Sludge Sedimentation Basins Periodic Hazard Potential Classification

Clover Power Station
Clover, Virginia

October 2021

Prepared For:

Virginia Electric and Power Company
4091 Clover Road
Clover, Virginia 24534

Prepared By:

TRC
50 International Drive, Suite 150
Greenville, South Carolina 29615

Jonathan Hotstream
Senior Scientist

Nakia Addison, P.E.
Project Manager

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FIGURES

APPENDICES

Revision History

Revision Number	Revision Date	Section Revised	Summary of Revisions
0	10/3/2016		Initial Issue
1	10/14/2021	1, 2, 3, and 5	Update for periodic assessment

1.0 Background

Virginia Electric and Power Company d/b/a Dominion Virginia Power (Dominion) owns[1] and operates the Clover Power Station (Station). The purpose of this report is to determine the hazard potential classification (Classification) for the two retrofitted sludge sedimentation basins (basins) at the Clover Power Station as required by the United States Environmental Protection Agency's (USEPA) final coal combustion residual (CCR) rule Title 40 Code of Federal Regulations (40 CFR) Parts 257 and 261 Subpart D - "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments." The requirements for hazard potential classification assessments for existing and new surface impoundments are presented in 40 CFR 257.73 and 40 CFR 257.74. The basins are considered existing surface impoundments according to the federal rule (40 CFR 257.53). The initial hazard potential classification was completed on October 17, 2016. The Periodic Hazard Potential Classification Assessments are to be updated every five (5) years pursuant to 40 CFR §257.73(f)(3).

1.1 Existing Conditions

The Clover Power Station is located near the Staunton River in Halifax County, Virginia near the Town of Clover, refer to Figure 1. There are currently two existing basins (North and South) at the Clover Power Station, which cover a total area of approximately 3.8 acres (refer to Figure 2). The basins are located outside of the 100-year flood plain of the nearby Staunton River (refer to Figure 2).

The basins are located on the eastern side of the Station and were constructed in partial cut with an earthen berm constructed on the northeastern perimeter of the north basin. The maximum depth of each basin is approximately nine feet with a bottom elevation of 365 feet North American Vertical Datum of 1988 (NAVD88) based on the top of concrete and a top of berm elevation of approximately 374 feet NAVD88. The existing storage capacity for each basin is approximately 12-acre feet.

The basins provide treatment and storage for Station low volume wastewaters including flue gas desulfurization (FGD) blowdown. The treatment system is designed to be closed loop where suspended solids are settled, and resultant decant is used back in the Station as process water. Accumulated solids are periodically removed and transported to the Station's CCR landfill. The basins do not have a discharge location and water levels in the basins are controlled by pumping.

The surrounding ground is approximately level with the basins on the west and south sides. Berms were constructed with the North Basin on the north and east sides. The natural ground beyond the basins slopes down gently to the northeast.

The basins were designed and constructed with engineered fill which was placed and compacted to project specifications during original basin construction in 1995. The existing basins were retrofitted by constructing a liner compliant with the CCR rule. The North and South basins were retrofitted in 2018 and 2019, respectively.

[1] Old Dominion Electric Cooperative owns a 50% undivided interest in the Clover Power Station.

The constructed berms have not shown signs of weakening, poor performance, or differential settlement. The stability of the berms was evaluated during the design of the retrofit with resulting factors of safety exceeding design standards. This Classification considers potential berm failures to identify possible downstream impacts. A berm failure is highly unlikely based on the previous performance, the design evaluations, and the geomembrane liner installed in each basin.

2.0 Hazard Potential Evaluation

The basins have a maximum hydraulic height of 9 feet with an estimated maximum combined basin capacity of approximately 24 acre-feet. Based on these characteristics, the basins do not meet the definition of a dam or impounding structure according to the Virginia Dam Safety Regulations (Title 4 Virginia Administrative Code 50-20-30).

Due to the site grading, discharge out of the basins due to a potential berm failure would flow directly toward the Staunton River, refer to Figures 1 and 2. The figures contain arrows which reflect the likely flow paths of the water to and from the basins. The flow path directions are based on site topographic survey information in the immediate vicinity of the basins and United States Geologic Survey topographic maps in areas beyond the extent of the site survey. Based on this evaluation, there are no habitable structures currently at risk in the event of a failure.

It is also noted that the property at risk should a failure occur is owned by Dominion (refer to Figure 2). There is in excess of 100 acres of undeveloped property located immediately between the basins and the Staunton River. This area would serve to significantly attenuate peak discharge before entering the river.

Based on this evaluation of the existing basins:

- There is no apparent risk of loss of life associated with a potential failure of the basin berms.
- There will not be interruption or impact to critical infrastructure due to a potential failure of the basin berms.
- Environmental impacts will be limited to property owned and operated by Dominion.

Therefore, the existing and retrofitted sludge sedimentation basins are classified as **LOW HAZARD**.

3.0 Conclusions

Based upon these evaluations, the retrofitted sludge sedimentation basins at the Clover Power Station are classified as low hazard potential surface impoundments. The Virginia Department of Environmental Quality will be notified once this document has been placed in the operating record and posted to the publicly accessible website.

A periodic hazard potential classification assessment must be conducted every 5 years from the completion date of this Classification. The next periodic assessment is required by October 2026.

The Classification shall be amended whenever the periodic review period is reached or if changes in site conditions, either intentionally or unintentionally, occur that will change the current Classification.

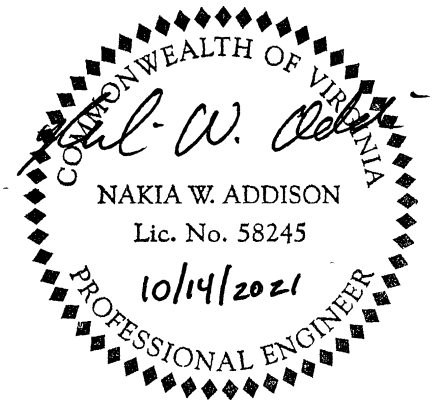
4.0 References

National Flood Insurance Program. 2009. Flood Insurance Rate Map: Halifax County Virginia Panel 350 of 625. Map Number 51083C0350D. Effective Date October 16, 2009. Federal Emergency Management Agency. Washington, D.C.

5.0 Certification

I, the undersigned Virginia Professional Engineer, hereby certify that I am familiar with the technical requirements of 40 CFR 257 Subpart D. I also certify that it is my professional opinion that, to the best of my knowledge, information, and belief, that the information in this demonstration is in accordance with current good and accepted engineering practice(s) and standard(s) and meets the requirements of paragraph (a) in 40 CFR 257.73 and 40 CFR 257.74.

For the purpose of this document, "certify" and "certification" shall be interpreted and construed to be a "statement of professional opinion." The certification is understood and intended to be an expression of my professional opinion as a Virginia Licensed Professional Engineer, based upon knowledge, information, and belief. The statement(s) of professional opinion are not and shall not be interpreted or construed to be a guarantee or a warranty of the analysis herein.



Nakia Addison, P.E.	58245
Printed Name of Professional Engineer	Commonwealth of Virginia License Number
Signature of Professional Engineer	October 14, 2021
	Date

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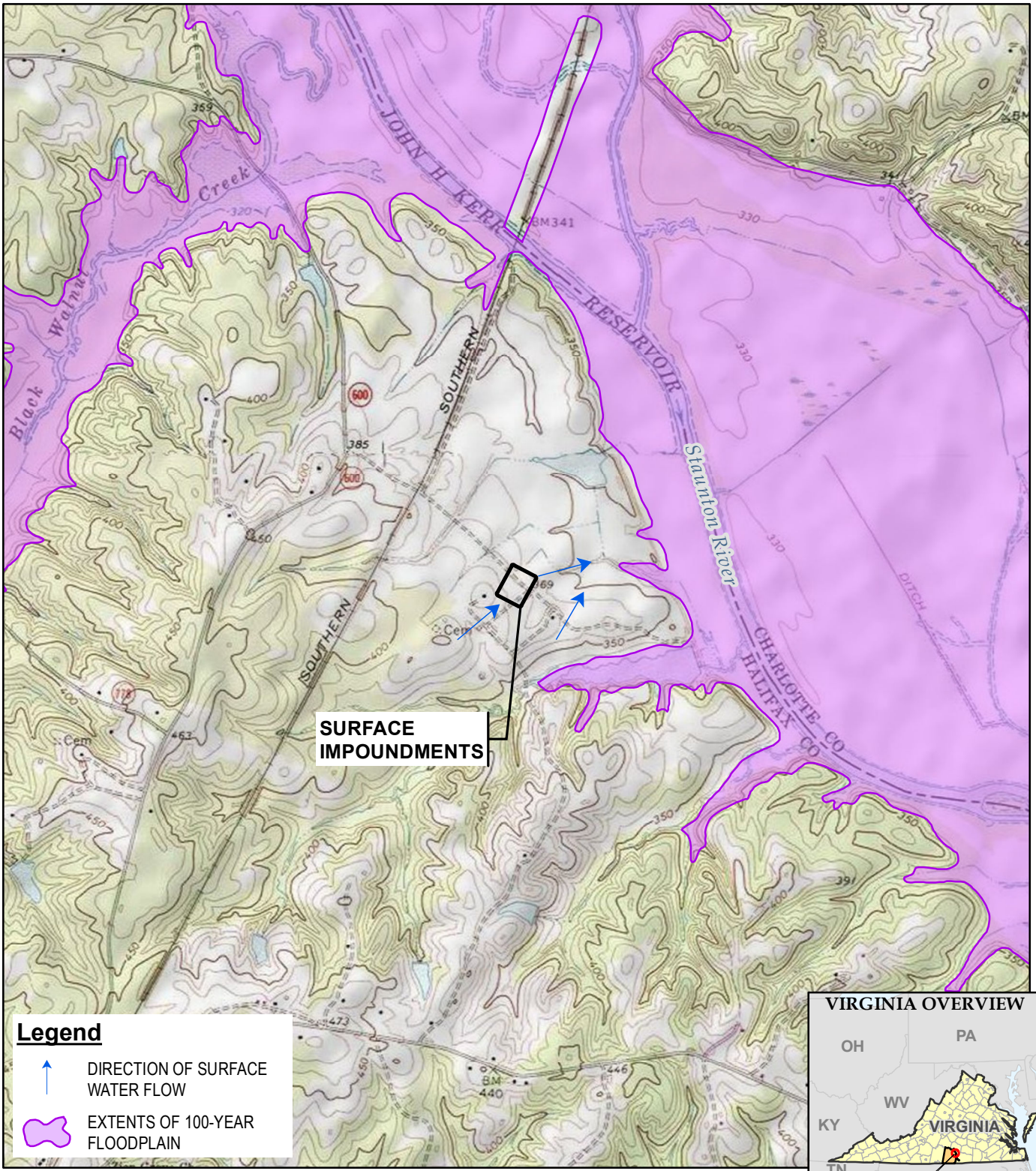
TRC - GIS



-BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES, 1982.
-FLOOD DATA ACQUIRED FROM FEMA NATIONAL FLOOD HAZARD LAYER (NFHL).

1 " = 2,000 '
1:24,000

0 2,000 4,000 FEET

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TRC
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Suite 150
Greenville, SC 29615
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DOMINION RESOURCES SERVICES, INC.
CLOVER POWER STATION
CLOVER, HALIFAX COUNTY, VIRGINIA

HAZARD POTENTIAL CLASSIFICATION
SITE LOCATION MAP

DRAWN BY:	A FOJTIK
APPROVED BY:	J. HOTSTREAM
PROJECT NO:	430492
FILE NO.	430492a.mxd
DATE:	OCTOBER 2021

FIGURE 1

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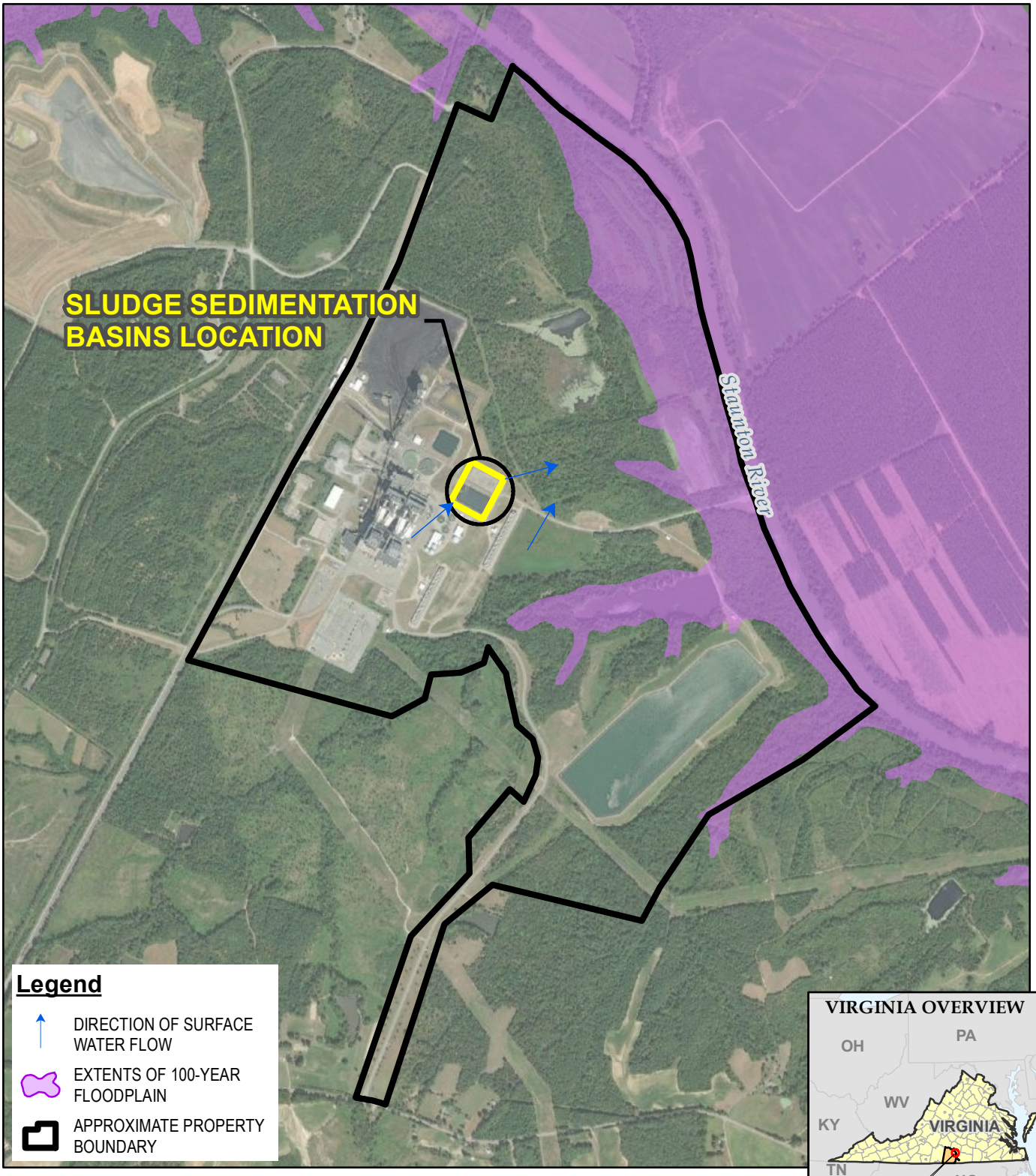
TRC - GIS



-BASE MAP FROM COMMONWEALTH OF VIRGINIA ORTHOPHOTOGRAPHY, 2013.
-FLOOD DATA ACQUIRED FROM FEMA NATIONAL FLOOD HAZARD LAYER (NFHL).

1 " = 1,500 '
1:18,000

0 1,500 3,000 Feet

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50 International Drive
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DOMINION RESOURCES SERVICES, INC.
CLOVER POWER STATION
CLOVER, HALIFAX COUNTY, VIRGINIA

HAZARD POTENTIAL CLASSIFICATION
SITE OVERVIEW MAP

DRAWN BY:	A FOJTIK
APPROVED BY:	J. HOTSTREAM
PROJECT NO:	430492
FILE NO.	430492b.mxd
DATE:	OCTOBER 2021

FIGURE 2

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Appendix A: Select Engineering Drawings

CLOVER POWER STATION

RETROFIT - SLUDGE SEDIMENTATION BASINS AS-BUILT DRAWINGS

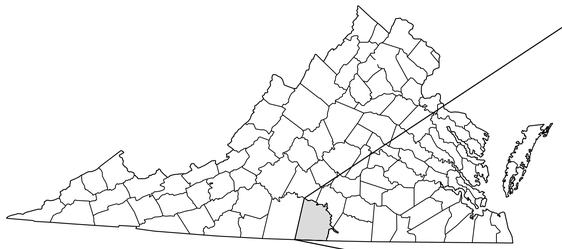
PREPARED FOR: DOMINION RESOURCES SERVICES, INC.
CLOVER POWER STATION
CLOVER, VIRGINIA

PREPARED BY: TRC ENGINEERS, INC.
GREENVILLE, SOUTH CAROLINA

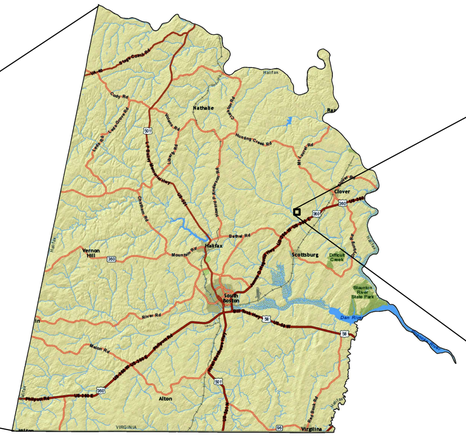
DATE: NOVEMBER 2016
REVISED JULY 2017
REVISED SEPTEMBER 2017
REVISED SEPTEMBER 2019

SHEET INDEX

SHEET NUMBER	SHEET TITLE	REVISION
66706-15348-CWSG-S3100	TITLE SHEET	
66706-15348-CWSG-S3101	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL	2
66706-15348-CWSG-S3102	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL	1
66706-15348-CWSG-S3103	CIVIL STANDARD LEGEND	5
66706-15348-CWSG-S3104	EXISTING CONDITIONS	3
66706-15348-CWSG-S3105	SUGGESTED CONSTRUCTION SEQUENCE PLAN	5
66706-15348-CWSG-S3106	EROSION AND SEDIMENT CONTROL PLAN	5
66706-15348-CWSG-S3107	OVERVIEW NORTH AND SOUTH BASINS	5
66706-15348-CWSG-S3108	NORTH BASIN LINER SUBBASE GRADES	5
66706-15348-CWSG-S3108B	NORTH BASIN LINER BASE GRADES	5
66706-15348-CWSG-S3108C	NORTH BASIN PANEL LAYOUT	2
66706-15348-CWSG-S3109	NORTH BASIN BASE AND PAVING	5
66706-15348-CWSG-S3110	NORTH BASIN CROSS SECTIONS	2
66706-15348-CWSG-S3111	SOUTH BASIN LINER SUBBASE GRADES	5
66706-15348-CWSG-S3111B	SOUTH BASIN LINER BASE GRADES	5
66706-15348-CWSG-S3111C	SOUTH BASIN PANEL LAYOUT	2
66706-15348-CWSG-S3112	SOUTH BASIN BASE AND PAVING	5
66706-15348-CWSG-S3113	SOUTH BASIN CROSS SECTIONS	3
66706-15348-CWSG-S3114	CIVIL DETAILS - NORTH AND SOUTH BASINS	5
66706-15348-CWSG-S3115	CIVIL DETAILS - NORTH AND SOUTH BASINS	5
66706-15348-CWSG-S3116	CIVIL DETAILS - SOUTH BASIN	3
66706-15348-CWSG-S3117	CIVIL DETAILS - SOUTH BASIN	5
66706-15348-CWSG-S3118	CIVIL DETAILS	5
66706-15348-CWSG-S3119	CIVIL DETAILS - EROSION AND SEDIMENT CONTROL	3
66706-15348-CWSG-M2647	MECHANICAL P&ID	1
66706-15348-CWSG-M4000	YARD PIPING PROFILES	2
66706-15348-CWSG-M4000A	YARD PIPING PROFILES	2
66706-15348-CWSG-M4001	PUMP STATION PLAN VIEW	1
66706-15348-CWSG-M4002	PUMP STATION SECTION VIEWS	1
66706-15348-CWSG-M4003	FLOW SPLIT BOX PLAN AND SECTIONS	1
66706-15348-CWSG-M4004	TEMPORARY PUMP STATION PLAN	1
66706-15348-CWSG-M4005	MECHANICAL DETAILS 1	1
66706-15348-CWSG-M4006	MECHANICAL DETAILS 2	1
66706-15348-CWSG-S6200	STRUCTURAL - SLUDGE PUMP STATION	1
66706-15348-CWSG-S6201	STRUCTURAL - SLUDGE PUMP STATION	1
66706-15348-CWSG-S6202	STRUCTURAL - FLOW SPLIT BOX	1
66706-15348-CWSG-S6203	STRUCTURAL - TYPICAL SECTIONS AND DETAILS	1
66706-15348-CWSG-S6204	STRUCTURAL/ARCHITECTURAL - SECTIONS & DETAILS	1
66706-15348-CWSG-E1001	ELECTRICAL SYMBOLS AND ABBREVIATIONS	1
66706-15348-CWSG-E1002	ELECTRICAL SITE PLAN - DEMO	1
66706-15348-CWSG-E1003	ELECTRICAL SITE PLAN - PROPOSED	1
66706-15348-CWSG-E1004	ELECTRICAL ONELINE	1
66706-15348-CWSG-E1005	ELECTRICAL DETAILS AND ENLARGED PLANS	1
66706-15348-CWSG-E1006	ELECTRICAL DETAILS	1
66706-15348-CWSG-E1007	ELECTRICAL DETAILS AND RACEWAY SCHEDULE	1
66706-15348-CWSG-E1008	CABLE AND PANEL SCHEDULE	1



VIRGINIA



HALIFAX COUNTY

SITE LOCATOR
1" = 600'

COMMONWEALTH OF VIRGINIA
B. KENT NELSON
Lic. No. 026477
PROFESSIONAL ENGINEER
9/19/19

TRC
50 International Drive
Patewood Plaza Three, Suite 150
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Phone: 864.281.0030

11,423,500 E | 11,423,600 E | 11,423,700 E | 11,423,800 E | 11,423,900 E | 11,424,000 E | 11,424,100 E | 11,424,200 E | 11,424,300 E | 11,424,400 E | 11,424,500 E

3,476,600 N

3,476,500 N

3,476,100 N

STA. 0+00 VALUE VAULT FOR CONNECTION NEW PIPE TO EXISTING PIPE SEE DETAIL 5/M4005

INSTALLED 280 L.F. OF 6" HDPE PIPE. SEE PROFILE "B" SHEET M4000

10" HDPE INFLUENT SUPPLY
6" HDPE DISCHARGE TO RIVER

10" HDPE INFLUENT SUPPLY
8" HDPE OVERFLOW AND DRAIN
6" HDPE DISCHARGE TO RIVER
2" HDPE CLARIFIER DRAIN

EXISTING ELECTRICAL BUILDING

WARNING: EXISTING UTILITY SEE NOTE 1

HYDRANT (TYP)
BOLLARD (TYP)

EXISTING ELECTRICAL VAULT

STA. 2+60.03 INSTALLED: 4 - 8" 45° BENDS

STA. 2+67.64 INSTALLED: 4 - 8" 45° BENDS

STA. 2+25.64 INSTALLED: 1 - 6" 45° BEND

STA. 2+30.80 LINE "B" =
STA. 0+00 LINE "C"
INSTALLED:
2 - 6" KNIFE GATE VALVES
1 - VALVE VAULT, SEE DETAIL 5/M4005

STA. 3+34.59 END 3-8" HDPE BASIN INLET PIPES

NORTH BASIN

BASE LINER SEE DETAIL 1/S3114

EXISTING FENCE LINE

BASIN DIVIDING BERM SEE DETAIL 4/S3114

STORAGE BASIN ACCESS RAMP SEE DETAIL 1/S3115

STORAGE BASIN ACCESS RAMP SEE DETAIL 2/S3115

STORAGE BASIN ACCESS RAMP SEE DETAIL 3/S3115

REMOVED 3 EX. 8" STL BASIN INLET PIPES & REPLACED WITH NEW 8" HDPE PIPES. 340 L.F. EACH FOR A TOTAL OF 1,020 L.F. SEE PROFILE "A," SHEET M4000

STA. 2+58.59 END 6" HDPE PIPE

STA. 2+20.14 INSTALLED: 1 - 6" 90° BEND

STA. 2+46.61 INSTALLED: 4 - 8" 45° BENDS

FLOW SPLIT BOX. SEE SHEETS M4003, S6202. SEE DETAIL 2/S3116

STA. 0+00 BEGIN 8" HDPE BASIN INLET PIPES & PUMP DISCHARGE PIPE. CONNECTED TO EX. 8" STL. PIPING.

STA. 2+08.62 INSTALLED: 4 - 8" 45° BENDS

REMOVED 581 L.F. OF EX. 8" STL PUMP DISCH. PIPE & REPLACED WITH NEW 8" HDPE PIPE. SEE PROFILE "A," SHEET M4000

SOUTH BASIN

INSTALLED 442 L.F. OF 6" HDPE PIPE. SEE PROFILE "C" SHEET M40004

STA. 5+21.08 INSTALLED 8" TEE FITTING. CONNECT TO 8" PUMP DISCHARGE PIPE

BASE LINER SEE DETAIL 1/S3114

STA. 5+79.06 END 8" HDPE PUMP DISCHARGE PIPE

PUMP STATION SEE SHEETS S6200, S6201, & E1006. SEE DETAIL 1/S3116

EXISTING ELECTRICAL VAULT

EXISTING MONITORING WELL (TYP)

0+12.25 INSTALLED 4-8" 90° BENDS

LIMITS OF 8" PIPE REPLACEMENT

RAMP SLAB SEE DETAIL 1/S3116

STORAGE BASIN ACCESS RAMP SEE DETAIL 1/S3115

EXISTING 8" DIA. HDPE WATER PIPE

STA. 4+37.93 INSTALLED: 1 - 6" 90° BEND

STORAGE BASIN ACCESS RAMP SEE DETAIL 3/S3115

8" RAW WATER LINE

STA. 4+32.00 INSTALLED: 1 - 6" KNIFE GATE VALVE 1 - VALVE VAULT

STA. 4+41.52 END 6" HDPE COAL ASH PIPE EXTENSION. CONNECTED TO EX. 6" LINE W(1).

STORAGE BASIN ACCESS RAMP SEE DETAIL 2/S3115

EXISTING 4" DIA. HDPE WATER PIPE

6" DIA. HDPE DRAIN PIPE TO SOUTH BASIN SEE DETAIL 1/S3117

WATER TRUCK LOADOUT STATION SEE DETAIL 1/S3117

EXISTING BUILDING

SEE NOTE 4.

STAGE VS STORAGE MATRIX

ELEVATION	NORTH BASIN CAPACITY (GAL)	NORTH BASIN CAPACITY (AC FT)	SOUTH BASIN CAPACITY (GAL)	SOUTH BASIN CAPACITY (AC FT)	COMBINED BASIN CAPACITY (GAL)	COMBINED BASIN CAPACITY (AC FT)
365	14,400	0.0	14,500	0.0	28,900	0.1
366	163,400	0.5	162,800	0.5	326,300	1.0
367	532,200	1.6	527,700	1.6	1,059,900	3.3
368	949,200	2.9	939,600	2.9	1,888,900	5.8
369	1,388,800	4.3	1,373,900	4.2	2,762,700	8.5
370	1,851,100	5.7	1,830,900	5.6	3,682,000	11.3
371	2,336,600	7.2	2,310,800	7.1	4,647,400	14.3
372	2,845,500	8.7	2,814,000	8.6	5,659,500	17.4
373	3,377,800	10.4	3,340,300	10.3	6,718,100	20.6
374	3,930,300	12.1	3,886,500	11.9	7,816,700	24.0

NOTES

1. REFER TO PLAN SHEET S3103 OF THIS PLAN SET FOR STANDARD LEGEND NOTES AND CONTROL POINT LOCATIONS.
2. GRADES SHOWN ARE BASE GRADES (TOP OF CLAY).

5+00 STATIONING FOR PIPE PROFILES SHOWN ON PLAN SHEET M4000.

ADDITIONAL NOTES

1. BURIED ELECTRICAL DUCT BANK IN DIVIDER BERM AND NORTHWEST OF BASINS. USE CAUTION DURING EXCAVATION.
2. HDPE YARD PIPING SHALL BE CLASS DR-17 WITH WORKING PRESSURE RATING OF 125 PSI. PIPE AND FITTINGS SHALL MEET THE REQUIREMENTS OF AWWA C906 AND ASTM D2239. PIPE SIZE NOTED INDICATES THE INSIDE DIAMETER.
3. PROVIDE THRUST BLOCKING FOR ALL BURIED PIPE BENDS AS DESCRIBED IN DETAIL 9, SHEET M4006.
4. TABLE PROVIDES VOLUMES BASED ON DESIGN GRADES.

COMMONWEALTH OF VIRGINIA
R. KENT NILSSON
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PROFESSIONAL ENGINEER
9/19/19

NAD83 CONSTRUCTION COORDINATES

TAG	OBJECT (CENTERLINE)	NORTHING	EASTING	REFERENCE SHEETS
A	8" PIPE STA. 0+00	3476201.45	11423595.33	M4002
B	8" PIPE STA. 0+12.25 (90° BEND)	3476195.40	11423605.99	M4002
C	8" PIPE STA. 2+08.62 (45° BEND)	3476367.93	11423699.75	M4002
D	8" PIPE STA. 2+46.61 (45° BEND)	3476382.19	11423734.82	M4002
E	6" HDPE VALVE VAULT	3476600.92	11423844.25	M4002, M4005
F	FLOW SPLIT BOX	3476364.65	11423811.46	M4003, S6202
H	PUMP STATION	3476249.01	11424029.00	M4001, M4002, S6200, S6201, E1005
K	6" HDPE VALVE VAULT	3476400.28	11423732.40	M4005
L	6" PIPE STA. 2+20.14 (90° BEND)	3476203.44	11423638.83	M4000A
M	6" HDPE VALVE VAULT	3476103.11	11423820.04	M4005
N	6" HDPE PIPE CONNECTION	3476100.21	11423819.24	M4000A
O	8" PIPE STA. 2+60.03 (45° BEND)	3476394.08	11423741.04	M4002
P	8" PIPE STA. 2+67.64 (45° BEND)	3476397.38	11423747.90	M4002

0 40 80 120 160
SCALE IN FEET

REV	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR	DESCRIPTION
5	09 13 2019	DM	TAF	JNH		NA	RKN	CS	DS				AS-BUILT
4	08 01 2018	DM	TAF	JNH		NA	RKN	CS	DS				NORTH BASIN RETROFIT AS-BUILT
3	09 15 2017	DM	LLS	JNH		NA	RKN						UPDATED SUBBASE GRADES AND PIPING REVISIONS
2	07 24 2017	DM	LLS	JNH		NA	RKN						UPDATES TO EROSION AND SEDIMENT CONTROL SHEET AND EXISTING CONDITIONS
1	11 16 2016	DM	LLS	JNH		NA	RKN	CS	DS				REVISED LINER SYSTEM

Dominion
TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

OVERVIEW NORTH AND SOUTH BASINS

RETROFIT – SLUDGE SEDIMENTATION BASINS
CLOVER, VIRGINIA

DSGN D.MARSHALL	DSGN SUPV	DATE NOVEMBER 2016 DGNSPEC FOR FILE VERIFICATION	
DRWN L. STORMER	ENGR SUPV	DRAWING NO.	REV.
CHKD JH	PROJ ENGR	66706-15348-CWSG-S3107	5
DISPL ENGR ---	SCALE: AS NOTED	UNLESS OTHERWISE NOTED	SH 8 OF 41

Appendix B: Flood Insurance Rate Map

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0 foot North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Virginia State Plane South zone. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the Commonwealth of Virginia, through the Virginia Geographic Network Division of its Department of Technology Planning (VGIN). These data were produced at scales of 1:2,400 and 1:4,800 from one-foot and two-foot resolution digital orthoimagery flown in Spring 2002.

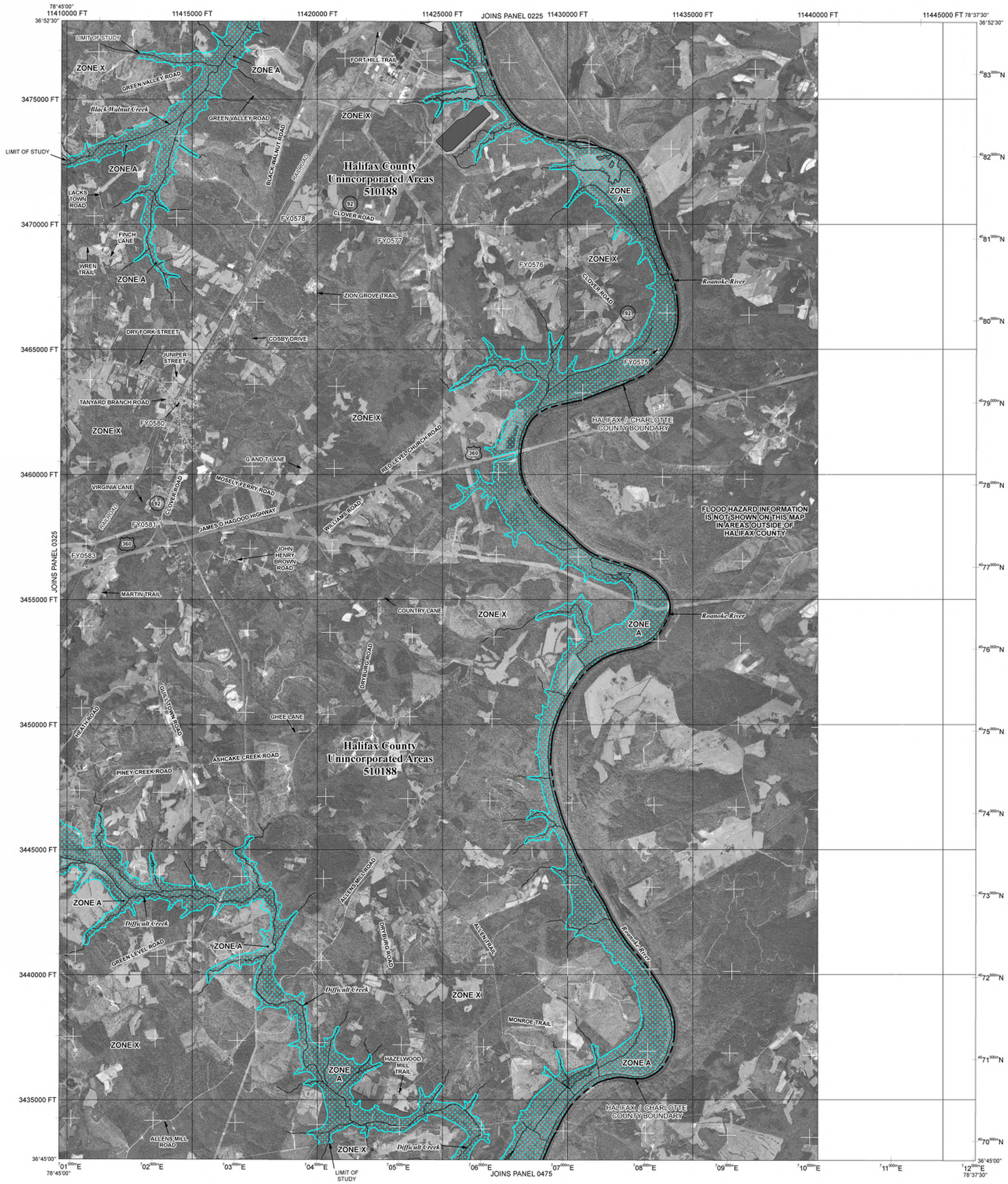
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

- (A)—(A) Cross section line
- (23)—(23) Transect line
- 87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000mN — 1000-meter Universal Transverse Mercator grid values, zone 17
- 600000 FT — 5000-foot grid ticks: Virginia State Plane coordinate system, South zone (FIPSZONE 4502), Lambert Conformal Conic projection
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- ●M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
October 16, 2009

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 2000'
1000 0 2000 4000 FEET
600 0 600 1200 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0350D

FIRM
FLOOD INSURANCE RATE MAP

HALIFAX COUNTY, VIRGINIA
AND INCORPORATED AREAS

PANEL 350 OF 625
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HALIFAX COUNTY	510188	0350	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51083C0350D

EFFECTIVE DATE
OCTOBER 16, 2009

Federal Emergency Management Agency