead to dam failure and flooding downstream, but there is not an immediate threat of dam failure. The Spotsylvania County Emergency Management Division should be notified of this emergency situation and placed on alert. The dam operator should closely monitor the condition of the dam and periodically report the status of the situation to Spotsylvania County if the condition worsens and failure becomes imminent. The Spotsylvania County Emergency Management Division must be notified immediately of the change in the emergency level for evacuation of the people at risk downstream. If time permits, the dam owner's engineers and state dam safety officials should be contacted to help evaluate the situation and recommend remedial actions to prevent failure of the dam. The dam operator should initiate recommended remedial repairs.

Emergency Level 3 – Urgent; dam failure appears imminent or is in progress:
This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. The Spotsylvania County Emergency Management Division should be contacted immediately so emergency services can begin evacuations of all at-risk people and close roads as needed.

Emergency Situations:
The following are typical examples of conditions that may occur at a dam that usually constitute an emergency situation. Adverse or unusual conditions that can cause the failure of a dam are typically related to aging, poor maintenance, design deficiencies and construction oversights. Extreme weather events that exceed the original designed conditions can cause significant flow through the overflow spillway or overtopping of the embankment. However, accidental or intentional damage to the dam may also result in emergency conditions. The conditions have been grouped in Table 2 to identify the most likely emergency level condition. The groupings are provided as guidance only. Not all emergency conditions may be listed, and the dam operator is urged to use conservative judgment in determining whether a specific condition should be defined as an emergency situation at the dam.

Pre-existing conditions on this dam:
Current Virginia dam safety regulations typically require that High Hazard impoundments have a spillway capacity equal to at least a 0.9 PMP storm event, unless it can be shown by an Incremental Damage Assessment (IDA) that increasing the emergency spillway to that size provides no additional protection to downstream facilities or roads.

Fawn Lake Dam is currently classified as a Special High Hazard Dam in accordance with 4VAC50-20-53 of Virginia's Dam Safety Regulations. Per these regulations, an impounding structure that is classified as high hazard shall be required to pass the flood resulting from 0.6 PMP instead of the flood resulting from 0.9 PMP SDF if the dam owner certifies annually that the dam structure meets the 8 special conditions described in the Regulations.

See Table 2 for guidance in determining the proper emergency level for various situations.

Table 2: Guidance for Determining the Emergency Level

Event	Situation	Emergency Level*
Spillways	Principal spillway severely blocked with debris or structurally damaged	1
	Principal spillway blocked with debris and pool is rapidly rising	2
	Principal spillway leaking with muddy discharge	1
	Emergency spillway severely blocked with debris, soil, or trees	2
	Emergency spillway severely eroded and head cutting	2
Flooding	The reservoir elevation reaches the predetermined notification trigger flow depth of **one (1) foot** and rising in the Emergency Spillway.	2
	The reservoir elevation reaches the predetermined notification trigger flow depth of **two (2) feet** and rising in the Emergency Spillway.	3
	Spillway flow is flooding roads and people downstream	2
	Flood flows are nearing dam overtopping	3
Seepage	New seepage areas in or near the dam	1
	Boils observed on downstream face of dam	1
	Boils observed on downstream face of dam with cloudy discharge	2
	New seepage area with cloudy discharge or increasing flow rate	2
	Seepage with discharge rate greater than 10 gallons per minute	3
Sinkholes	Observation of new sinkhole in reservoir area or on embankment	2
	Rapidly enlarging sinkhole in or near the dam	3
Embankment Cracking	New cracks in the embankment greater than 1/4 –inch wide without seepage	1
	Cracks in the embankment with seepage	2
Embankment Movement	Visual movement/slippage of the embankment slope	1
	Sudden or rapidly proceeding slides of the embankment slopes	3
Instruments	Instrumentation readings beyond predetermined values	1
Earthquake	Measurable earthquake felt or reported on or within 50 miles of the dam	1
	Earthquake resulting in visible damage to the dam or appurtenances	2
	Earthquake resulting in uncontrolled release of water from the dam	3
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	2
	Detonated bomb that has resulted in damage to the dam or appurtenances	3
Sabotage / Vandalism	Damage to dam or appurtenances with no impacts to the functioning of the dam	1
	Modification to the dam or appurtenances that could adversely impact the dam	1
	Damage to the dam or appurtenances that has resulted in seepage flow	2
	Damage to dam or appurtenances that has resulted in uncontrolled water release	3

*Emergency Level 1: Non-emergency, slowly developing
*Emergency Level 2: Potential dam failure situation, rapidly developing
*Emergency Level 3: Urgent; dam failure appears to be imminent or is in progress

5.3 Emergency Evaluation

5.3.1 Emergency Spillway Flows

Emergency Level 2 - Potential Dam Failure Situation; Rapidly Developing

1. Significant damage to the spillway is occurring but the rate does not appear to threaten an imminent breach of the spillway crest that would result in an uncontrolled release of the reservoir.
2. Flow through the emergency spillway is expected to cause flooding that could threaten people, homes, and/or roads downstream from the dam.
3. Flow depth of **one (1) foot** and rising in the Emergency Spillway (340') based on observation of the staff gauge.

Emergency Level 3 - Urgent; Severe Flooding is occurring to roads, houses and loss of life is probable

1. Significant damage to the spillway is occurring at a rapid rate and a breach of the control section appears to be imminent.
2. Flow through the emergency spillway is causing flooding that is threatening people, homes, and/or roads downstream from the dam.
3. Flow depth of **two (2) feet** and rising in the Emergency Spillway (341') based on observation of the staff gauge.

5.3.2 Embankment Overtopping

Emergency Level 2 – Potential Dam Failure Situation; Rapidly Developing

1. The reservoir level has reached the predetermined depth of **one (1) foot** and rising in the Emergency Spillway (340') which is 3' from embankment overtopping.

Emergency Level 3 - Urgent; Severe Flooding is occurring to roads, houses and loss of life is probable

1. The reservoir level has reached the predetermined depth of **two (2) feet** in the Emergency Spillway (341') which is 2' from embankment overtopping.

5.3.3 Flooding

Emergency Level 1 – Flood Warning issued by National Weather Service

1. The reservoir elevation has reached the predetermined trigger flow depth of **0.5 feet below** the Emergency Spillway and rising that requires Emergency Level 1 notification.
2. Flooding is expected to occur in low lying areas near the dam, or predicted rainfall is to exceed the following rain amounts:
    a. 5.9 inches per six (6) hours
    b. 6.3 inches per twelve (12) hours
    c. 6.7 inches per twenty-four (24) hours

Emergency Level 2 – Potential Dam Failure Situation; Rapidly Developing

1. The reservoir elevation has reached the predetermined trigger flow depth of **one (1) foot** in the Emergency Spillway and rising that requires Emergency Level 2 notification.
2. Flow through the spillways is expected to cause flooding that could threaten people, homes, and/or roads downstream from the dam.
3. Rainfall at or above the following rates:
    a. 9.6 inches per six (6) hours
    b. 10.6 inches per twelve (12) hours
    c. 12.2 inches per twenty-four (24) hours

Emergency Level 3 – Imminent Dam Failure Situation; Severe Flooding is occurring to roads, houses and loss of life is probable

1. The reservoir elevation has reached the predetermined trigger flow depth of **two (2) feet** in the Emergency Spillway and rising that requires Emergency Level 3 notification.
2. Rainfall at or above the following rates:
    a. 12.4 inches per six (6) hours
    b. 14.6 inches per twelve (12) hours
    c. 17.0 inches per twenty-four (24) hours

5.3.4 Seepage and Sinkholes

Emergency Level 2 – Potential Dam Failure Situation; Rapidly Developing

1. Cloudy seepage or soil deposits are observed at seepage exit points or from internal drain outlet pipes.
2. New or increased areas of wet or muddy soils are present on the downstream slope, abutment, and/or foundation of the dam, and there is an easily detectable and unusual increase in volume of downstream seepage.
3. Significant new sinkhole(s) near the dam or settlement of the dam is observed.
4. Reservoir level is falling without apparent cause.
5. The following known dam defects are or will soon be initiated by a rise in the reservoir
    a. Sinkhole(s) located on the upstream slope, crest, abutment, and/or foundation of the dam; or
    b. Transverse cracks extending through the dam, abutments, or foundation.

Emergency Level 3 – Urgent; Dam Failure Appears to be Imminent or is in Progress

1. Rapidly increasing cloudy seepage or soil deposits at seepage exit points to the extent that failure appears imminent or is in progress.
2. Rapid increase in volume of downstream seepage to the extent that failure appears imminent or is in progress.
3. Water flowing out of holes in the downstream slope, abutment, and/or foundation of the dam to the extent that failure appears imminent or is in progress.
4. Whirlpools or other evidence exists indicating that the reservoir is draining rapidly through the dam or foundation.
5. Rapidly enlarging sinkhole(s) are forming on the dam or abutments to the extent that failure appears imminent or is in progress.
6. Rapidly increasing flow through crack(s) eroding materials to the extent that failure appears imminent or is in progress.

5.3.5 Embankment Movement and Cracking

Emergency Level 2 – Potential Dam Failure Situation; Rapidly Developing

1. Settlement of the crest, slopes, abutments and/or foundation of the dam, which may eventually result in breaching of the dam.
2. Significant increase in length, width, or offset of cracks in the crest, slopes, abutments, and/or foundation of the dam that may eventually result in breaching of the dam.

Emergency Level 3 – Urgent; Dam Failure Appears to be Imminent or is in Progress

1. Sudden or rapidly proceeding slides, settlement, or cracking of the embankment crest, slopes, abutments, and/or foundation, and breaching of the dam appears imminent or is in progress.

6.0 GENERAL RESPONSIBILITIES

6.1 Frequency of Observations

Level 1: Every 12 Hours
Level 2: Every 4 Hours
Level 3: Continuous, until emergency is terminated by the dam owner.

6.2 Owner or Observers

- Provide leadership to assure the EAP is reviewed and updated annually and copies of the revised EAP are available to all who received copies of the original EAP (Appendix A).
- Special High Hazard criteria require that conditions at the impounding structure are monitored daily. See the 8 special conditions for more details.
- As soon as an emergency event is observed or reported, immediately determine the emergency level, Section 5.2.
  - Level 1: Unusual event, slowly developing
  - Level 2: Potential dam failure situation, rapidly developing
  - Level 3: Dam failure appears imminent or is in progress
- Immediately notify the personnel in the order shown on the notification charts for the appropriate level, see Section 3.0.
- Provide updates of a Level 1 or 2 situation to Spotsylvania County to assist them in making timely and accurate decisions regarding warnings and evacuations.
- Record progression of events in the provided event log (Appendix A).
- Terminate EAP operations once emergency is over in a Level 1 situation.
- In a Level 2 or 3 situation, notify the Spotsylvania County Emergency Management Division when the emergency at the dam is over for the dam owner.
- Maintain insurance coverage in an amount that will substantially cover the costs of downstream property losses to others that may result from a dam failure.

6.3 Spotsylvania County Emergency Management Division

- Serve as the primary contact responsible for coordination of all emergency actions and maintain contact with local media.
- Respond to annual reviews and updates of the EAP.
- When a Level 2 situation occurs, prepare for possible evacuations
  - Alert the public as appropriate. See Appendix C for Inundation Maps depicting impacted areas.
  - Review the summary of dwellings and properties including contact information for occupied dwellings in the anticipated inundation zones included in Appendix D.
  - Prepare for the evacuation of people and close roads within the evacuation area.
- When a Level 3 situation occurs:
  - Initiate warnings and order evacuations of people at risk downstream of the dam.
  - Carry out the evacuation of people and close roads within the evacuation area.
  - Alert the general public of the emergency.

6.4 Virginia DCR Dam Safety

- Provide assistance in determining the emergency level, if time permits.
- Provide advice of remedial actions to be taken if time permits.
- Provide advice of when to terminate the Event.

6.5 Termination Responsibilities

Whenever the EAP has been activated, an emergency level has been declared, all EAP actions have been completed, and the emergency is over, the EAP event must eventually be terminated, and follow-up procedures completed.

The dam owner and observers are responsible for informing the Spotsylvania County Emergency Management Division, the Virginia Department of Emergency Management (VDEM), and Virginia DCR Dam Safety that the emergency at the dam is over and EAP operations can be terminated. It is then the responsibility of each person to notify the same group of contacts that were notified during the original event notification process to inform those people that the event has been terminated.

Prior to the termination of an Emergency Level 2 or 3 event that has not caused actual dam failure, the dam operator's engineer will inspect the dam to determine whether any damage has occurred that could potentially result in loss of life, injury, or property damage. If it is determined that conditions do not pose a threat to people or properties, the Spotsylvania County Emergency Management Division or designated alternates will be advised to terminate EAP operations as described above.

The dam owner shall assure that the Dam Safety Emergency Situation Report (Appendix A) is completed to document the emergency event and all the actions taken. The dam owner shall distribute copies of the completed report to the VDEM Office and his technical representative.

The Virginia Department of Transportation is responsible for inspection and reopening affected public roads and structures prior to being opened to traffic. The Spotsylvania County Building Official may inspect all affected buildings prior to being reoccupied. The Spotsylvania County Department of Utilities should inspect its affected utilities. Photographs and written logs should be used to document any damage. The Spotsylvania County Sheriff's department will control access into these areas until such time that these areas are declared safe.

7.0 EAP REVIEW AND REVISION

7.1 EAP Annual Drill

The dam owner or his representative will review and, if needed, update the EAP at least once each year. The owner shall contact the Spotsylvania County Emergency Management Division once a year to verify that the plan has been reviewed and updated as necessary. The EAP annual review will include the following:

- Calling all contacts on the three notification charts in the EAP to verify that the phone numbers and persons in the specified positions are current. The EAP will be revised if any of the contacts have changed.

- Contacting the local law enforcement agency to verify the phone numbers and persons in the specified positions. In addition, the dam owner or his representative will ask if each person contacted knows where the EAP is kept and if responsibilities described in the EAP are understood.

- Calling the locally available resources to verify that the phone number, addresses, and available resources are current.

7.2 Revisions

The dam owner or his representative is responsible for updating the EAP document. When revisions occur, the dam owner will provide the revised pages and revised revision summary page to all the EAP document holders electronically. The document holders are responsible for updating their outdated copy of the respective document(s) whenever revisions are received. Outdated pages shall be immediately discarded to avoid any confusion with the revisions.

7.3 EAP Periodic Test

The dam owner will host and facilitate a periodic test of the EAP at least once every 2 years.

The periodic test will consist of a meeting, including a tabletop exercise. Invitations for attendance should include the dam owner, staff gage observers, the owner's engineer, the local emergency management director, VA DCR Dam Safety representative, VA Department of Emergency Services (VDEM) representative, and at least one representative of local law enforcement, along with other EAP record holders and those with key responsibilities listed in the EAP. Before the tabletop exercise begins, meeting participants may visit the dam to familiarize themselves with the dam site.

The tabletop exercise will include the facilitator presenting a scenario of an emergency event at the dam. The scenario will be developed prior to the exercise. Once the scenario has been presented, the participants will discuss the responses and actions that they would take to address and resolve the scenario. The narrator will control the discussion, ensuring realistic responses and developing the scenario throughout the exercise. The dam owner or their representative should complete an event log (Appendix A) as they would during an actual event.

After the tabletop exercise, the nine sections of the EAP will be reviewed and discussed. Mutual aid agreements and other emergency procedures can be discussed. The dam owner or his representative will prepare a written summary of the periodic test and revise the EAP as necessary.

In the intervening years, an EAP drill will be held. Invitations for attendance should include the dam owner, staff gage observers, and the owner's engineer, along with any others with key responsibilities listed in the EAP. The EAP drill will include reviewing and updating the EAP together, however it will not include a tabletop exercise.

8.0 PREPAREDNESS

8.1 Access to the Site

Access to the site in all weather conditions should be pre-planned by the staff gauge observer and alternate observer to avoid areas of flooding.

Access to either end of the dam will normally be by automobile along Fawn Lake Parkway. In the case where access to the low-level outlet valve control box is necessary and the emergency spillway is either in operation or expected to operate, it may be necessary to access the dam from the west end using Fawn Lake Parkway. The map in Appendix B shows the primary and secondary access routes to the dam.

8.2 Surveillance

This dam is unattended during normal operating conditions however it is inspected daily by the dam owner.

The dam owner or his representative also monitors the status of weather fronts through the National Weather Service (NWS). The NWS maintains a hurricane center that reports on hurricanes, tropical storms, and tropical depressions as they travel and affect coastal and inland areas. Their website address is: http://www.nhc.noaa.gov/

The expected response time from the observer's home to the dam should be less than one (1) hour from the time they receive the information that a flood watch or warning has been declared. The observers should never put themselves in harm's way; however, in the event a

hurricane or tropical depression occurs with high winds the observers shall only venture out when weather conditions permit safe dam access.

Pre-planned access routes should be chosen given that even small streams crossing state roads may flood, preventing safe access. The observers and staff should never attempt to cross a road that has flood water crossing it at a depth greater than one-half (1/2) foot unless the vehicle is specially equipped for that purpose. Access to the dam is via an unimproved access road that traverses the dam crest. Fawn Lake Parkway wraps around the reservoir so there are primary and secondary access ways via Fawn Lake Parkway on either side of the dam.

Alternative routes should be chosen for access by foot if a car is unsafe for use. Other alternative means of surveillance may be considered such as drone flights and the installation of remote monitoring equipment (camera, depth gage, etc.).

8.3 Response During Periods of Darkness

The staff gauge has reflective signage so that it can be easily read from the location chosen by the staff gauge observer with a flashlight after dark. This is currently anticipated to be the high ground behind the marina, without crossing into the emergency spillway by car or foot except when it is safe to approach the staff gage at the marina boat launch.

The staff gauge observer should check the overflow spillway for erosion once the spillway starts to flow. The staff gauge observer should monitor the water level and go to higher ground when the level rises.

During periods of darkness, it will be necessary to light the affected areas of the dam with flashlights and car headlights. Light plants should be brought in if the situation is expected to occur over a long period of time. Potential sources are listed in Appendix E.

8.4 Response during Weekends and Holidays

The Fawn Lake Community security team is available 24 hours a day and 7 days a week. The staff gauge observer also lives locally and can respond as needed 24 hours per day and 7 days per week. When the staff gauge observer leaves the area, they should contact the alternate observer so coverage in the event of a problem will continue while they are away.

8.5 Alternative Systems of Communications

Communications during a major rainfall event may be problematic. Telephone land lines should be used as the first means of communication. Cellular telephones may be used to supplement the land lines. When calling locally, dial 911 from a landline or cell phone to reach the Spotsylvania County Emergency Management Division Communications Center (911 Center). Unfortunately, telephone lines like electrical lines are subject to being broken by falling trees so radio communication during large storm events is often required.

The primary system of communication within the Fawn Lake Property will be by cell phone and Community Association portable radios operating on Channel 2. Fawn Lake Community Safety 'Base' will monitor this channel. Phone numbers are contained in the Notification Charts. Alternate systems will be either landline from a neighboring house or the Fawn Lake Community Association office and main gate guard house.

8.6 Emergency Supplies

It is recommended that barricades be stockpiled at the local fire and rescue buildings so roads could be closed as needed. Emergency access to supplies and equipment should be planned before any emergency is called.

The following equipment and materials are available on-site.

1. *1-Ton Dump Truck*

Sand and stone can be obtained at a local quarry during business hours or possibly from the Virginia Department of Transportation after hours. Light plants can be rented from a local rental company. Contact information is contained in Appendix E.

9.0 INUNDATION MAPS

Planimetric maps were produced depicting the location of structures, roads, and other property that would be endangered should the impounding structure fail. The resulting Inundation Maps that graphically display downstream inhabited areas and structures, roads, and other pertinent structures within the identified inundation areas are provided in Appendix C.

The breach analysis of Fawn Lake Dam and mapping of downstream inundation zone were completed by Dewberry & Davis in March of 2010. Fawn Lake Dam's probable maximum flood (PMF) inundation zone extends 23 miles downstream of the dam. This zone follows Greenfield Creek to the Po River and ends at the confluence of the Po and Ni Rivers 1.6 miles downstream of I-95. The inundation maps were updated by others in August 2023 as part of the six-year update cycle.

APPENDIX A
Observer Documents

Contact Checklist

Fawn Lake Dam, No. 177009

Spotsylvania County, Virginia **Date _____**

The following contacts should be made immediately after the emergency level is determined (See Section 5.0 for guidance to determine the appropriate emergency level for a specific situation). The person making the contacts should initial and record the time of the call and who was notified for each contact made. See the *Notification Charts* for critical contact information.

Emergency Level 1	CONTACTED	TIME OF CALL	CONTACT NAME
-Dam Owner's Engineer	☐	_____am/pm	_____
-VA DCR Dam Safety	☐	_____am/pm	_____
-FLCA Staff	☐	_____am/pm	_____

Emergency Level 2	CONTACTED	TIME OF CALL	CONTACT NAME
-Dam Operator's Engineer	☐	_____am/pm	_____
-Office of Emergency Management	☐	_____am/pm	_____
-VA DCR Dam Safety	☐	_____am/pm	_____
-FLCA Staff	☐	_____am/pm	_____

Emergency Level 3	CONTACTED	TIME OF CALL	CONTACT NAME
-Office of Emergency Management	☐	_____am/pm	_____
-VA DCR Dam Safety	☐	_____am/pm	_____
-Dam Operator's Engineer	☐	_____am/pm	_____
-FLCA Staff	☐	_____am/pm	_____

Emergency Event Log

Fawn Lake Dam, No. 177009

Spotsylvania County, Virginia **Date _____**

When and how was the event detected?

_____

_____

_____

Weather conditions:

_____

General description of the emergency situation:

_____

_____

_____

Emergency level determination: _____ Made by: _____

Actions and Event Progression

Date	Time	Action/event progression	Taken by

Report prepared by: _____ Date: _____

Dam Emergency Situation Report

(to be completed following the termination of the emergency)

Fawn Lake Dam, No. 177009

Spotsylvania County, Virginia **Date _____**

Weather Conditions: _____

General description of emergency situation:

_____

_____

_____

Area(s) of dam affected:

_____

_____

_____

Extend of dam damage:

_____

_____

_____

Possible cause(s): _____

Effect on dam's operation: _____

Initial reservoir elevation: _____ Time: _____

Maximum reservoir elevation: _____ Time: _____

Final reservoir elevation: _____ Time: _____

Description of area flooded downstream/damages/injuries/loss of life:

_____

_____

_____

Other data and comments:

_____

_____

Observer's name and telephone number: _____

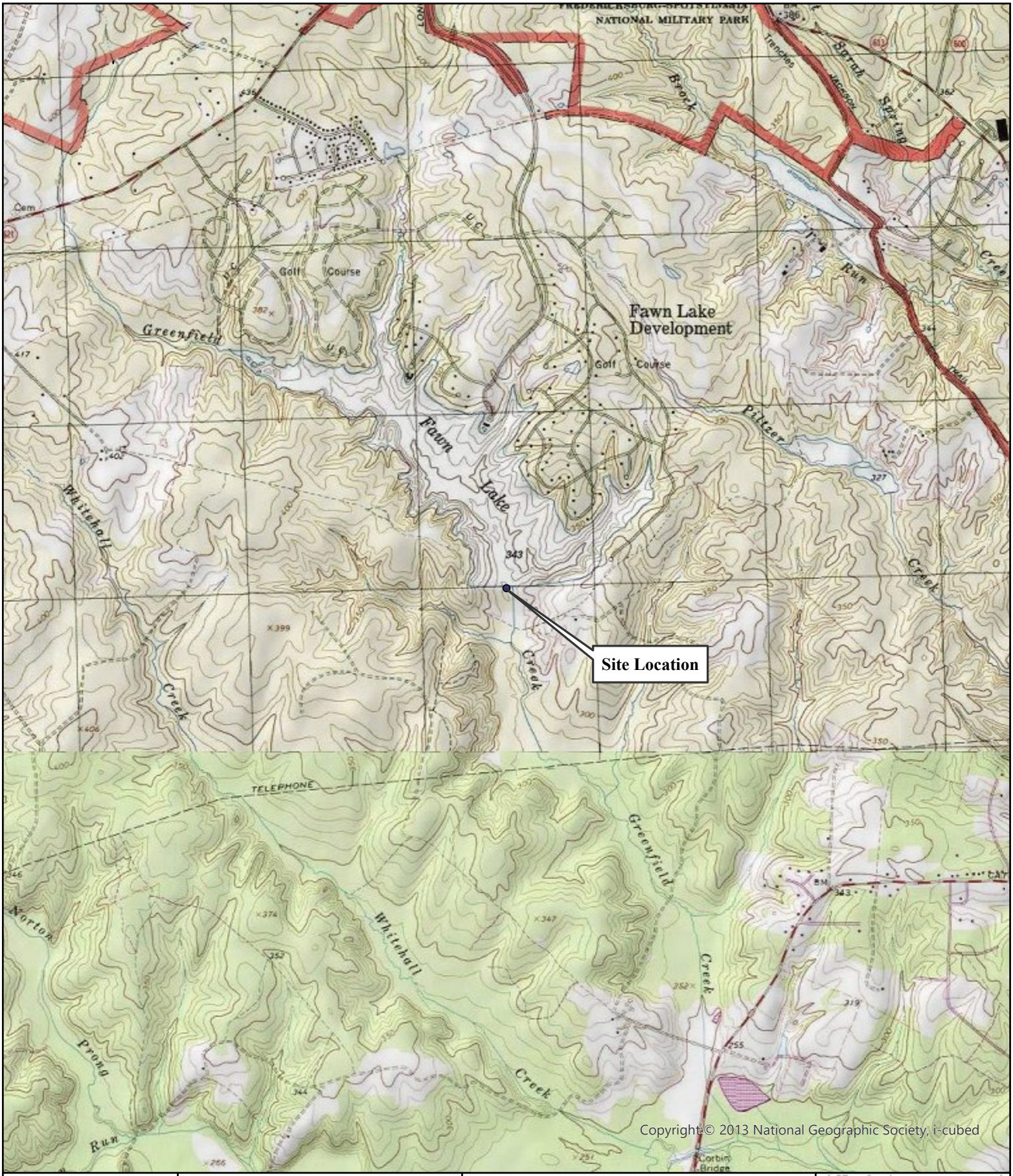
Record of EAP Holders

Copy Number	Organization	Person receiving copy
1	Fawn Lake Community Association, Inc. 11300 Longstreet Drive Spotsylvania, VA 22551	Ron Bishop, President 412-841-6986
1	Fawn Lake Community Association, Inc. 11300 Longstreet Drive Spotsylvania, VA 22551	Chief Hennessey 804-720-3549
2	Spotsylvania County Office of Emergency Management – 9119 Dean Ridings Lane, 2nd Floor, Spotsylvania, VA 22553	Donald Willis 540-455-2637
3	Spotsylvania County Sheriff's Office 9119 Dean Ridings Lane, 2nd Floor, Spotsylvania, VA 22553	Roger L. Harris 540-507-7200
4	VDOT Fredericksburg Residency 86 Deacon Rd, Fredericksburg, VA 22405	Kyle Bates, P.E. 540-907-6055
5	Virginia DCR Dam Safety Region 2 600 E. Main St, 24th Floor, Richmond, VA 23219	Brenton Payne, P.E. 804-840-7213
6	Virginia Department of Emergency Management – Region 2 13206 Lovers Lane, Culpeper, VA 22701	Alexa Boggs 804-674-2400
7	AMT Engineering, Inc. 100 Gateway Centre Pkwy, Ste. 140, Richmond, VA 23235	Don Rissmeyer, P.E. 804-916-9476

Record of EAP Revisions and Updates

Revision Number	Date	Revisions Made	By Whom

APPENDIX B
Site Vicinity Map



A. MORTON THOMAS AND ASSOCIATES, INC.
CONSULTING ENGINEERS
www.amtengineering.com

Fawn Lake Dam
Site Vicinity Map

Fawn Lake Community
Spotsylvania County, Virginia
Project No. 24-0459.002
October 2024
Figure 1

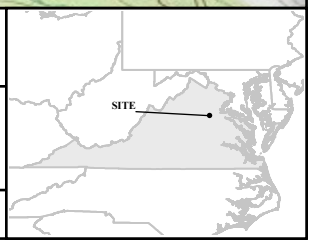
N

1:36,000

Miles
0 0.15 0.3 0.6 0.9 1.2

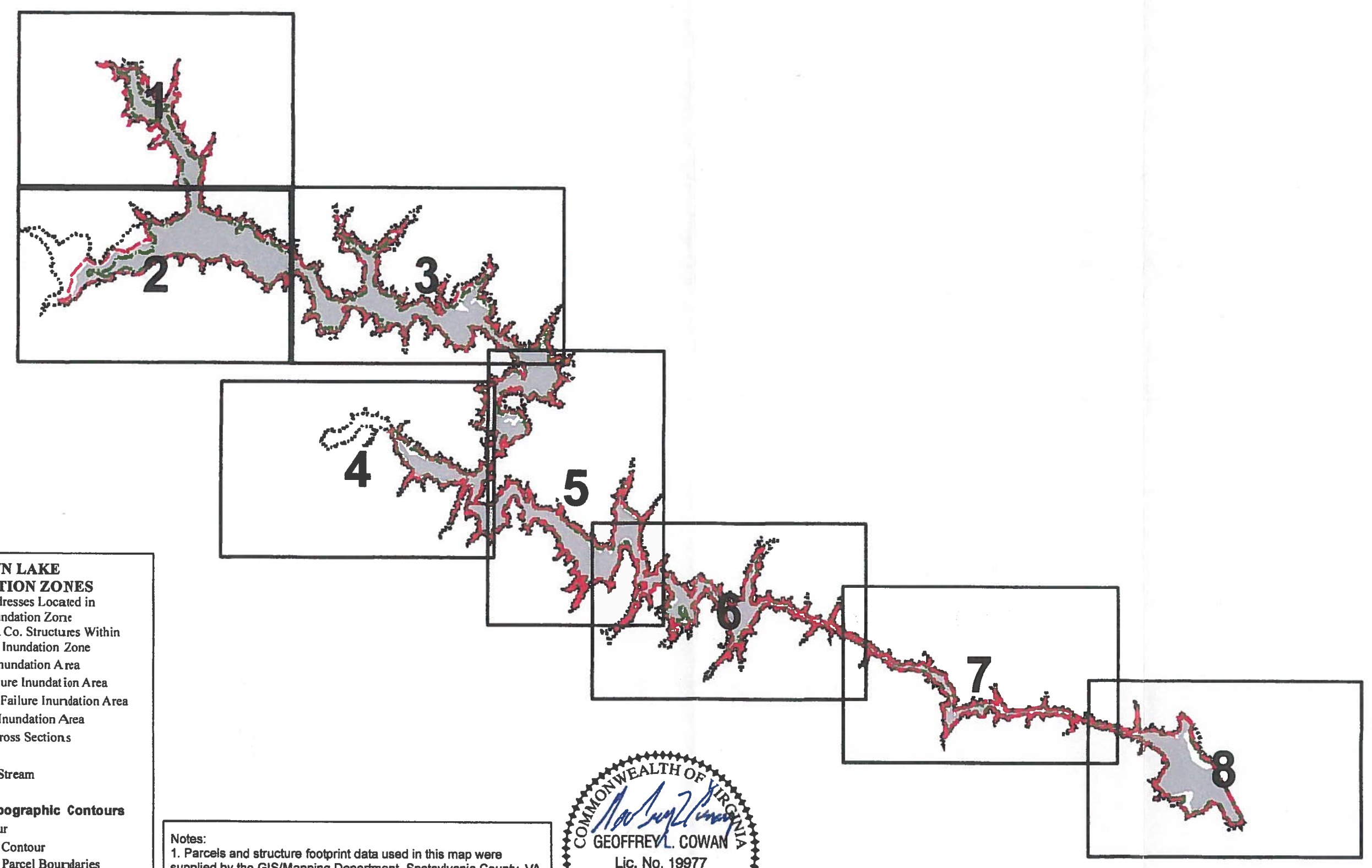
Disclaimer: AMT makes no warranties or guarantees regarding the accuracy or completeness of geographic features shown on this map. Spatial accuracy of measurement provided by source agencies can be obtained by contacting AMT.

DATA: NGS USGS 1:24,000 Topographic Maps



APPENDIX C
Inundation Maps

FAWN LAKE INUNDATION MAPPING INDEX



FAWN LAKE INUNDATION ZONES

- Property Addresses Located in PMF DB Inundation Zone
- Spotsylvania Co. Structures Within Dam Breach Inundation Zone
- Sunny Day Inundation Area
- 0.6 PMF Failure Inundation Area
- 0.6 PMF No Failure Inundation Area
- PMF Failure Inundation Area
- HEC-RAS Cross Sections

Streams

- Intermittent Stream
- Stream

USGS 10-ft Topographic Contours

- Index Contour
- Intermediate Contour
- Spotsylvania Parcel Boundaries
- Spotsylvania County Boundary

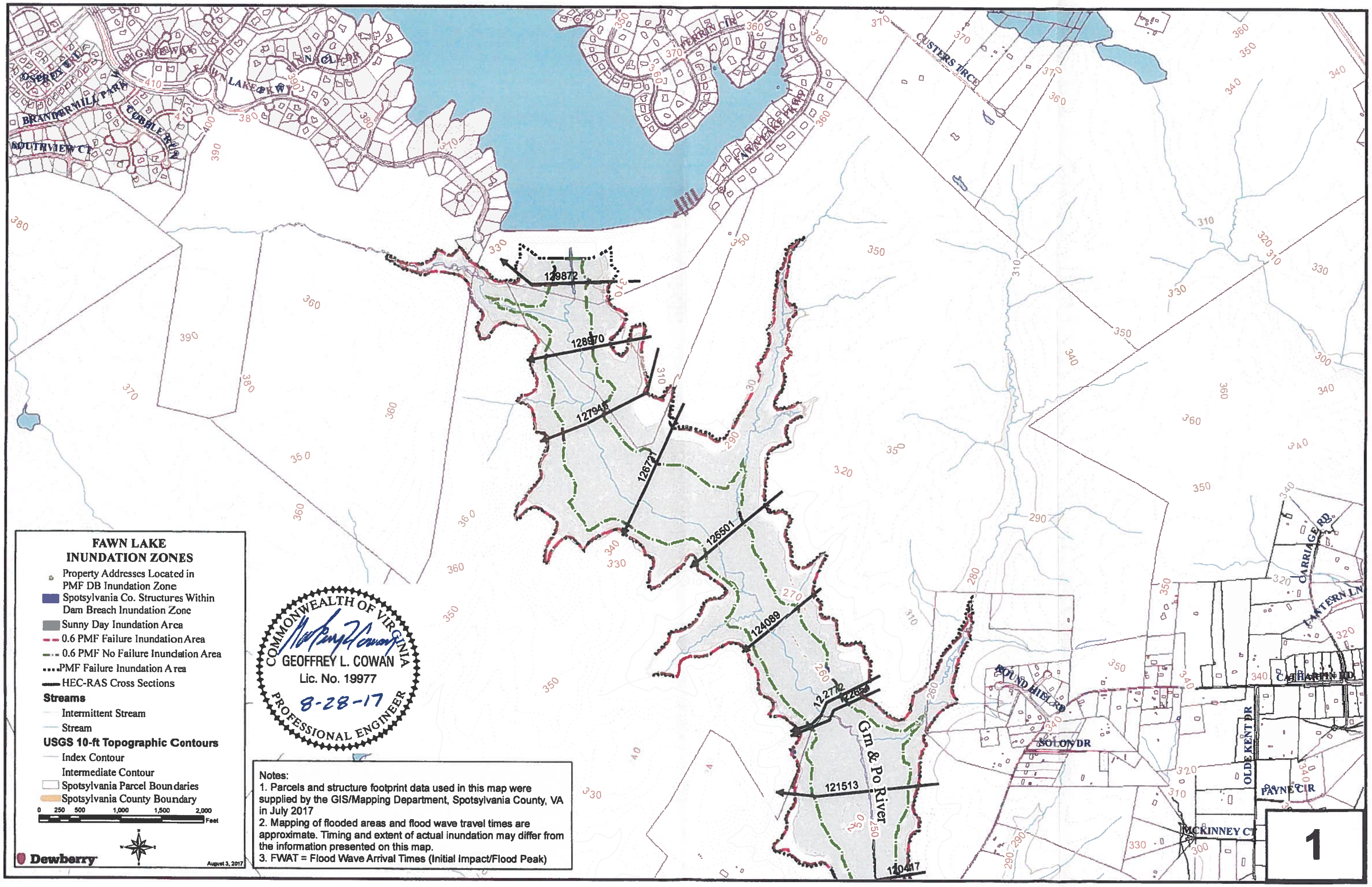
Dewberry

August 3, 2017

Notes:
1. Parcels and structure footprint data used in this map were supplied by the GIS/Mapping Department, Spotsylvania County, VA in July 2017
2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

COMMONWEALTH OF VIRGINIA
GEOFFREY L. COWAN
Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER

0 0.5 1 2 3 4 Miles


FAWN LAKE
INUNDATION ZONES
Property Addresses Located in PMF DB Inundation Zone
Spotsylvania Co. Structures Within Dam Breach Inundation Zone
Sunny Day Inundation Area
0.6 PMF Failure Inundation Area
0.6 PMF No Failure Inundation Area
PMF Failure Inundation Area
HEC-RAS Cross Sections
Streams
Intermittent Stream
Stream
USGS 10-ft Topographic Contours
Index Contour
Intermediate Contour
Spotsylvania Parcel Boundaries
Spotsylvania County Boundary
0 250 500 1,000 1,500 2,000 Feet
Dewberry
August 3, 2017
COMMONWEALTH OF VIRGINIA
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8-28-17
PROFESSIONAL ENGINEER
Notes:
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129872
128970
127945
126721
125501
124089
122772
122624
121513
120417
Gm & Po River
FAWN LAKE PKWY
NAGLE DR
PERRIN CIR
CUSTERS TRCE
BRANDERMILL PARK
SOUTHVIEW CT
CUBBLE RUN
EASTERN LN
CARRIAGE RD
CATHARINE RD
OLDE KENT DR
PAYNE CIR
MCKINNEY CT
SOLON DR
ROUND HILL RD
1

FAWN LAKE INUNDATION ZONES

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0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

XSEC 119733
Distance Downstream of Dam = 1.9 miles
FWAT = (15 min/54 min)
Max Flood Depth = 21.3 feet

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
1	9811 CATHARPIN RD

Notes:
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3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

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8-28-17
PROFESSIONAL ENGINEER

3

FAWN LAKE INUNDATION ZONES

- Property Addresses Located in PMF DB Inundation Zone
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USGS 10-ft Topographic Contours

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- Spotsylvania Parcel Boundaries
- Spotsylvania County Boundary

0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
2	9452 MILL POND RD
3	9428 MILL POND RD
4	9415 MILL POND RD
5	9429 MILL POND RD
6	9742 BEAVER LN
7	9842 BEAVER LN
8	9448 MILL POND RD
9	9444 MILL POND RD
10	10024 BEAVER LN
11	10530 BEAVER LN
12	9401 MILL POND RD
13	9621 PARADISE CT
14	9409 MILL POND RD
15	9490 VANREENAN WAY
16	8308 SINGING WOOD LN
17	8304 SINGING WOOD LN
18	8217 SINGING WOOD LN

XSEC 103427
Distance Downstream of Dam = 5.0 miles
FWAT = (40 min/1 hr 56 min)
Max Flood Depth = 34.4 feet

Notes:
1. Parcels and structure footprint data used in this map were supplied by the GIS/Mapping Department, Spotsylvania County, VA in July 2017
2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

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Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
42	8521 HERON POINTE WAY
43	9510 NORTHLAKE DR
44	9430 NORTHLAKE DR

FAWN LAKE INUNDATION ZONES

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0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

Notes:
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2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

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Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER

4

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
19	8136 SINGING WOOD LN
20	8135 SINGING WOOD LN
21	8619 ROBERT E LEE DR
22	8114 SINGING WOOD LN
23	8100 SINGING WOOD LN
24	8921 RIVER VALLEY LN
25	9001 RIVER VALLEY LN
26	9011 RIVER VALLEY LN
27	8926 RIVER VALLEY LN
28	8517 ROBERT E LEE DR
29	8911 RIVER VALLEY LN
30	8425 ROBERT E LEE DR
31	8421 ROBERT E LEE DR
32	8415 ROBERT E LEE DR
33	8424 ROBERT E LEE DR
34	8700 MILLWOOD DR
35	8510 ROBERT E LEE DR
36	8802 MILLWOOD DR
37	8804 MILLWOOD DR
38	8806 MILLWOOD DR
39	8808 MILLWOOD DR
40	8810 MILLWOOD DR
41	8812 MILLWOOD DR
45	9003 MILLWOOD CT
46	8323 OLD MILL LN
47	8401 OLD MILL LN

XSEC 84747
Distance Downstream of Dam = 8.6 miles
FWAT = (1 hr 30 min/3 hr 13 min)
Max Flood Depth = 40.2 feet

XSEC 58352
Distance Downstream of Dam = 13.6 miles
FWAT = (2 hr 40 min/5 hr 13 min)
Max Flood Depth = 32.0 feet

FAWN LAKE INUNDATION ZONES

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0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

Notes:
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2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

COMMONWEALTH OF VIRGINIA
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Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER

XSEC 47399
Distance Downstream of Dam = 15.6 miles
FWAT = (2 hr 55 min/5 hr 46 min)
Max Flood Depth = 33.2 feet

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
48	7722 PO RIVER DR
49	7714 PO RIVER DR
50	7640 PO RIVER DR
51	7630 PO RIVER DR
52	7708 HUNTER CV
53	7700 HUNTER CV
54	7707 HUNTER CV
55	7741 COURTHOUSE RD
56	7737 COURTHOUSE RD
57	7801 COURTHOUSE RD
58	7800 COURTHOUSE RD
59	7732 COURTHOUSE RD
60	7736 COURTHOUSE RD
61	7320 SNOW HILL DR
62	7901 MELTON LN
63	7300 SNOW HILL DR
64	7240 SNOW HILL DR

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
65	7315 SNOW HILL DR
66	8004 SOURWOOD CT
67	4 SHETLAND CT
68	230 MORGAN LN
69	225 MORGAN LN
70	223 MORGAN LN
71	310 CLYDESDALE CT
77	7225 GARDNER FARM RD
78	7235 GARDNER FARM RD
79	7818 COURTHOUSE RD

FAWN LAKE INUNDATION ZONES

- Property Addresses Located in PMF DB Inundation Zone
- Spotsylvania Co. Structures Within Dam Breach Inundation Zone
- Sunny Day Inundation Area
- 0.6 PMF Failure Inundation Area
- 0.6 PMF No Failure Inundation Area
- PMF Failure Inundation Area
- HEC-RAS Cross Sections

Streams
- Intermittent Stream
- Stream

USGS 10-ft Topographic Contours
- Index Contour
- Intermediate Contour
- Spotsylvania Parcel Boundaries
- Spotsylvania County Boundary

0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

Notes:
1. Parcels and structure footprint data used in this map were supplied by the GIS/Mapping Department, Spotsylvania County, VA in July 2017
2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)

COMMONWEALTH OF VIRGINIA
GEOFFREY L. COWAN
Lic. No. 19977
8-31-17
PROFESSIONAL ENGINEER

Addresses in PMF Dam Breach Inundation Zone	
MAP ID	Address
72	INDIAN ACRES
73	6437 MORRIS RD
74	47 WAUCOMA TRL
75	7001 JEFFERSON DAVIS HWY
76	6908 S ROXBURY MILL RD

COMMONWEALTH OF VIRGINIA
GEOFFREY L. COWAN
Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER

XSEC 36321
Distance Downstream of Dam = 17.7 miles
FWAT = (3 hr 15 min/6 hr 28 min)
Max Flood Depth = 31.6 feet

XSEC 18182
Distance Downstream of Dam = 21.2 miles
FWAT = (3 hr 40 min/6 hr 45 min)
Max Flood Depth = 29.0 feet

FAWN LAKE INUNDATION ZONES

- Property Addresses Located in PMF DB Inundation Zone
- Spotsylvania Co. Structures Within Dam Breach Inundation Zone
- Sunny Day Inundation Area
- 0.6 PMF Failure Inundation Area
- 0.6 PMF No Failure Inundation Area
- PMF Failure Inundation Area
- HEC-RAS Cross Sections

Streams
- Intermittent Stream
- Stream

USGS 10-ft Topographic Contours
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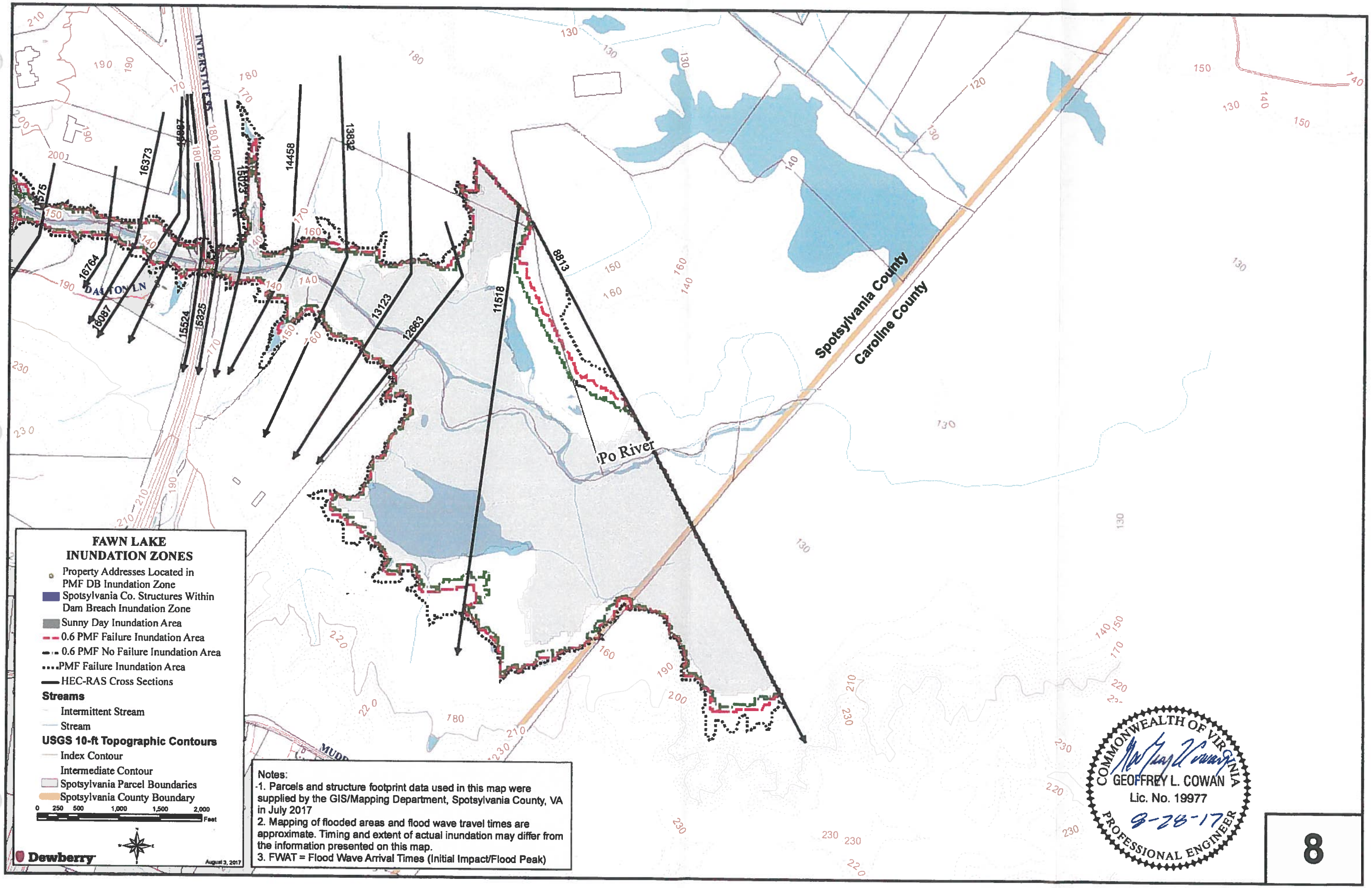
- Spotsylvania Parcel Boundaries
- Spotsylvania County Boundary

0 250 500 1,000 1,500 2,000 Feet

Dewberry

August 3, 2017

Notes:
1. Parcels and structure footprint data used in this map were supplied by the GIS/Mapping Department, Spotsylvania County, VA in July 2017
2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)
4. Indian Acres is a campground with mulitple impacted permanent and temporary structures


INTERSTATE 95
DALTON LN
16373
16764
16087
15524
15325
15023
14458
13832
13123
12663
11518
8813
Spotsylvania County
Caroline County
Po River
MUDD
FAWN LAKE
INUNDATION ZONES
Property Addresses Located in PMF DB Inundation Zone
Spotsylvania Co. Structures Within Dam Breach Inundation Zone
Sunny Day Inundation Area
0.6 PMF Failure Inundation Area
0.6 PMF No Failure Inundation Area
PMF Failure Inundation Area
HEC-RAS Cross Sections
Streams
Intermittent Stream
Stream
USGS 10-ft Topographic Contours
Index Contour
Intermediate Contour
Spotsylvania Parcel Boundaries
Spotsylvania County Boundary
0 250 500 1,000 1,500 2,000
Feet
Dewberry
August 3, 2017
Notes:
-1. Parcels and structure footprint data used in this map were supplied by the GIS/Mapping Department, Spotsylvania County, VA in July 2017
2. Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map.
3. FWAT = Flood Wave Arrival Times (Initial Impact/Flood Peak)
COMMONWEALTH OF VIRGINIA
GEOFFREY L. COWAN
Lic. No. 19977
8-28-17
PROFESSIONAL ENGINEER
8

APPENDIX D
Impacted Structures

Summary Table of Impacted Dwellings

				Sunny Day Breach		SDF w/ Breach		PMF w/Breach	
Map ID	Address	Map #	Distance from Dam (miles)	Peak FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)
1	9811 Catharpin Road	2	2.06					0.93	2.0
2	9452 Mill Pond Road	3	4.93					1.42	4.5
3	9428 Mill Pond Road	3	5.01	2.43	5.0	1.63	13.0	1.44	19.5
4	9415 Mill Pond Road	3	5.06	2.45	4.0	1.63	12.0	1.45	18.0
5	9429 Mill Pond Road	3	5.11	2.45	3.5	1.63	11.5	1.45	17.5
6	9742 Beaver Lane	3	4.93					1.42	1.0
7	9842 Beaver Lane	3	4.7					1.37	0.5
8	9448 Mill Pond Road	3	4.93					1.42	4.5
9	9444 Mill Pond Road	3	4.93	2.39	0*	1.59	7.5	1.42	14.0
10	10024 Beaver Lane	3	4.45					1.34	0*
11	10530 Beaver Lane	3	4.12					1.3	4.5
12	9401 Mill Pond Road	3	5.06					1.45	0*
13	9621 Paradise Court	3	4.93			1.59	4.5	1.42	10.5
14	9409 Mill Pond Road	3	5.25					1.48	8.0
15	9490 VanReenan Way	3	5.16					1.48	3.5
16	8308 Singing Wood Lane	3	7.86					2.25	3.0
17	8304 Singing Wood Lane	3	7.86					2.25	1.0
18	8217 Singing Wood Lane	3	7.86					2.25	2.5
101	8216 Singing Wood LN	3	7.86			2.70	6.5	2.25	13.5
42	8521 Heron Pointe WAY	4	9.33			3.9	7.0	3.03	14.0

				Sunny Day Breach		SDF w/ Breach		PMF w/Breach	
Map ID	Address	Map #	Distance from Dam (miles)	Peak FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)
43	9510 Northlake Dr	4	10.44					3.4	0.5
44	9430 Northlake Dr	4	10.44					3.4	1.5
19	8136 Singing Wood Lane	5	8.02			2.7	8.5	2.25	16.0
20	8135 Singing Wood LN	5	8.02					2.25	9.5
21	8619 Robert E Lee DR	5	8.32					2.48	6.0
22	8114 Singing Wood LN	5	8.17					2.38	17.5
23	8100 Singing Wood LN	5	8.24	4.48	0.5	2.91	11.0	2.38	18.5
24	8921 River Valley LN	5	8.43					2.48	3.5
25	9001 River Valley LN	5	8.32					2.48	4.0
27	8926 River Valley LN	5	8.32			3.02	10.0	2.48	17.0
28	8517 Robert E Lee DR	5	8.55	4.60	0*	3.34	10.0	2.68	17.5
29	8911 River Valley LN	5	8.43					2.48	7.5
30	8425 Robert E Lee DR	5	8.55					2.68	11.5
31	8421 Robert E Lee DR	5	8.55					2.68	6.5
32	8415 Robert E Lee DR	5	8.55					2.68	4.0
33	8424 Robert E Lee DR	5	8.59					2.68	6.0
34	8700 Millwood DR	5	9.80					3.16	9.0
35	8510 Robert E Lee DR	5	8.59					2.68	2.0
36	8802 Millwood DR	5	9.91					3.26	11.0

				Sunny Day Breach		SDF w/ Breach		PMF w/Breach	
Map ID	Address	Map #	Distance from Dam (miles)	Peak FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)
37	8804 Millwood DR	5	9.91					3.26	13.0
38	8806 Millwood DR	5	9.91					3.26	7.5
39	8808 Millwood DR	5	10.06					3.26	3.0
40	8810 Millwood DR	5	10.06					3.26	7.5
41	8812 Millwood DR	5	10.06					3.26	7.5
45	9003 Millwood CT	5	11.19			4.46	4.5	3.43	11.5
46	8323 Old Mill LN	5	12.11					3.64	2.5
47	8401 Old Mill LN	5	12.23					3.68	1.5
102	9001 Millwood CT	5	11.23			4.52	6.5	3.47	13.5
105	8800 Millwood DR	5	9.8			3.89	6.5	3.16	13.5
48	7722 Po River DR	6	14.28			6.35	5.0	4.68	12.0
49	7714 Po River DR	6	14.39					4.72	0*
50	7640 Po River DR	6	14.74					4.75	11.0
51	7630 Po River DR	6	14.83					4.75	9.0
52	7708 Hunter CV	6	15.18					4.96	2.5
53	7700 Hunter CV	6	15.32					5.12	0.5
54	7707 Hunter CV	6	15.64					5.18	0*
55	7741 Courthouse RD	6	15.64			7.12	0*	5.27	6.5
56	7737 Courthouse RD	6	15.64					5.27	0*

				Sunny Day Breach		SDF w/ Breach		PMF w/Breach	
Map ID	Address	Map #	Distance from Dam (miles)	Peak FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)	FWAT (Hours)	Max Depth (ft)
57	7801 Courthouse RD	6	15.62					5.27	10.0
58	7810 Courthouse RD	6	15.62			7.12	3.5	5.27	9.5
59	7732 Courthouse RD	6	15.62					5.27	0*
60	7736 Courthouse RD	6	15.62					5.27	3.5
61	7320 Snow Hill DR	6	15.86					5.35	1.5
62	7901 Melton LN	6	15.74			7.16	0*	5.31	3.5
63	7300 Snow Hill DR	6	16.22	10.83	0*	7.46	10.5	5.56	19.0
64	7240 Snow Hill DR	6	16.07	10.63	1.0	7.3	11.0	5.43	19.5
65	7315 Snow Hill DR	6	16.22					5.56	15.0
66	8004 Sourwood CT	6	16.22					5.56	1.0
67	4 Shetland CT	6	16.84					5.81	0*
68	230 Morgan LN	6	17.05					5.84	1.5
69	225 Morgan LN	6	17.05					5.84	8.0
70	223 Morgan LN	6	17.14					5.84	10.5
71	310 Clydesdale CT	6	17.23					5.87	6.5
79	7818 Courthouse RD	6	15.62	10.4	11.5	7.12	24.5	5.27	30.5
77	7225 Gardner Farm RD	6	16.29					5.56	0.5
78	7235 Gardner Farm RS	6	16.35					5.68	12.0
103	7669 Courthouse RD	6	16.01					5.38	0*

				Sunny Day Breach		SDF w/ Breach		PMF w/Breach	
Map ID	**Address**	**Map #**	**Distance from Dam (miles)**	**Peak FWAT (Hours)**	**Max Depth (ft)**	**FWAT (Hours)**	**Max Depth (ft)**	**FWAT (Hours)**	**Max Depth (ft)**
106	7731 Courthouse RD	6	15.78					5.31	13.5
107	7459 Azores Islands WAY	6	15.32			6.97	7.5	5.12	13.5
72	0 Indian Acres	7	18.71	11.64	0*	8.04	7.0	6.14	15.0
73	6437 Morris RD	7	19.09					6.25	2.5
74	47 Waucoma TRL	7	20.06					6.55	9.0
75	7001 Jefferson Davis HWY	7	20.67					6.65	2.5
76	6908 S Roxbury Mill RD	7	21.15					6.5	6.71
80	39 Waucoma TRL	7	20.20					6.58	14.0

1. Empty cells with a grey background indicate the structure is not within the inundation zone of the specific breach case.

2. Maximum flood depths with a '0*' value were found to have flood elevations below the first floor elevation of the structures. This is the result of using a topographic map with two-foot contours instead of ten-foot contour elevations. Mapping with two-foot contours was not available at the time of the initial inundation zone mapping.

3.

Summary of Impacted Roads & Bridges

Roadways that are expected to be submerged or partially submerged during a PMF Breach are as follows:

1. West Catharpin Road (Rte. 608) – From 11236 West Catharpin Road to 11670 West Catharpin Road. A length of approximately 3,000 ft.

2. Catharpin Road (Rte. 612) – 9768 Catharpin Road to intersection of Catharpin Road and Corbin Lane.

3. Corbin Lane - From intersection of Catharpin Road (Rte. 612) to 4,250 ft. west of intersection.

4. Mill Pond Road - from intersection with Beaver Lane to 2,000 ft. south of intersection.

5. Private Drive – Located on east side of Mill Pond Road between Fox Hunt Trail and Vanreenen Way. Beginning 530 ft. from intersection with Mill Pond Road and continuing past that point approximately 300 ft.

6. Vanreenen Way – Beginning approximately 1,000 ft. east from intersection with Mill Pond Road and continuing past that point approximately 225 ft.

7. Mystic Lane – Beginning approximately 2,000 ft. north of the Intersection with Robert E. Lee Drive and Mystic Lane, and continuing past that point approximately 800 ft.

8. JR Montgomery Lane – Beginning approximately 900 ft. north of intersection with Robert E. Lee Drive and continuing north approximately 300 ft.

9. Robert E. Lee Drive (Rte. 608) – From 8974 Robert E. Lee Drive to 8528 Robert E. Lee Drive. A length of approximately 3,700 ft.

10. River Valley Lane – Beginning at the intersection with Robert E. Lee Drive (Rte. 608) and extending north on River Valley Lane approximately 1,100 ft.

11. Singing Wood Lane – Two areas along this road: (a) From approximately 8305 Singing Wood Lane to Singing Wood Lane 8100, (b) From approximately 8028 Singing Wood Lane to 8305 Singing Wood Lane.

12. Millwood Drive – Three areas along this road: (a) From approximately 8700 Millwood Dr. to 8802 Millwood Dr, (b) From approximately 8805 Millwood Dr to 8809 Millwood Dr,

13. From approximately 8909 Millwood Dr to 8911 Millwood Dr.

14. Millwood Court – West of 9009 Millwood Ct.

15. North Lake Drive – Two areas along this road: (a) Beginning at the Intersection of Jennings Lane and Northlake Drive, (Two isolated areas), go approximately 528 ft. west on Northlake Drive to the beginning of the inundated area for the length of approximately 158 ft, (b) proceed approximately another 1,000 ft. to the beginning of the inundated area for the length of approximately 264 ft.

16. Southlake Drive – Two areas along this road: (a) Beginning at the intersection of Jennings Lane and Southlake Drive, go approximately 580 ft. south to the beginning of the inundated area for a length of approximately 425 ft. (b) proceed approximately another 850 feet to the beginning of the inundated area for the length of approximately 700 feet.

17. Millwood Drive – Two areas along this road: (a) Intersection of Millwood Drive, east to end of Millwood Drive at cul-de-sac, (b) from approximately 8810 Millwood Drive to 8812 Millwood Drive.

18. Old Mill Lane – From approximately 8312 Old Mill Lane to 8314 Old Mill Lane.

19. Block House Road (Rte. 648) From approximately 7893 Blockhouse Road to 7812 Blockhouse Road over the Poe River.

20. Courthouse Road (Rte. 208) - 8150 Courthouse Road to 8044 Courthouse Road, a length of approximately 1,400 feet.

21. Snow Hill Drive – From approximately 7142 Snow Hill Drive to 7240 Snow Hill Drive.

22. Garner Farm Road – Beginning approximately 1,250 ft east of intersection with Courthouse Road and extending 1,000 feet beyond that point.

23. Blackfish Lane – Two location on this road: (a) Between Iowa Lane and Ponca Lane, (b) Between Kusan Lane and Cornstalk.

24. Laughing Water Lane – From intersection with Fawnskin Lane, east to end of Laughing Water Lane.

25. Fawnskin Lane – From Laughing Water Lane to Canonchet Lane.

26. Naomi Lane – From Laughing Water Lane to Snow Bird Lane.

27. Blackfoot Lane – For its entire length.

28. Algonquin Drive – From Blackfoot Lane to Seneca Drive.

29. Maya Lane – From Cliff Dweller Lane to Kickapoo Lane.

30. Jefferson Davis Highway (Rte. 1) - 6828 Jefferson Davis Highway South to 6636 Jefferson Davis Highway, length of approximately 1,200 ft over the Po River.

31. North Roxbury Mill Road (Rte. 632) – From 6906 North Roxbury Mill Road to 6973 North Roxbury Mill Road over the Po River.

32. Interstate 95 - over the Po River at approximately mile marker 119.

Of these 32 roadways, the eight (8) public roadways that may be affected include:

1. Catharpin Road (Rte. 612) over the Po River
2. Mill Pond Road over Wright's Pond
3. Robert E. Lee Drive over the Poe River between 8700 and 8517
4. Block House Road (Rte. 648) over Po River
5. Courthouse Road (Rte. 208) over the Po River
6. Jefferson Davis Highway (Rte.1) over the Po River
7. North Roxbury Mill Road (Rte. 632) over the Po River
8. Interstate 95 over the Po River

APPENDIX E
Emergency Supplies
(Companies that can aid in the event of an emergency)

CONTRACTORS		
Bander-Smith (Dam Repair/Diving) P.O. Box 88 Ashland, VA 23005	Mr. Cameron Smith	804-212-2898 804-615-4560
W.C. Spratt Inc. (Earthwork) 491 Central Road Fredericksburg, VA 22401	Mr. Doug Tait	540-373-2002
Chemung Contracting Corp. (Earthwork) 7201 Rail Line Court Gainesville, VA 20156	Mr. Ed Dalrymple	540-829-7203
EQUIPMENT RENTAL (Lights and Pumps)		
Sunbelt Rentals 1250 Belman Road Fredericksburg, VA 22401		540-710-1300 800-667-9328
United Rentals 10 Le-Way Drive Fredericksburg, VA 22406		540-899-0055 800-877-3687
United Rentals 4616 Lassen Lane Fredericksburg, VA 22408		540-710-2300 800-222-7777
Rain for Rent 23025 Airpark Drive (SR-684) North Dinwiddie, VA 23803		804-732-6914 877-667-8541
MATERIALS - SAND		
Ennstone Inc (Albion Plant) 1170 Kings Highway Fredericksburg, VA 22405-3814		540-361-1653
MATERIALS - CRUSHED STONE		
9100 Luck Stone Ln Fredericksburg, VA 22407-5302		540-898-6060
MATERIALS - MISC		
Home Depot 5771 Plank Road Fredericksburg, Virginia 22407		540-785-8871

The Fawn Lake Community Association and the Fawn Lake Country Club may also have resources to help with an emergency situation, including manpower, trucks, and supplies (e.g., sand at the beach and sand traps). The residents of Fawn Lake are also potential sources of materials and equipment (e.g., private pontoon boats, manpower, etc.).

APPENDIX F
Glossary of Terms

Glossary of Terms

Abutment	That part of the valley side against which the dam is constructed. The left and right abutments of dams are defined with the observer looking downstream from the dam.
Acre-foot	A unit of volumetric measure that would cover 1 acre to a depth of 1 foot. One acre-foot is equal to 43,560 cubic feet or 325,850 gallons.
Berm	A nearly horizontal step (bench) in the upstream or downstream sloping face of the dam.
Boil	A disruption of the soil surface due to water discharging from below the surface. Eroded soil may be deposited in the form of a ring (miniature volcano) around the disruption.
Breach	An opening through the dam that allows draining of the reservoir. A controlled breach is an intentionally constructed opening. An uncontrolled breach is an unintended failure of the dam.
Conduit	A closed channel (round pipe or rectangular box) that conveys water through, around, or under the dam.
Control section	A usually level segment in the profile of an open channel spillway above which water in the reservoir discharges through the spillway.
Cross section	A slice through the dam showing elevation vertically and direction of natural water flow horizontally from left to right. Also, a slice through a spillway showing elevation vertically and left and right sides of the spillway looking downstream.
Dam	An artificial barrier generally constructed across a watercourse for the purpose of impounding or diverting water.
Dam failure	The uncontrolled release of a dam's impounded water.
Dam Operator	The person(s) or unit(s) of government with responsibility for the operation and maintenance of dam.
Drain or blanket	A water collection system of sand and gravel. Typically pipes along the downstream portion of the dam to collect seepage and convey it to a safe outlet.
Drainage area (watershed)	The geographic area on which rainfall flows into the dam.
Drawdown	The lowering or releasing of the water level in a reservoir over time or the volume lowered or released over a particular period of time.
Emergency	A condition that develops unexpectedly, endangers the structural integrity of the dam and/or downstream human life and property, and requires immediate action.

Emergency Action Plan (EAP)	A formal document identifying potential emergency conditions that may occur at the dam and specifying preplanned actions to minimize potential failure of the dam or minimize failure consequences including loss of life, property damage, and environmental impacts.
Evacuation map	A map showing the geographic area downstream of a dam that should be evacuated if it is threatened to be flooded by a breach of the dam or other large discharge.
Filter	The layers of sand and gravel in a drain that allow seepage through an embankment to discharge into the drain without eroding the embankment soil.
Freeboard	Vertical distance between a stated water level in the reservoir and the top of dam.
Gate	An operable, watertight valve to manage the discharge of water from the dam.
Groin	The area along the intersection of the face of a dam and the abutment.
Hazard classification	A system that categorizes dams (high, significant, or low) according to the degree of their potential to create adverse incremental consequences such as loss of life, property damage, or environmental impacts of a failure.
Height of dam	The vertical distance between the lowest point along the top of the dam and the lowest point at the downstream toe, which usually occurs in the bed of the outlet channel.
Hydrograph	A graphical representation of either the flow rate or flow depth at a specific point above or below the dam over time for a specific flood occurrence.
Instrumentation	An arrangement of devices installed into or near dams that provide measurements to evaluate the structural behavior and other performance parameters of the dam and appurtenant structures.
Inundation area or map	The geographic area downstream of the dam that would be flooded by a breach of the dam or other large discharge.
Notification	To immediately inform appropriate individuals, organizations, or agencies about a potentially dangerous situation so they can initiate appropriate actions.
Outlet works (principal spillway)	An appurtenant structure that provides for controlled passage of normal water flows through the dam.
Piping	The progressive destruction of an embankment or embankment foundation by internal erosion of the soil by seepage flows.

Probable Maximum Precipitation (PMP) or Flood (PMF)	The theoretically greatest precipitation or resulting flood that is meteorologically feasible for a given duration over a specific drainage area at a particular geographical location.
Reservoir	The body of water impounded or potentially impounded by the dam.
Riprap	A layer of large rock, precast blocks, bags of cement, or other suitable material, generally placed on an embankment or along a watercourse as protection against wave action, erosion, or scour.
Risk	A measure of the likelihood and severity of an adverse consequence.
Seepage	The natural movement of water through the embankment, foundation, or abutments of the dam.
Slide	The movement of a mass of earth down a slope on the embankment or abutment of the dam.
Spillway (auxiliary or emergency)	The appurtenant structure that provides the controlled conveyance of excess water through, over, or around the dam.
Spillway capacity	The maximum discharge the spillway can safely convey with the reservoir at the maximum design elevation.
Spillway crest	The lowest level at which reservoir water can flow into the spillway.
Tailwater	The body of water immediately downstream of the embankment at a specific point in time.
Toe of dam	The junction of the upstream or downstream face of an embankment with the ground surface.
Top of dam (crest of dam)	The elevation of the uppermost surface of an embankment that can safely impound water behind the dam.

APPENDIX G
Dam Record Drawings

FAWN 9A

DISPOSAL AREA

FLOW

UPSTREAM

DOWNSTREAM

CHANNEL "B"

℄ PRINCIPAL SPILLWAY

SUGGESTED LOCATION OF DIVERSION CHANNEL

NOT TO SCALE

STA 10+81 ℄ DAM = STA 0+00 ℄ CANOUT

℄ DAM

BASE LINE REFERENCE

CLEARING & GRUBBING LIMITS OF THE DAM SITE

OSCOLA HOLE SEE SHEET 13 OF 21

CEM.

CEMETERIES ARE NOT TO BE DISTURBED

CONNECTED FILL

℄ EMS

ORIGINAL WATER LINE

NEW WATER LINE

TO BE EXCAVATED

LEGEND

EXISTING CONTOUR

PROPOSED CONTOUR

IRON PIN

CONC. MONUMENT

PROPERTY BOUNDARY

FOR ROAD LAYOUT SEE SHEET 9A OF 21

CHANNEL "A"

CHANNEL "B"

TYP. CROSS SECTIONS OF DIVERSION CHANNELS

NOT TO SCALE

1" EQUALS 100'
GRAPHIC SCALE

NOTES:

1. ALL HIGH ORGANIC SOILS (roots, leaves, decayed materials, etc.) UNDER THE DAM SITE ARE TO BE EXCAVATED AND DISPOSED OF IN THE DISPOSAL AREA DESIGNATED BY THE ENGINEER.
2. LOGS OF ALL TEST BORINGS AND LAB DATA ON SOIL ANALYSIS ARE AVAILABLE UPON REQUEST TO THE ENGINEER.
3. THE EMERGENCY SPILLWAY IS TO BE UNDER CUT 12" AND BACKFILLED WITH CLASS "A" COMPACTED FILL.
4. CULVERTS SHALL BE USED WHERE HAUL ROADS OR EQUIPMENT CROSS DRAINAGE WAYS.
5. PRECAUTION SHALL BE TAKEN TO PREVENT EROSION AND SILTATION WHERE POSSIBLE.
6. ENTIRE DOWNSTREAM PORTION OF DIVERSION CHANNEL SHALL BE FILLED, GARDED, & SEEDED UPON COMPLETION OF DAM.
7. NO EXCAVATION FOR BORROW IS TO TAKE PLACE WITHIN 150' OF THE UPSTREAM TOE OF DAM.
8. THE DAM SITE AND BORROW AREAS ARE TO BE CLEARD AND GRUBBED UNDER THIS CONTRACT. ALL OTHER AREAS ARE TO BE CLEARED ONLY AND WILL BE ACCOMPLISHED UNDER SEPERATE CONTRACT.

PLAN OF DAM & EMS.

FAWN LAKE COMMUNITY

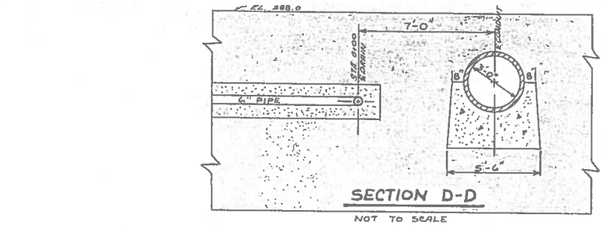
AMERICAN CENTRAL CORPORATION

SPOTSYLVANIA COUNTY, VIRGINIA

QUIBLE & ASSOCIATES, INC.
CHASE CITY, VIRGINIA

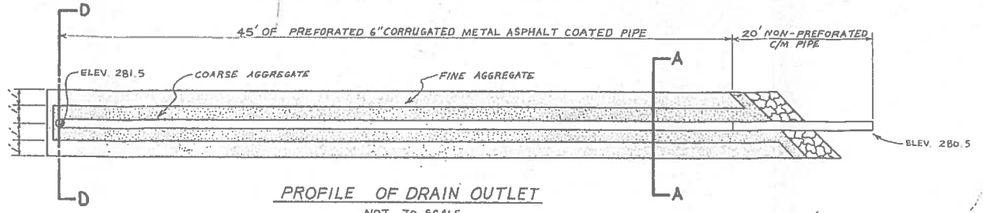
FILE NO.	DATE	DESIGNED	DRAWN	SCALE	SHEET
21072-10	11-2-73	M.L.C.	R.L.W.	AS NOTED	9 OF 21

REV. 9-18-74
REV. 9-24-74



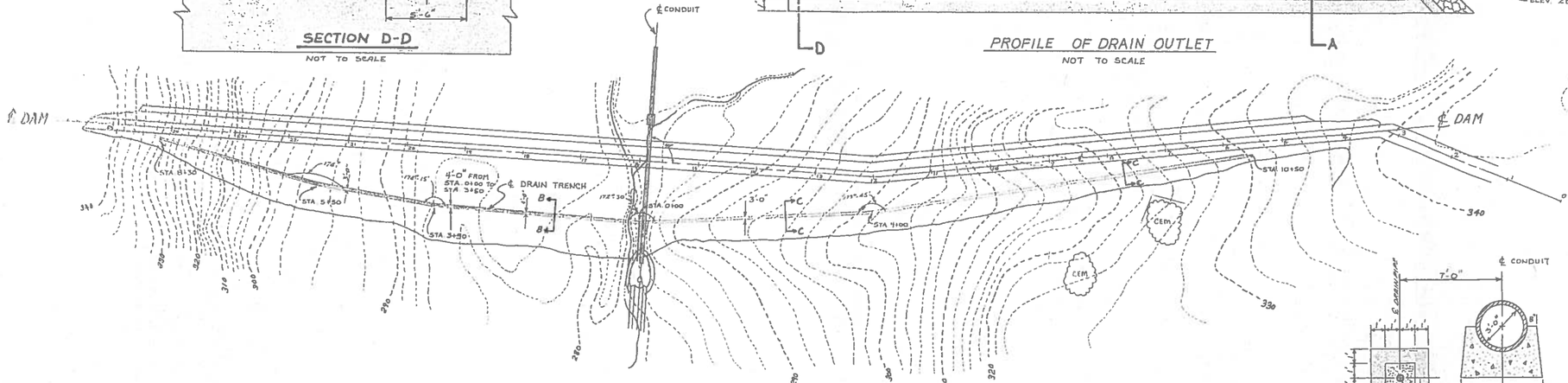
SECTION D-D

NOT TO SCALE



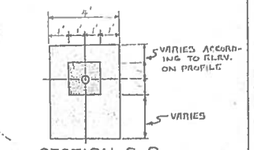
PROFILE OF DRAIN OUTLET

NOT TO SCALE



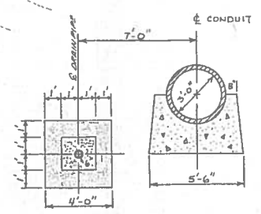
DOWNSTREAM

SCALE: 1" = 100'



SECTION B-B

NOT TO SCALE



SECTION A-A

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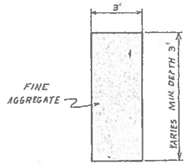
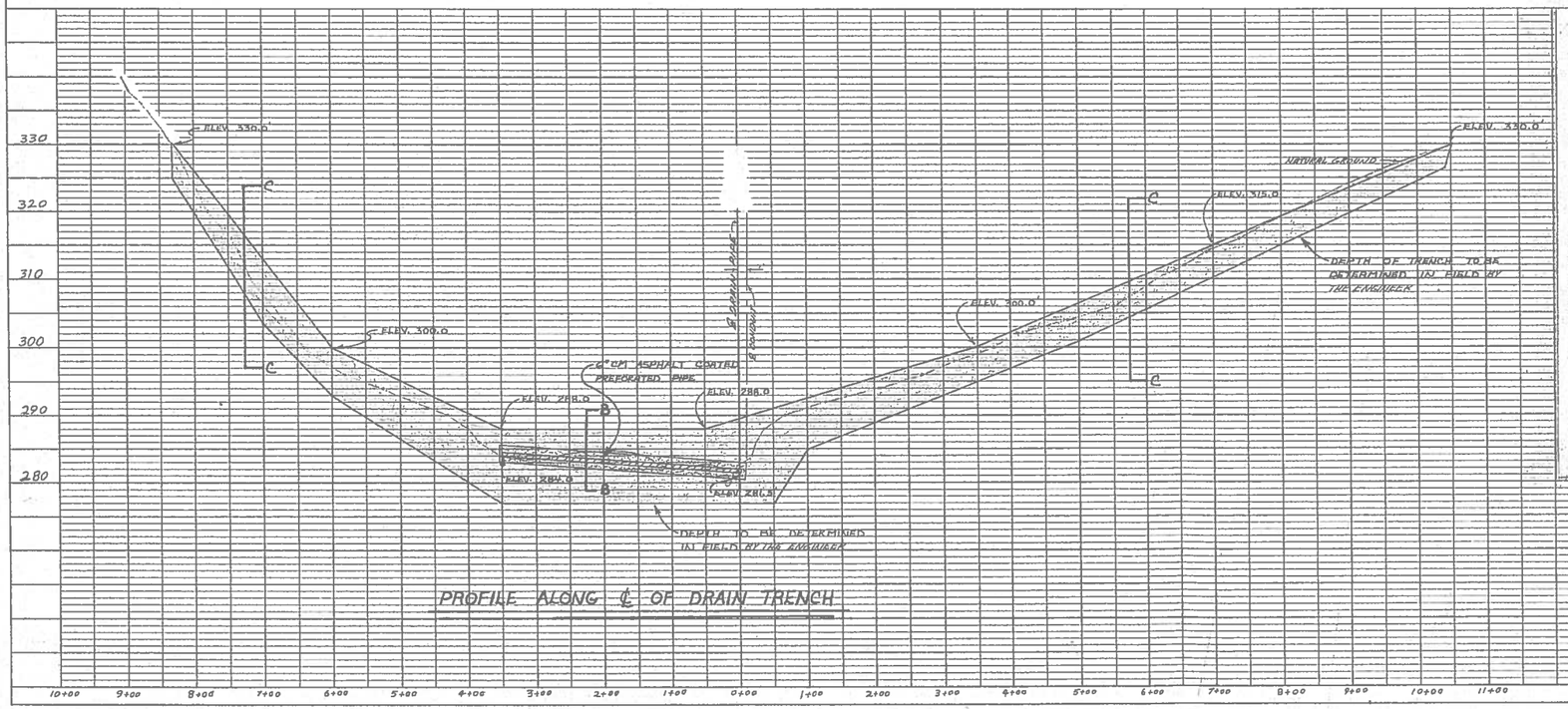
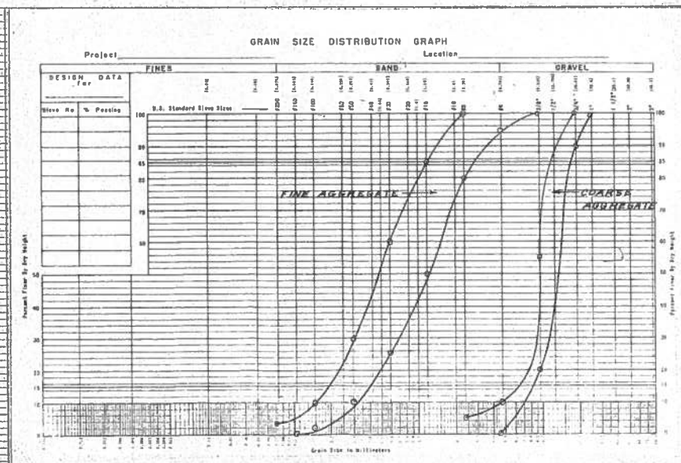


SECTION C-C

NOT TO SCALE



PROFILE ALONG ℄ OF DRAIN TRENCH



DRAINAGE DETAILS

FAWN LAKE COMMUNITY

AMERICAN CENTRAL CORPORATION

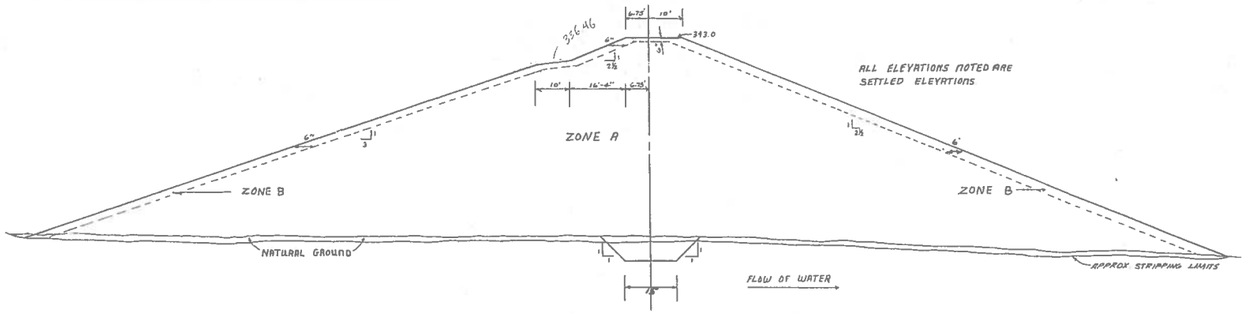
SPOTSYLVANIA COUNTY, VIRGINIA

QUIBLE & ASSOCIATES, INC.

CHASE CITY, VIRGINIA

FILE NO.	DATE	DESIGNED	DRAWN	SCALE	SHEET
21072-10	11-2-73	M.L.C	M.W.B.	AS NOTED	12 OF 21

REV. 9-18-74



TYPICAL SECTION OF COMPACTED FILL

SCALE 1" = 20'

CLASS	ZONE	MATERIALS	SOURCE	MAX. ROCK SIZE	MAX LIFT THICKNESS (UNCOMPACTED)	REQUIRE WATER CONTENT	COMPACTION
A	A	PLASTIC OR SEMI-PLASTIC SILTS & CLAYS (ML, CL, SM, & SC)	BORROW AREAS A, B, C AND EMERGENCY SPILLWAY AND ALTERNATE BORROW AREA IF NEEDED.	6"	9"	OPTIMUM TO + 3 %	95 % OF STANDARD PROCTOR AASHO : T99-70
A	B	SEMI-PLASTIC TO NON-PLASTIC SITY SANDS - ML & SM (TOP SOIL)	TOP SOIL FROM BORROW AREAS A, B, C AND EMERGENCY SPILLWAY AND BETTER MATERIALS FROM LOW BENCHES NEAR FLOOD PLAIN	6"	9"	OPTIMUM TO + 3 %	95 % OF STANDARD PROCTOR AASHO : T99-70

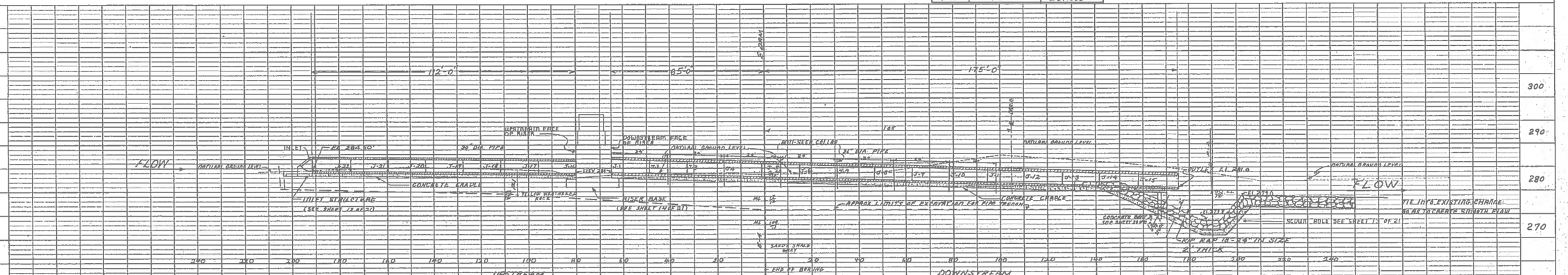
CONDUIT		
JOINT	DIST. FROM RISER WALL	INVERT ELEV.
J-1	0	284.00
J-2	16	283.80
J-3	32	283.60
J-4	48	283.40
J-5	64	283.20
J-6	80	283.00
J-7	96	282.80
J-8	112	282.60
J-9	128	282.40
J-10	144	282.20
J-11	160	282.00
J-12	176	281.80
J-13	192	281.60
J-14	208	281.40
J-15	224	281.20
OUTLET	240	281.00
DRAIN		
J-16	0	284.000
J-17	16	284.071
J-18	32	284.143
J-19	48	284.214
J-20	64	284.286
J-21	80	284.357
J-22	96	284.428
INLET	112	284.500

PIPE DATA

36" I.D. REINFORCED CONCRETE PRESSURE PIPE
15 - 16'-0" SECTIONS (deep Joint)
1 - SPIGOT WALL PIECE FOR 12" WALL
PRESSURE HEAD TO TOP OF DAM-62.0'
LOAD - 51783 #/LF BASED ON O.D 3.47'
MIN. 3 EDGE BEARING STRENGTH FOR 0.001" CRACK
(PRESTRESSED PIPE) = 12,995 #/LF- AWWA-C-301
SUPPLIER NOTE - CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON ONE 16'-0" SECTION.

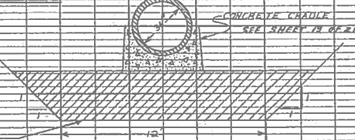
30" I.D. REINFORCED CONCRETE PRESSURE PIPE
7 - 16'-0" SECTIONS (deep Joint)
1 - SPIGOT WALL FITTING FOR 10" WALL
1 - BELL WALL FITTING FOR 24" WALL
PRESSURE HEAD TO TOP OF DAM = 59'
LOAD 33,500 #/LF BASED ON O.D = 3.01'
MIN. 3 EDGE BEARING STRENGTH FOR 0.001" CRACK
(PRESTRESSED PIPE) = 8500 #/LF - AWWA - C - 301

LAY ALL PIPE WITH BELLS UPSTREAM



PROFILE ALONG ℄ OF PRINCIPAL SPILLWAY

PRINCIPAL SPILLWAY EXCAVATION
30" DRAIN PIPE



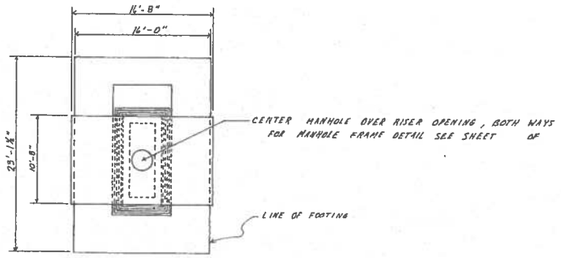
PRINCIPAL SPILLWAY EXCAVATION
36" DIA. DRAIN PIPE

FILL PLACEMENT & PRINCIPAL SPILLWAY
FAWN LAKE COMMUNITY
AMERICAN CENTRAL CORPORATION
SPOTSYLVANIA COUNTY, VIRGINIA
QUIBLE & ASSOCIATES, INC.
CHASE CITY, VIRGINIA

FILE NO.	DATE	DESIGNED	DRAWN	SCALE	SHEET
2107P	11-2-73	M.L.C.	M.W.B	AS NOTED	11 OF 21

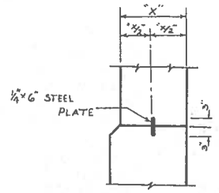
REV. 9-18-74 REV. 3/7/75 TYPICAL SECTION OF DAM

PLATE 1—PLAN PROFILE O. P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO



TOP PLAN

1/8" = 1'-0"

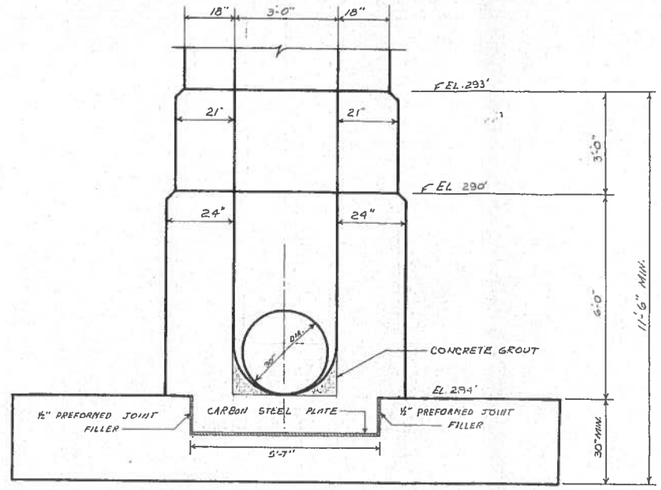


TYP PLATE CONSTRUCTION JOINT

SCALE - NONE

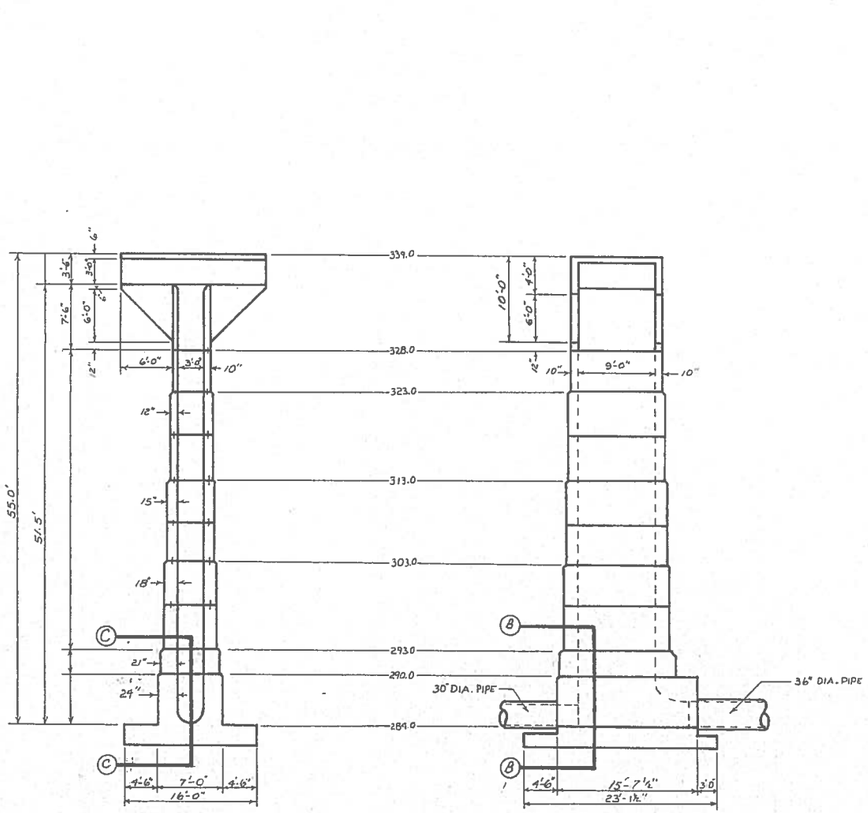
NOTE: STEEL PLATE, GRADE B OR C, CONTINUOUS THRU CONSTRUCTION JOINT. SPLICES SHALL BE EITHER:

1. BUTT WELDED
2. LAPPED 3" & BOLTED
3. LAPPED 3" & FILLET WELDED



SECTION B-B

SCALE ½" = 1'-0"



SECTION A-A

SCALE 1/8" = 1'-0"

SIDEWALL ELEVATION

SCALE 1/8" = 1'-0"

SECTION C-C

SCALE 1/2" = 1'-0"

RISER DETAILS

FAWN LAKE COMMUNITY

AMERICAN CENTRAL CORPORATION

SPOTSYLVANIA COUNTY, VIRGINIA

QUIBLE & ASSOCIATES, INC.

CHASE CITY, VIRGINIA

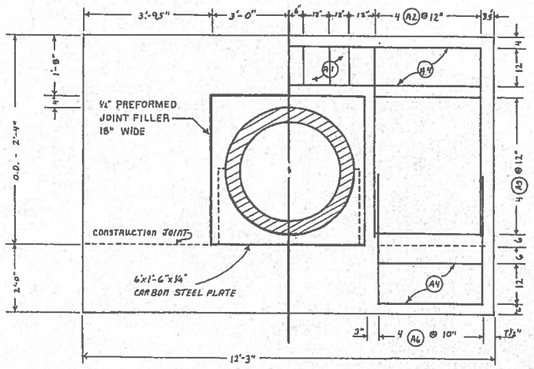
FILE NO.	DATE	DESIGNED	DRAWN	SCALE	SHEET
21072-10	11-2-73	M.L.C.	P.H.R.	AS NOTED	14 OF 21

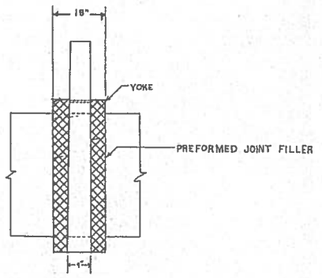
REV 9-18-74

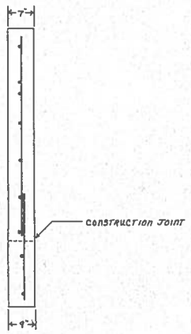
ANTI-SEEP COLLAR STEEL SCHEDULE

MARK	SIZE	LENGTH	TYPE	QUAN/COLLAR	TOTAL QUAN.	TOTAL LENG.
A-1	4	1-3	1	4	32	40'
A-2	4	5-3	1	8	64	336'
A-3	4	3-3	1	8	64	208'
A-4	4	11-9	1	4	32	376'
A-5	4	1-6	1	4	32	48'
A-6	4	3-9	L	8	64	240'

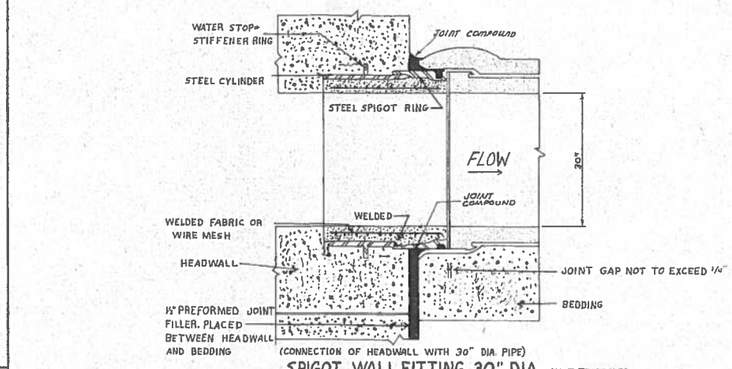
BAR TYPE





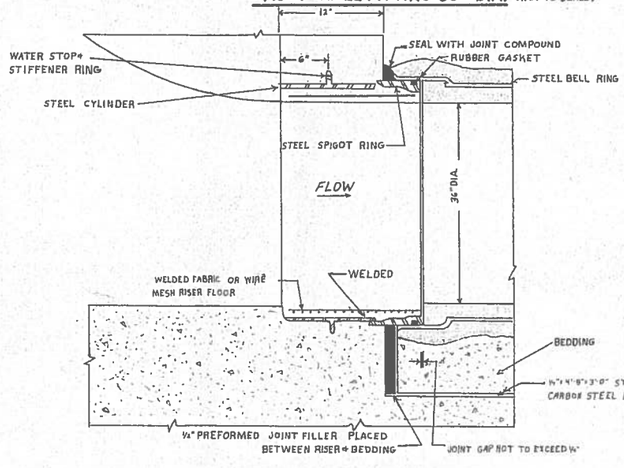


DETAIL OF ANTI-SEEP COLLAR
(NOT TO SCALE)

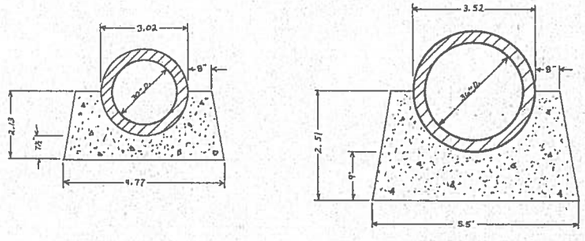


(CONNECTION OF HEADWALL WITH 30" DIA PIPE)

SPIGOT WALL FITTING 30" DIA. (NOT TO SCALE)



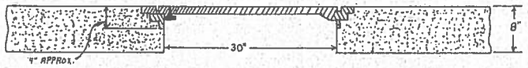
SPIGOT WALL FITTING 36" DIA.
NOT TO SCALE

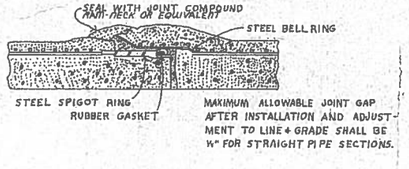


CONCRETE BEDDING
(CLASS 4000 CONC.)
NOT TO SCALE

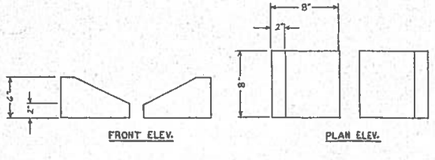
MANHOLE ASSEMBLY

1. THE ASSEMBLY SHALL BE GRAY IRON CASTING CLASS 30 WITH A 30" DIA. OPENING
2. THE LIFTING DEVICE SHALL CONSIST OF A 1" DIA HOLE, APPROX. 3" FROM THE OUTSIDE PERIMETER OF THE LID.
3. THE LOCKING DEVICE SHALL CONSIST OF A HOOK AT ONE EDGE OF THE LID UNDERSIDE AND A ROTATING BAR WITH A HEX BOLT AT THE OPPOSITE EDGE.



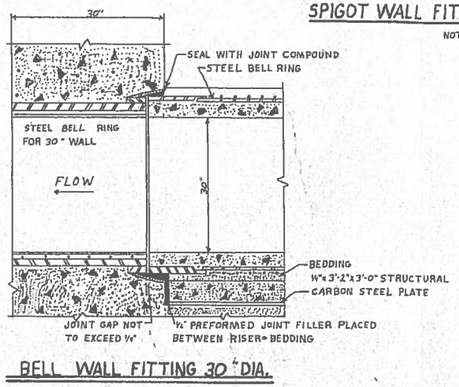


REINFORCED CONCRETE PIPE - JOINT DETAILS



SUGGESTED SUPPORT BLOCK

NOTE:
THE CONTRACTOR SHALL DETERMINE THE NUMBER & SIZE OF THE BLOCKS.



BELL WALL FITTING 30" DIA.
(CONNECTION OF RISER WITH 30" DIA. PIPE)

CONDUIT DETAILS

FAWN LAKE COMMUNITY

AMERICAN CENTRAL CORPORATION
SPOTSYLVANIA COUNTY, VIRGINIA

QUIBLE & ASSOCIATES, INC.
CHASE CITY, VIRGINIA

FILE NO.	DATE	DESIGNED	DRAWN	SCALE	SHEET
21072-10	11-2-73	M.L.C.	E.C.W.	AS NOTED	19 OF 21

REV. 9-18-74

TOE DRAIN DESIGN

FAWN LAKE DAM

PREPARED FOR

SPOTSYLVANIA COUNTY, VIRGINIA
NTS/VIRGINIA DEVELOPMENT COMPANY

BY

ECS MID-ATLANTIC

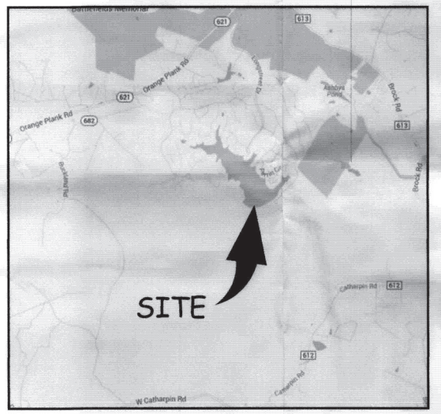
TAX MAP# 18
PARCELS 19 AND 21

OWNER:

NTS/VIRGINIA DEVELOPMENT COMPANY
ATTN: MR. RALPH DE ROSA
12201 LONGSTREET DRIVE
SPOTSYLVANIA, VIRGINIA 22551

APPLICANT:

NTS/VIRGINIA DEVELOPMENT COMPANY
ATTN: MR. RALPH DE ROSA
12201 LONGSTREET DRIVE
SPOTSYLVANIA, VIRGINIA 22551



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VICINITY MAP
NTS

RLD:
JOSEPH A. MEIBURGER, P.E. #46897

(NAMED RLD FOR PERMIT PURPOSES ONLY
CONTRACTOR TO PROVIDE RLD UPON CONTRACT AWARD)

PERMIT:
DCR: ALTERATON PERMIT PENDING

PRELIMINARY NOT FOR CONSTRUCTION

INDEX OF DRAWINGS

COMMONWEALTH OF VIRGINIA
JOSEPH A MEIBURGER III
Lic. No. 046897
PROFESSIONAL ENGINEER
6/11/2014

ECS MID-ATLANTIC, LLC
9409 INNOVATION DRIVE
MANASSAS, VA 20110
(703) 396-6299
(703) 396-6298 FAX

CELEBRATING OVER 25 YEARS OF EXCELLENCE

SETTING THE STANDARD FOR SERVICE

Fawn Lake Dam
Toe Drain Design
Spotsylvania County, Virginia

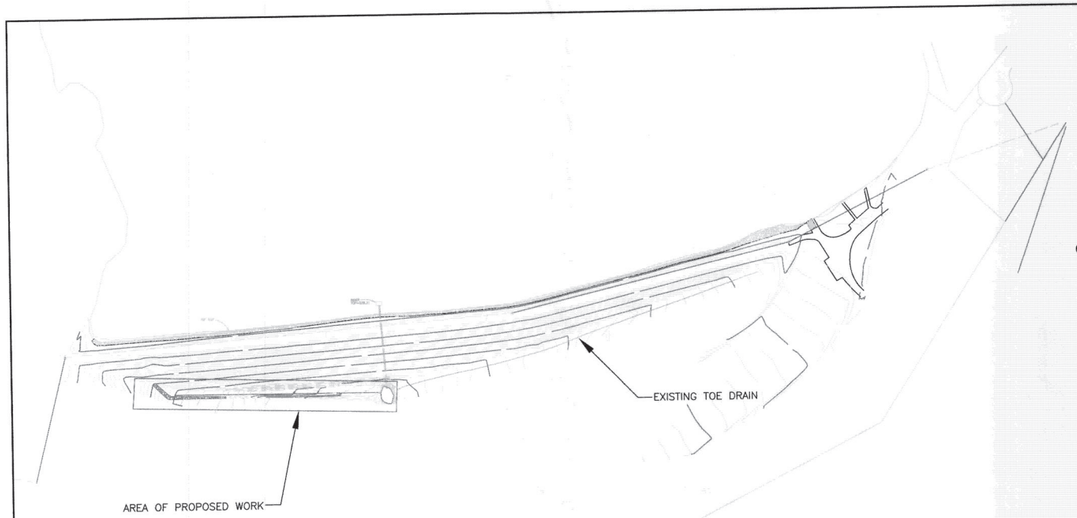
C-0
COVER SHEET
NTS Virginia Development Company

ECS REVISIONS

ENGINEER	DRAFTING
JM	DJK

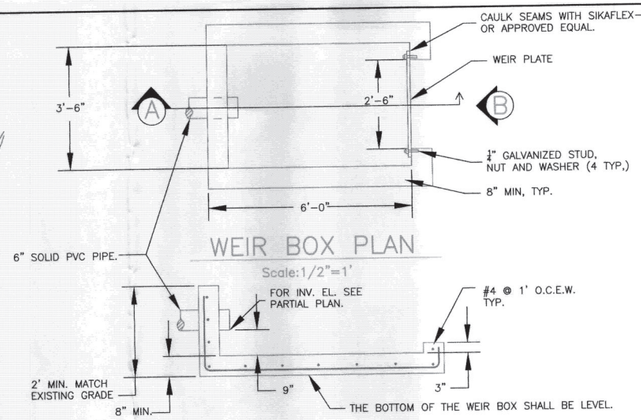
SCALE: AS NOTED
PROJECT NO.: 29:1741
SHEET: 1 OF 5
DATE: 04/04/2014

177009_DAMDSGNLP_20140611



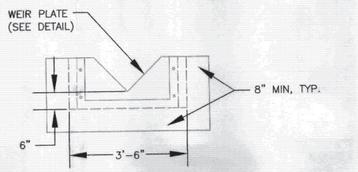
SCALE (IN FEET)
200' 100' 200'
1" 0

OVERALL PLAN
Scale= 1":200'

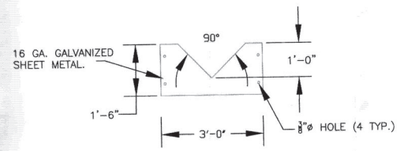


WEIR BOX PLAN
Scale:1/2"=1'

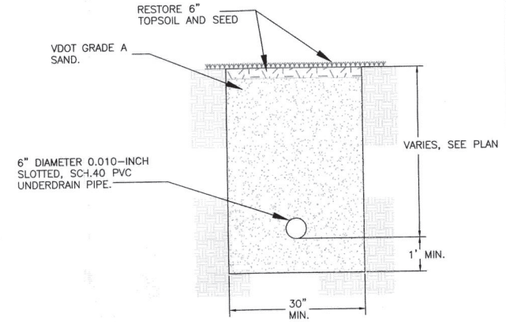
WEIR BOX SECTION A
Scale:1/2"=1'



WEIR BOX SECTION B
Scale:1/2"=1'



WEIR PLATE DETAIL
Scale:1/2"=1'



TOE DRAIN DETAIL
Scale:1/2"=1'

NOTES:

1. CONSTRUCTION TO BE PERFORMED ONLY DURING PERIODS OF TIME WHEN RESERVOIR IS AT OR BELOW NORMAL POOL ELEVATION (BELOW EL. 336 FEET).
2. SLOPE EXCAVATION AS NECESSARY FOR SAFETY IN ACCORDANCE WITH APPLICABLE REGULATIONS.
3. MAXIMUM 15 ft. OF TRENCH OR 1.5 X PIPE LENGTH, WHICHEVER IS GREATER, SHALL BE OPEN.
4. EXCAVATION AND INSTALLATION OF TOE DRAIN SHALL PROCEED FROM DOWNSTREAM TO UPSTREAM.
5. CONSTRUCT CLEAN-OUTS IN ACCORDANCE WITH VDOT STANDARD DETAIL SCO-1 TYPE "B" AT MAXIMUM 100 ft. INTERVALS.

PARTIAL PLAN
Scale= 1":60'

SCALE (IN FEET)
60' 30' 60'
1" 0

COMMONWEALTH OF VIRGINIA
JOSEPH A MEIBURGER III
Lic. No. 04697
PROFESSIONAL ENGINEER
6/11/2014

PRELIMINARY NOT FOR CONSTRUCTION

CELEBRATING OVER 25 YEARS OF EXCELLENCE

SETTING THE STANDARD FOR SERVICE

ECS MID-ATLANTIC, LLC
9409 INNOVATION DRIVE
MANASSAS, VA 20110
(703) 396-4800
(703) 396-4299 FAX

ECS

Fawn Lake Dam
Toe Drain Design
Spotsylvania County, Virginia

C-1
PLAN & DETAIL
NTS Virginia Development Company

ECS REVISIONS

ENGINEER	DRAFTING
JM	DJK

SCALE: AS NOTED
PROJECT NO.: 29:1741
SHEET: 2 OF 5
DATE: 04/04/2014

EROSION AND SEDIMENTATION PLAN NARRATIVE

PROJECT DESCRIPTION

The purpose of this project is to install a toe drain along the downstream toe to the left of the principal spillway outlet at Fawn Lake Dam. A total of 7,000 square feet of land is expected to be disturbed during construction. Flows from the toe drain are expected to be on the order of 10 gpm.

Work will commence by installing a weir box at the outlet and then installing the toe drain from downstream to upstream thereby draining the excavation during construction. This project is expected to be completed within 30 days.

EXISTING SITE CONDITIONS

The site is located at the downstream toe of a 65 foot high embankment dam with upstream and downstream slopes of 2.25H:1V. The area immediately adjacent to the project site is used as a common area. The Lake Wilderness Property Owners Association owns the Dam, the area immediately downstream of the dam. The downstream channel is Greenfield Creek. There is a farm downstream of the dam.

The area to be excavated is currently a delineated wetland. A permit to disturb the wetlands must be obtained prior to commencing work.

OFF-SITE AREAS

Use of offsite areas are not planned for this project.

EROSION AND SEDIMENT CONTROL MEASURES

Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standard and specifications of the handbook. The minimum standards of the VESCR shall be adhered to unless otherwise waived or approved by a variance.

STRUCTURAL PRACTICES

1. Silt Fence Barrier – 3.05 Silt fence sediment barriers will be installed downslope of the areas with minimal grades to filter sediment-laden runoff from sheet flow. Silt fence will also encircle any stockpiles of soil.
2. Temporary Construction Entrance – 3.02 A temporary construction entrance shall be installed within the gravel drive leading to the work site just before reaching the dam.
3. Outlet Protection – 3.18 Outlet protection will be incorporated into the final work at the downstream end of the weir box. VDOT No. 3 crushed gravel will be used.

VEGETATIVE PRACTICES

1. Topsoiling (Stockpile) – 3.30 Topsoil will be stripped from areas to be graded and stockpiled for use immediately after the trench is backfilled. As only 15 feet of trench may be opened at any one time, topsoil is not anticipated to be stockpiled anywhere except adjacent to the excavation.

MANAGEMENT STRATEGIES

1. Construction will be sequenced so that grading operations can begin and end as quickly as possible.
2. Temporary seeding or other stabilization will follow immediately after grading.
3. The job superintendent shall be responsible for the installation and maintenance of all erosion and sediment control practices.
4. After achieving adequate stabilization, the temporary E&S controls will be cleaned up and removed.

PERMANENT STABILIZATION

All areas disturbed by construction shall be stabilized with permanent seeding immediately following finish grading. Seeding shall be done with Kentucky 31 Tall Fescue according to Standard and Specification 3.32, PERMANENT SEEDING, of the handbook. In seeding operations, seed, fertilizer and lime will be applied prior to mulching.

MAINTENANCE

In general, all erosion and sediment control measures will be checked daily and after each significant rainfall. The following items will be checked in particular:

1. The plunge pool will be cleaned out on a regular basis.
2. The silt fence barrier will be checked regularly for undermining or deterioration of the fabric. Sediment shall be removed when the level of sediment deposition reaches half way to the top of the barrier.
3. The seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and reseeded as needed.

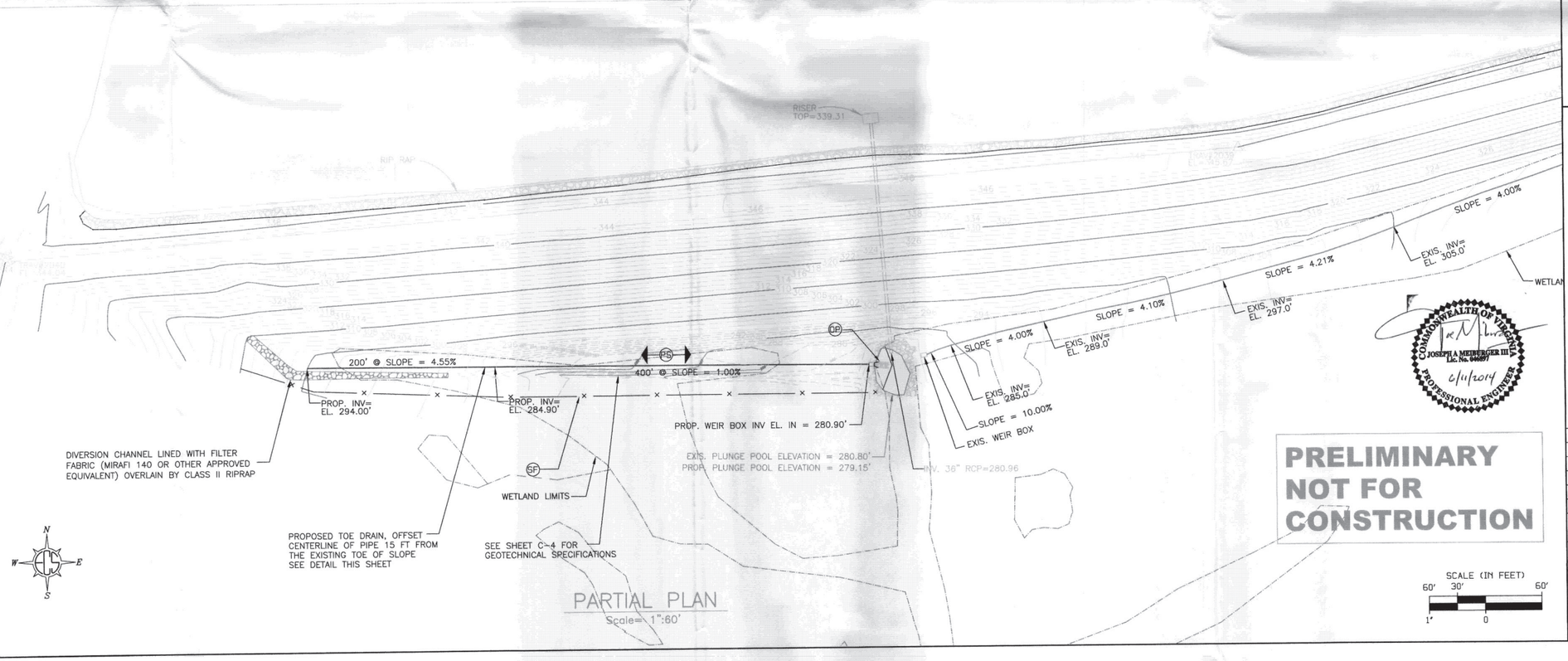
EROSION AND SEDIMENTATION ENGINEERS STATEMENTS OF PROBABLE COSTS				
ITEM	QTY.	U/M	UNIT PRICE	TOTAL
CE	1	EA.	$1,000.00	$1,000.00
SF	740	LF.	$ 3.00	$2,220.00
PS	0.09	AC.	$1,500.00	$ 135.00
DP	1	EA.	$ 250.00	$ 250.00
SUBTOTAL				$3,605.00
+25% MAINTENANCE				$ 901.25
TOTAL				$4,506.25

NOTE:
1) USE VDOT NO.3 CRUSHED GRAVEL FOR (DP)

LEGEND

- SILT FENCE (SF)
- PERMANENT SEEDING (PS)
- OUTLET PROTECTION (DP)

NOTE: CONSTRUCTION ENTRANCE WILL BE INSTALLED AT THE END OF THE EXISTING GRAVEL ACCESS ROAD WHERE IT MEETS THE EDGE OF PAVEMENT AT FAWN LAKE PKWY.



PARTIAL PLAN
Scale= 1":60'

COMMONWEALTH OF VIRGINIA
JOSEPH A MEISBERGER III
Lic. No. 040697
PROFESSIONAL ENGINEER
6/11/2014

PRELIMINARY NOT FOR CONSTRUCTION

SCALE (IN FEET)
60' 30' 0 60'
1"

ECS MID-ATLANTIC, LLC
9409 INNOVATION DRIVE
MANASSAS, VA 20110
(703) 396-6299
(703) 396-6298 FAX

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SETTING THE STANDARD FOR SERVICE

Fawn Lake Dam
Toe Drain Design
Spotsylvania County, Virginia

C-2
E & S PLAN
NTS Virginia Development Company

ECS REVISIONS

ENGINEER	DRAFTING
JM	DJK

SCALE	AS NOTED
PROJECT NO.	29:1741
SHEET	3 OF 5
DATE	04/04/2014

PROFILE

HORIZ. 1"=30' – VERT. 1"=12'

COMMONWEALTH OF VIRGINIA
JOSEPH A MEIBURGER III
Lic. No. 046097
PROFESSIONAL ENGINEER
6/11/2014

PRELIMINARY NOT FOR CONSTRUCTION

ECS - MID-ATLANTIC, LLC
9409 INNOVATION DRIVE
MANASSAS, VA 20110
(703) 393-4495
(703) 393-4528 FAX

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Fawn Lake Dam
Toe Drain Design
Spotsylvania County, Virginia

C-3
TOE DRAIN PROFILE
NTS Virginia Development Company

ECS REVISIONS

ENGINEER	DRAFTING
JM	DJK

SCALE: AS NOTED

PROJECT NO.: 29:1741

SHEET: 4 OF 5

DATE: 04/04/2014

GEOTECHNICAL SPECIFICATIONS

Fawn Lake Dam Toe Drain Design

Spotsylvania County, Virginia

ECS Project No. 29:1741

March 25, 2014

STRIPPING OPERATIONS AND SUBGRADE PREPARATION

1. The existing ground surface within the toe drain alignment and proposed fill area shall be stripped of vegetation, rootmat, topsoil, and any soft or unsuitable materials.

2. The stripping operations shall extend at least 10 feet, where possible, beyond the planned limits.

3. After stripping to the desired grade and prior to new fill placement, the exposed natural subgrade should be carefully examined to identify localized loose, yielding, or otherwise unsuitable materials by the Geotechnical Engineer or his authorized representative.

4. After examining the exposed soils, loose and yielding areas shall be identified by proofrolling with an approved piece of equipment, such as a loaded dump truck having an axle weight of at least 10 tons. Any soft or unsuitable materials encountered during this proofrolling shall be removed and replaced with an approved backfill compacted to the criteria presented in the section entitled FILL PLACEMENT AND COMPACTION.

5. The preparation of fill subgrades should be observed on a full-time basis. These observations should be performed by the Geotechnical Engineer, or his authorized representative, in an effort to ensure that unsuitable materials have been removed and that the subgrade is suitable for support of the proposed fills.

FILL PLACEMENT AND COMPACTION

1. Upon achieving competent subgrade materials, after the removal of the surficial topsoil, the exposed soils shall be filled, where appropriate, to planned subgrade levels with an approved controlled, compacted fill.

2. Compacted soils placed within proposed fill areas shall be placed in lifts not exceeding 8 inches in loose thickness and moisture conditioned to within 3 percentage points on the wet side of the optimum moisture content.

3. Each lift shall be compacted to at least 90 percent of the maximum dry density, as determined in accordance with the Standard Proctor Test Method (ASTM D698), for the full depth of the fill.

4. Prior to the commencement of fill operations and/or utilization of any off-site borrow materials, the Geotechnical Engineer shall be provided with representative samples in order to evaluate the material's suitability for use in a controlled compacted fill and to develop moisture-density relationships. Non-select type soils to be used as controlled fill for the purpose of establishing proposed grades shall be approved inorganic materials, free of debris.

5. Select granular materials consisting of the Virginia Department of Transportation (VDOT) Sand gradations shall be used for the toe drain backfill above and below the pipe, as indicated in the Toe Drain Detail on Sheet C-1.

6. The alignment of the proposed toe drain and the limits of fill placement shall be well defined. Grade controls shall be maintained throughout the filling operations.

7. New fill soils shall be benched into the existing soils, where possible, to verify adequate soil bonding of these materials. If the top of an exposed layer is too smooth, it shall be re-rolled with a sheepsfoot roller, or scarified prior to the placement of the next lift of fill.

8. Filling operations shall be observed on a full-time basis by a qualified soils technician to determine that minimum compaction requirements are being achieved.

9. A minimum of one compaction test per 2,500 square foot area shall be performed for each lift. The elevation and location of the tests shall be clearly identified at the time of fill placement.

10. Compaction equipment suitable to the soil type used as fill shall be used to compact the fill material. A steel drum roller shall be used for compacting and sealing the surface soil. A sheepsfoot roller shall be utilized for compaction of cohesive soils.

11. Areas receiving fill shall be graded to facilitate positive drainage away from the toe of the embankment of any free water associated with precipitation and surface run-off.

12. Fill materials shall not be placed on frozen soils or frost-heaved soils and/or soils which have been recently subjected to precipitation. Frozen soils shall be removed prior to continuation of fill operations. Borrow fill materials, if required, shall not contain frozen materials at the time of placement.

13. If any problems are encountered during the earthwork operations, the Geotechnical Engineer shall be notified immediately.

COMMONWEALTH OF VIRGINIA
JOSEPH A MEIBURGER III
Lic. No. 046697
6/11/2014
PROFESSIONAL ENGINEER

ECS - MID-ATLANTIC, LLC
9409 INNOVATION DRIVE
MANASSAS, VA 20110
(703) 396-6299
(703) 396-6298 FAX

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Fawn Lake Dam
Toe Drain Design
Spotsylvania County, Virginia

C-4
GEOTECH SPECS
NTS Virginia Development Company

ECS REVISIONS	
ENGINEER: JM	DRAFTING: DJK
SCALE: AS NOTED	
PROJECT NO.: 29:1741	
SHEET: 5 OF 5	
DATE: 04/04/2014	