Low Volume Waste Settling Ponds
Initial Inflow Design Flood Control System Plan

Mount Storm Power Station
Mount Storm, West Virginia

October 2016

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Initial Inflow Design Flood Control System Plan

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Mount Storm, West Virginia

October 2016

Prepared For
Virginia Electric and Power Company

Jonathan Hotstream
Senior Scientist

R. Kent Nilsson, P.E.
Senior Engineer

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Revision History

REVISION NUMBER	REVISION DATE	SECTION REVISED	SUMMARY OF REVISIONS

Section 1
Background

Virginia Electric and Power Company d/b/a Dominion Virginia Power (Dominion) owns and operates the Mount Storm Power Station (Station). The Station manages coal combustion residuals (CCR) in five existing low volume waste settling ponds (LVWSP) (Pyrite Pond and Ponds A, B, C, and D). The purpose of this Inflow Design Flood Control System Plan (Plan) is to present the designed and constructed flood control features of the five existing LVWSP and the proposed retrofitted and reconstructed LVWSP at the Station that will be used to manage the inflow design flood 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 LVWSP are considered existing CCR surface impoundments according to the CCR rule (40 CFR 257.53).

1.1 Existing Conditions

The Station is located in Union District, Grant County, West Virginia (refer to Figure 1). There are currently five LVWSP at the Station (refer to Figure 2). The area including the LVWSP is approximately nine acres with the surrounding terrain sloping down toward Mount Storm Lake to the east and south from the topographic high on the northwest side of the LVWSP. The normal water elevation for Mount Storm Lake is approximately 3245 feet NAVD88 with a maximum elevation of 3248.3 feet NAVD88. The water levels of Mount Storm Lake are controlled by the Mount Storm Lake Dam which is operated by Dominion.

The LVWSP receive influent water from dewatering bin overflows and area sumps, along with water from Station drain systems, the oily water separator system, storm water, and other Station drains. The water flows to a pH neutralizing system before flowing to the primary ponds (Ponds A and B) for settling. After the primary ponds, water flows into a secondary ponds (Ponds C and D) for additional settling. From the secondary ponds, water is discharged into Mount Storm Lake via a National Pollutant Discharge Elimination System permitted outfall. The four pond configuration allows one pond to be dredged and cleaned while maintaining the other LVWSP in service to process wastewaters.

The Pyrite Pond receives primarily storm water inflows upstream of Ponds A through D. The Pyrite Pond discharges to the pH neutralizing system prior to flowing into the primary settling LVWSP.

The wastewater flows though several outlet structures in a circuit through the LVWSP. The water flow is driven by gravity. Station personnel can control flow to and from a pond by operating gates on the outlet structures.

The LVWSP are located on the south side of the station and were constructed in partial cut with an earthen berm constructed on the southern perimeter berm of Pond D and the eastern and western berms of Ponds C and D. The dividing berms between Ponds A and B and Ponds C and D were constructed of fill after the original excavation of the LVWSP. The geometry of each pond varies. The maximum depth of water is maintained in Pond A with an approximate pond bottom elevation of 3244 feet NAVD88 and a top of berm elevation of 3260 feet NAVD88. Appendix A provides the existing conditions for the LVWSP.

1.2 Pond Retrofit and Reconstruction Design

Dominion plans to retrofit the Pyrite Pond, close Ponds A through D, and reconstruct Ponds A and B in accordance with 40 CFR 257.102 between 2016 and 2018. The final configuration of the LVWSP will have three ponds: Pyrite Pond, Pond A, and Pond B. Refer to Appendix A for engineering drawings presenting the proposed retrofit, closure, and reconstruction.

The retrofitted and reconstructed LVWSP were designed to operate at the same flow capacity as the existing conditions. Therefore, the retrofitted and reconstructed LVWSP will provide the same level of flood control as the existing LVWSP.

Section 2
Inflow Design Flood Control

Hydrologic and hydraulic capacity requirements for existing and new CCR surface impoundments are provided in 40 CFR 257.82. The Station LVWSP were classified as low hazard in accordance with 40 CFR 257.73 and 40 CFR 257.74. Based on the low hazard potential classification, the CCR units must adequately manage flow into the unit during and following the peak discharge of the 100-year flood (40 CFR 257.82(a)(3)(iii)).

The Mount Storm LVWSP were designed in a manner consistent with 40 CFR 257.82(a)(1), (2) and (3), which allows CCR units to adequately manage inflows during and following peak discharge and to manage outflows to collect and control peak discharge for a 100 year flood due to the low hazard classification.

The Flood Insurance Rate Map for the Station (National Flood Insurance Program 2009) shows that the LVWSP are located in an area determined to be outside the 0.2% annual chance flood (refer to Appendix B). Figures 1 and 2 show the extent of the 100 year flood plain is not mapped in the vicinity of the station. The existing and retrofitted LVWSP are located in an area that is above the 100 year flood elevation; therefore, a dedicated flood control system is not required. The LVWSP have been designed with several inflow design features presented in the sections below.

2.1 LVWSP Operation

The reconstructed Pond A and Pond B will operate in a manner similar to the current LVWSP configuration. The LVWSP are utilized to treat process waste water following the pH treatment system. The current Ponds A and B are designed to be operated in parallel. The current LVWSP were designed to operate at a maximum water elevation of 3255.1 feet NAVD88, which is approximately five feet below the top of berm height at 3260 feet NAVD88. The maximum water level in Pond A and Pond B is limited by the flow capacity of the upgradient hydraulic system. The water level within the active LVWSP are monitored daily by on-site personnel. High level alarms will be installed on the new filter equipment located downstream of the LVWSP prior to discharge.

The inflow to the Pyrite Pond is controlled by a splitter box from the Station and is also the primary pond for controlling surface water discharge across the site. The Pyrite Pond discharges to the pH treatment system upstream of Ponds A and B.

The following control measures are implemented during pond operations to control the water levels in the LVWSP:

- Regularly drain and clean ash hydrobins, in a manner to not exceed designed flow rate.
- Regularly remove settled solids from Ponds A and B to provide optimal system performance and maximum capacity.
- Operate outlet structures to control the pond water levels.
- Regularly check and maintain grades surrounding the LVWSP to minimize the area contributing to storm water run-on.

2.2 System Hydraulics

Based on instantaneous measurements for the existing LVWSP outlet, the current maximum outflow is approximately 26 million gallons per day (MGD). The system hydraulics for the retrofit and reconstruction has been designed to provide flow capacities up to the design maximum of 26 MGD through the LVWSP.

2.3 Storm Water Control

The LVWSP were designed to control the storm water run-on from a 100 year, 24 hour storm event based upon the Precipitation Frequency Estimates from the National Oceanic and Atmospheric Administration. The Pyrite Pond collects storm water runoff from areas outside of the LVWSP and routes it through the downstream LVWSP. Culverts bring storm water into the Pyrite Pond from across the station with the most significant contribution coming from the coal pad.

The LVWSP were designed to operate with at least two feet of freeboard, height from the design water elevation to the top of berm elevation. The storm water run-on volume calculated for the design storm were compared to the storage capacity above the LVWSP design operating elevation. The evaluation determined that there is sufficient capacity in the LVWSP when operating at the design water elevations (refer to Appendix C).

2.4 Conclusions

The existing and designed retrofit and reconstructed LVWSP meet the requirements of 40 CFR 257.82 of adequately controlling the inflows during and after peak discharge of the 100-year flood at the Mount Storm Power Station for the following reasons:

- The LVWSP are located above the 100 year floodplain.
- The LVWSP were adequately designed to withstand a 100 year, 24 hour storm event.
- The pond capacities are sufficient to control the water levels and provide freeboard.

Section 3
Amendment and Periodic Plan Revision

This Plan was been completed in compliance with the requirements set forth in 40 CFR 257.82. The WV Department of Environmental Protection will be notified once this document has been placed in the operating record and posted to the publicly accessible website. A periodic inflow design flood control system plan must be prepared every 5 years from the completion date of this Plan.

The Plan must be amended whenever the periodic review period is reached or if changes in site conditions occur that will sustainably affect the current written plan.

Section 4
References

National Flood Insurance Program. 2009. Flood Insurance Rate Map: Grant County West Virginia, and Incorporated Areas Panel 135 of 425. Map Number 54023C0135F. Effective Date September 2, 2009. Federal Emergency Management Agency. Washington, D.C.

TRC Engineers, Inc. 2016. Initial Hazard Potential Classification – Low Volume Waste Settling Ponds Mount Storm Power Station. October 2016.

Section 5
Certification

I, the undersigned West 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) of in 40 CFR 257.82.

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 West 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.

R. Kent Nilsson, P.E.	21543
Printed Namd of Professional Engineer	State of West Virginia License Number
	October 3, 2016
Signature of Professional Engineer	Date

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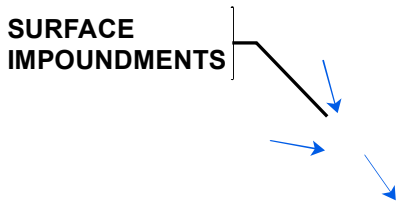
TRC - GIS



Legend

DIRECTION OF SURFACE WATER FLOW

-BASE MAP FROM USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE SERIES, 2011.
-THERE ARE NO 100 YEAR FLOODPLAIN AREAS LOCATED WITHIN THE EXTENTS OF THIS MAP.

N

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

0 2,000 4,000
FEET

TRC
Patewood Plaza One, Suite 300
30 Patewood Drive
Greenville, SC 29615
Phone: 864.281.0030

DOMINION RESOURCES SERVICES, INC.
MOUNT STORM POWER STATION
MOUNT STORM, GRANT COUNTY, WEST VIRGINIA

INITIAL HAZARD POTENTIAL CLASSIFICATION
SITE LOCATION MAP

DRAWN BY:	R SUEMNICHT
APPROVED BY:	R. K. NILSSON
PROJECT NO:	230765
FILE NO.	230765-004slm.mxd
DATE:	AUGUST 2016

E:\Dominion\MountStormWV\2015_230765\230765-004slm.mxd

FIGURE 1

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TRC - GIS

-BASE MAP IMAGERY FROM ESRI/BING, 2011.
-THERE ARE NO 100 YEAR FLOODPLAIN AREAS LOCATED WITHIN THE EXTENTS OF THIS MAP.

N

1 " = 400 '
1:4,800

0 700 1,400
FEET

E:\Dominion\MountStormWV\2015_230765\230765-005slm.mxd

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DOMINION RESOURCES SERVICES, INC.
MOUNT STORM POWER STATION
MOUNT STORM, GRANT COUNTY, WEST VIRGINIA

INITIAL HAZARD POTENTIAL CLASSIFICATION
SITE OVERVIEW MAP

DRAWN BY:	R SUEMNICHT
APPROVED BY:	R. K. NILSSON
PROJECT NO:	230765
FILE NO.	230765-005slm.mxd
DATE:	AUGUST 2016

FIGURE 2

Appendix A
Select Engineering Drawings

MOUNT STORM POWER STATION

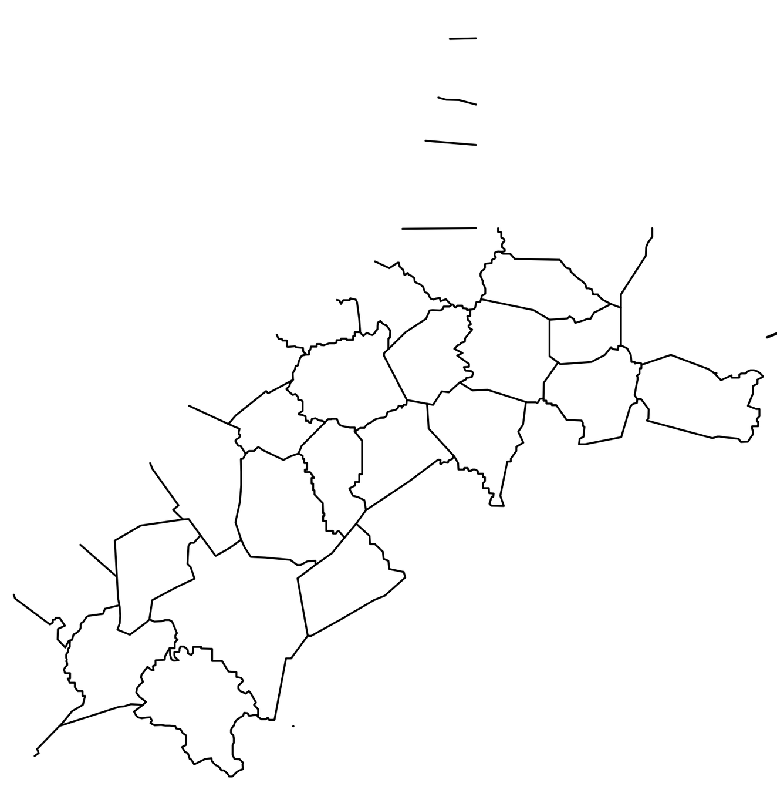
CLOSURE AND RECONSTRUCTION LOW VOLUME WASTE SETTLING PONDS (LVWSP)

PHASE 1 - 2016 CONSTRUCTION

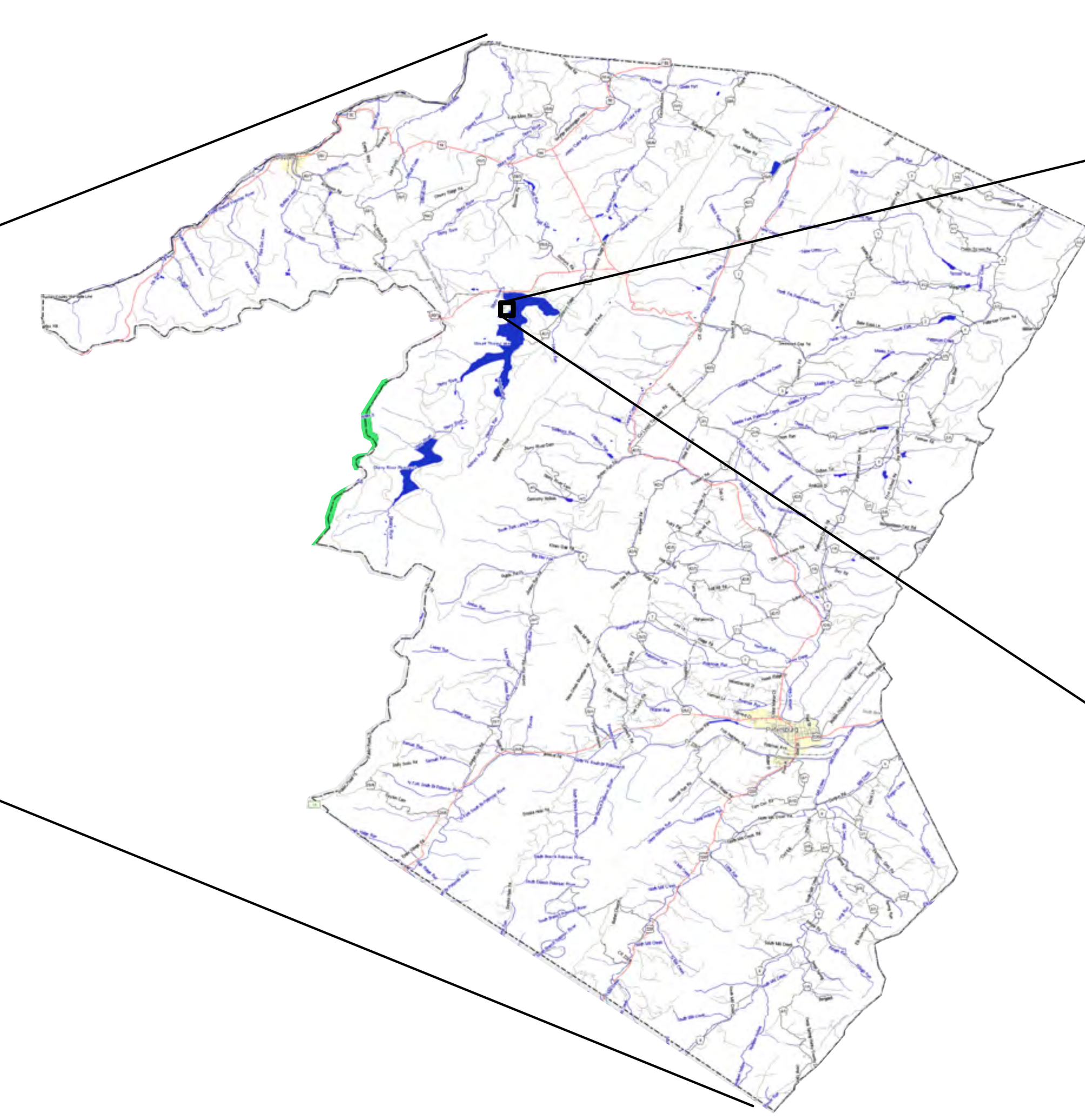
PREPARED FOR: DOMINION RESOURCES SERVICES, INC.
MOUNT STORM POWER STATION
MOUNT STORM, WEST VIRGINIA

PREPARED BY: TRC ENGINEERS INC.
GREENVILLE, SOUTH CAROLINA

DATE: JUNE 2016



WEST VIRGINIA



GRANT COUNTY

SITE LOCATION
1" = 600'

SHEET INDEX

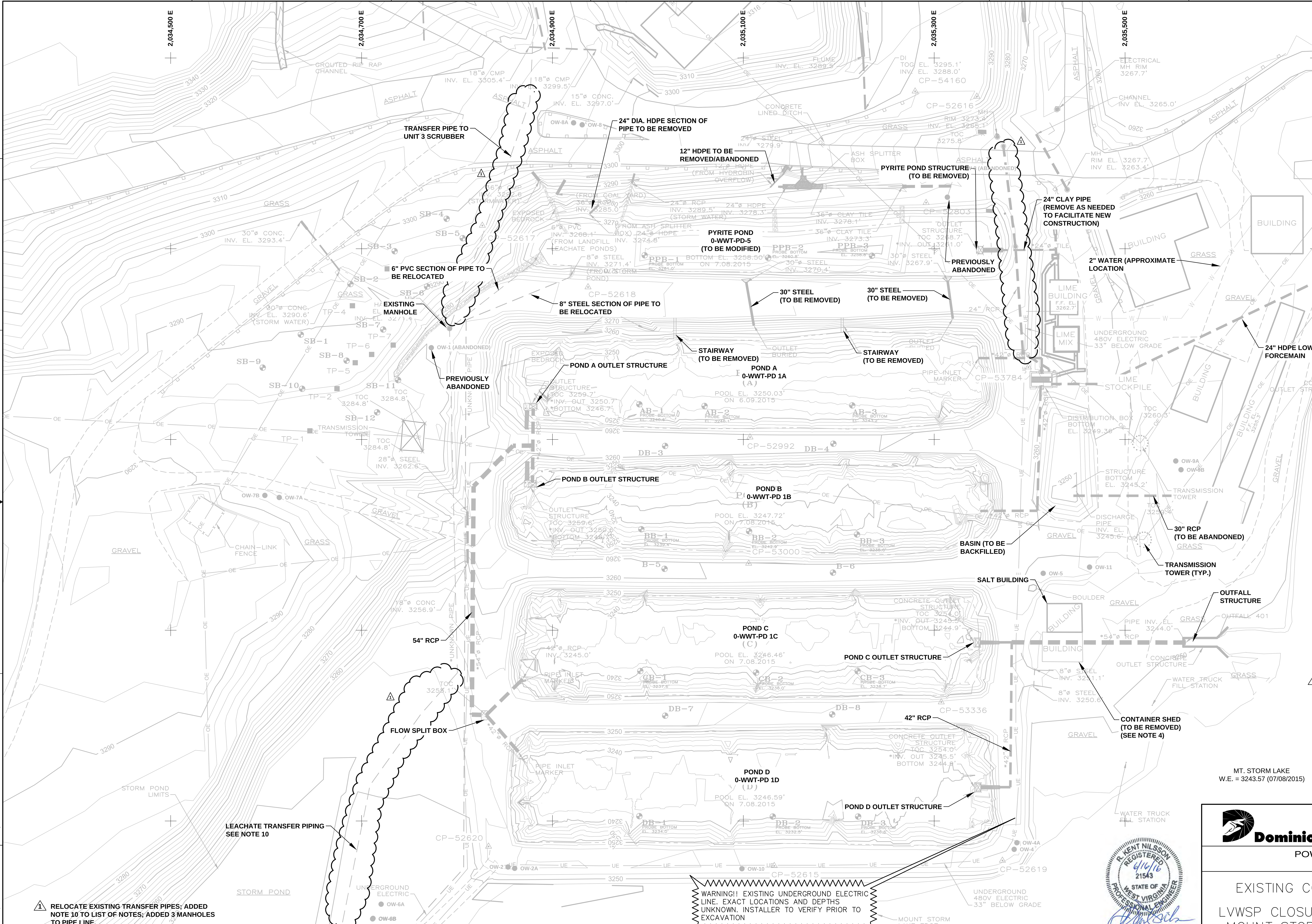
DRAWING NUMBER	SHEET TITLE
66703-1	TITLE SHEET
66703-2	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL
66703-3	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL
66703-4	GENERAL NOTES - STRUCTURAL
66703-5	GENERAL NOTES - STRUCTURAL
66703-C1	CIVIL STANDARD LEGEND
66703-C2	EXISTING CONDITIONS AND DEMOLITION PLAN
66703-C3	PROPOSED HYDRAULIC PROFILE
66703-C4	CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN
66703-C5	PYRITE POND SUBBASE PLAN
66703-C6	PYRITE POND BASE AND PIPING PLAN
66703-C7	CROSS SECTIONS PYRITE POND
66703-C8	PYRITE POND INFLUENT DIVERSION PIPE PLAN VIEW AND DETAILS
66703-C9	PYRITE POND INFLUENT DIVERSION PIPE PROFILE AND DETAILS
66703-C10	PROPOSED YARD PIPING SITE PLAN
66703-C11	GRADIENT CONTROL FORCE MAIN PLAN
66703-C12	WATER LINE & FORCE MAINS PLAN & DETAILS
66703-C13	BACKWASH PUMP FORCE MAIN PLAN & PROFILE
66703-C14	GRAVITY LINES PLAN & PROFILE
66703-C15	FILTER BUILDING CONNECTION PLAN & PROFILE
66703-C16	POND A & B EFFLUENT STA 0+00 - 1+50
66703-C17	POND A & B EFFLUENT STA 1+50 - END
66703-C18	CIVIL DETAILS
66703-C19	CIVIL DETAILS
66703-C20	CIVIL DETAILS
66703-C21	CIVIL DETAILS
66703-C22	CIVIL DETAILS
66703-C23	CIVIL DETAILS
66703-M1	GENERAL MECHANICAL NOTES
66703-MS-0-FL-WWT-120	PROCESS FLOW DIAGRAM I
66703-MS-0-FL-WWT-121	PROCESS FLOW DIAGRAM II
66703-M4	FILTER BUILDING EQUIPMENT PLAN VIEW @ 3253.00
66703-M5	FILTER BUILDING EQUIPMENT SECTIONS I
66703-M6	FILTER BUILDING EQUIPMENT SECTIONS II
66703-M7	FILTER BUILDING PIPING PLAN VIEW @ 3253.00
66703-M8	FILTER PIPING SECTIONS I
66703-M9	FILTER PIPING SECTIONS II
66703-M10	OUTLET STRUCTURE - PYRITE POND
66703-M11	JUNCTION BOX DETAILS
66703-M12	MISCELLANEOUS DETAILS 1
66703-M13	MISCELLANEOUS DETAILS 2
66703-M14	MISCELLANEOUS DETAILS 3
66703-M15	MISCELLANEOUS DETAILS 4
66703-SA1	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA2	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA3	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA4	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA5	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA6	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA7	STRUCTURAL/ARCHITECTURAL SECTIONS AND DETAILS
66703-SA8	STRUCTURAL/ARCHITECTURAL SECTIONS AND DETAILS
66703-S1	STRUCTURAL FILTER STRUCTURE
66703-S2	STRUCTURAL FILTER STRUCTURE
66703-S3	STRUCTURAL FILTER STRUCTURE
66703-S4	STRUCTURAL FILTER STRUCTURE
66703-S5	STRUCTURAL PYRITE POND OUTFALL
66703-S6	STRUCTURAL PYRITE POND OUTFALL
66703-S7	STRUCTURAL JUNCTION BOX A
66703-S8	STRUCTURAL JUNCTION BOX B
66703-S9	STRUCTURAL JUNCTION BOX C
66703-S10	STRUCTURAL JUNCTION BOX C
66703-S11	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S12	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S13	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S14	STRUCTURAL PEDESTRIAN BRIDGE SECTIONS & DETAILS
66703-E-001	ELECTRICAL SYMBOLS AND ABBREVIATIONS
66703-E-4500	ELECTRICAL SITE PLAN
66703-E-4800	ENLARGED ELECTRICAL PLANS #1
66703-E-4801	ENLARGED ELECTRICAL PLANS #2
66703-E-0300	EXISTING PYRITE BLDG. ENLARGED ELECTRICAL PLAN
66703-E-0900	ELECTRICAL DUCT BANK AND RACEWAY ROUTING INTERIOR ELEVATIONS AT FILTER BUILDING
66703-E-4803	ELECTRICAL ONELINE DIAGRAM AND DETAILS
66703-E-1400	PYRITE BLDG. RTU MODIFICATIONS
66703-E-1401	ELECTRICAL PANEL SCHEDULES
66703-E-4805	LIGHTING AND MECHANICAL SCHEDULES
66703-E-6000	ELECTRICAL DUCT BANK SECTIONS
66703-E-4501	ELECTRICAL DETAILS
66703-E13	RACEWAY SCHEDULE
66703-E14	CABLE SCHEDULE

R. KENT NILSSON
REGISTERED
6/16/16
21543
STATE OF
WEST VIRGINIA
PROFESSIONAL ENGINEER

RE-ISSUED FOR BID

TRC

30 Patewood



1 RELOCATE EXISTING TRANSFER PIPES; ADDED NOTE 10 TO LIST OF NOTES; ADDED 3 MANHOLES TO PIPE LINE.

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.
2. * - INDICATES THAT INFORMATION IS BASED ON REVIEW OF DOMINION DESIGN DRAWINGS AND INFORMATION PROVIDED BY DOMINION PERSONNEL DURING THE SURVEY. THIS INFORMATION SHOULD BE CONSIDERED APPROXIMATE.
3. SOIL BORING SYMBOLS REPRESENT LOCATIONS WHERE BORINGS TAKEN.
4. CONTRACTOR SHALL RELOCATE EXISTING CONTAINERS ON-SITE AS DIRECTED BY OWNER. CONTRACTOR SHALL PROVIDE THREE (3) REPLACEMENT CONTAINERS (WITH ROOFS) OF THE SAME SIZE AS EXISTING AND LOCATE ON SITE AS DIRECTED BY THE OWNER.
5. ITEMS TO BE ABANDONED/REMOVED SHALL BE DONE IN ACCORDANCE WITH THE OVERALL PROJECT SCHEDULE.
6. ABANDONED STRUCTURES SHALL BE FILLED WITH NON-SHRINK GROUT. STRUCTURES AND PIPES TO BE ABANDONED MAY BE REMOVED AS NEEDED TO FACILITATE NEW CONSTRUCTION.
7. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND SUPERINTENDENCE TO PROVIDE THE DEMOLITION WORK.
8. THE OWNER ASSUMES NO RESPONSIBILITY FOR THE ACTUAL CONDITION OF THE STRUCTURES TO BE DEMOLISHED OR MODIFIED.
9. ALL REMOVED CONCRETE/STRUCTURES SHALL BE BACKFILLED TO MATCH FINISHED GRADE AS SHOWN IN THE PLANS.
10. THE LOCATION OF THE LEACHATE TRANSFER PIPING IS BASED ON THE DESIGN LAYOUT PROVIDED IN DRAWING 896 2X-C-002 REV. 1 AND PLANT PERSONNEL DESCRIPTION OF CONSTRUCTION. LOCATION IS APPROXIMATE.

MT. STORM LAKE
W.E. = 3243.57 (07/08/2015)

SCALE IN FEET: 0 50 100 150 200

REV	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR
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	6 16 2016	DM	LLS	JNH		NA	RKN	CBS	SM			
0	ISSUED FOR BID											
	4 29 2016	DM	LLS	JNH		NA	RKN	CBS	CB			

Dominion | TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

EXISTING CONDITIONS AND DEMOLITION PLAN

LVWSP CLOSURE & RECONSTRUCTION – PHASE 1
MOUNT STORM POWER STATION, WEST VIRGINIA

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016 DGNSPEC FOR FILE VERIFICATION
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703–C2 — REV. 1
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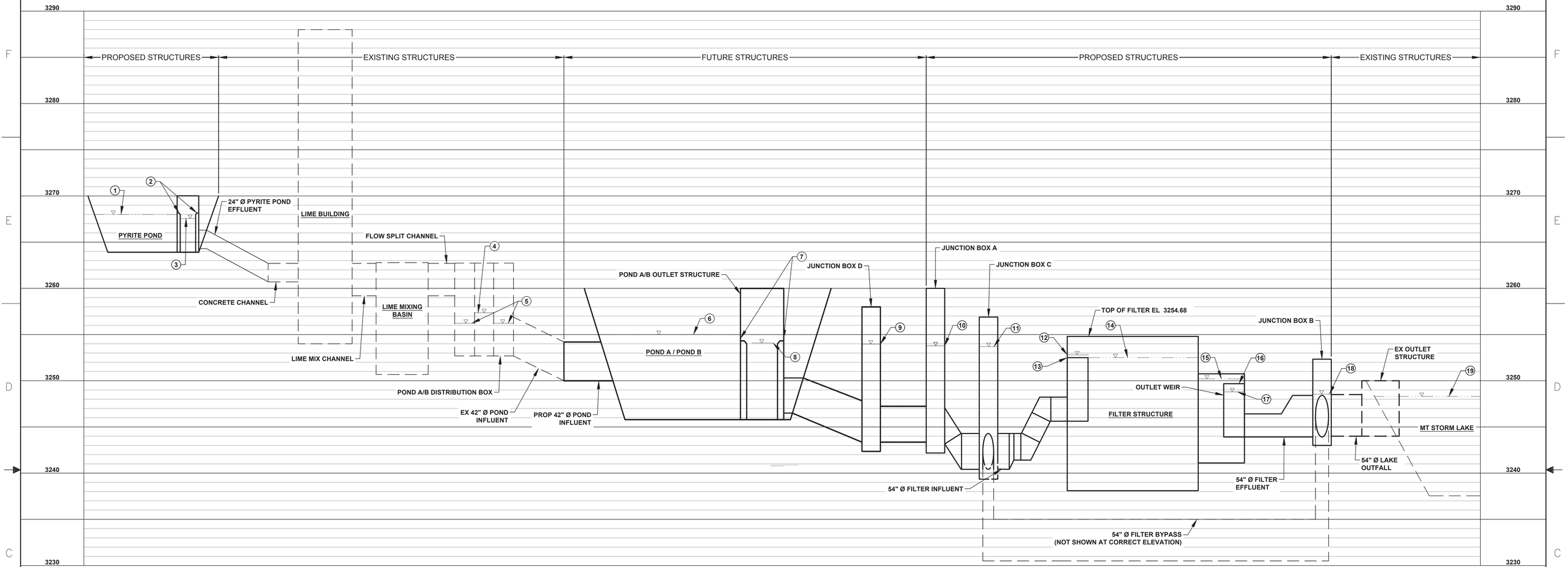
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED — SH C2 OF 23



WATER SURFACE ELEVATIONS

LOCATION	DESCRIPTION	WEIR ELEVATION	WATER SURFACE ELEVATIONS		
			MIN. (10.6 MGD)	DESIGN (20 MGD)	MAX (26 MGD)
①	PYRITE POND	–	3237.68	3267.77	3267.85
②	PYRITE POND OUTLET STRUCTURE WEIR	VARIABLE	3267.62	3267.68	3267.74
③	PYRITE POND OUTLET STRUCTURE		3267.12	3267.18	3267.24
④	POND A/B DISTRIBUTION BOX OVERFLOW	–	3257.05	3257.25	3257.36
⑤	POND A/B DISTRIBUTION BOX	–	3254.03	3255.06	3256.38
⑥	POND A/B	–	3253.79	3254.24	3255.11
⑦	POND A/B OUTLET STRUCTURE WEIR	VARIABLE	3253.50	3253.80	3254.57
⑧	POND A/B OUTLET STRUCTURE	–	3252.37	3253.30	3254.09
⑨	JUNCTION BOX D	–	3252.32	3253.13	3253.97
⑩	JUNCTION BOX A		3252.24	3252.87	3253.78
⑪	JUNCTION BOX C	–	3252.20	3252.74	3253.69
⑫	FILTER INLET WEIR OVERFLOW	–	3252.07	3252.28	3252.81
⑬	FILTER INLET WEIR	3251.08 (FIXED)	–	–	–
⑭	FILTER BACKWASH INITIATE	FIXED	3252.54	3252.54	3252.54
⑮	FILTER OUTLET WEIR OVERFLOW	–	3250.07	3250.28	3250.20
⑯	FILTER OUTLET WEIR	3249.68 (FIXED)	–	–	–
⑰	FILTER OUTLET BOX	–	3248.41	3248.69	3248.95
⑱	JUNCTION BOX B	–	3248.33	3248.40	3248.54
⑲	MT STORM LAKE	MAX WSE	3248.30	3248.30	3248.30

NOTES:

1. ELEVATIONS OF EXISTING LIME BUILDING ARE APPROXIMATE.
2. MIN. FLOW = 10.6 MGD
   DES. FLOW = 20 MGD
   MAX. FLOW = 26 MGD

PLAN LEGEND

- PROPOSED STRUCTURES
- EXISTING STRUCTURES
- FUTURE STRUCTURES

STEPHEN J. MOBLEY REGISTERED 21631 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

6/16/2016

REV	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR	DESCRIPTION
1	6 16 2016	SJM	DRM	HCB		NA	RKN	CBS	SM	CA			RE-ISSUED FOR BID
0	04 29 2016	SJM	DRM	HCB		NA	RKN	CS	HCB	CA			ISSUE FOR BID

Dominion

TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

PROPOSED HYDRAULIC PROFILE

LVWSP CLOSURE & RECONSTRUCTION – PHASE 1
MOUNT STORM POWER STATION, WEST VIRGINIA

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CHKD	CBELL	PROJ ENGR	
DISPL ENGR		SCALE: NONE	UNLESS OTHERWISE NOTED SH C3 OF 23

NAD83 CONSTRUCTION COORDINATES			
Point #	Northing	Easting	Elevation
100	254561.52	2034865.50	3270.00
101	254546.78	2034876.56	3270.00
102	254552.78	2034890.90	3268.00
103	254572.59	2034878.72	3268.00
104	254591.20	2034870.27	3270.00
105	254617.91	2034879.71	3270.00
106	254625.74	2034897.87	3270.00
107	254617.91	2034894.19	3268.00
108	254628.78	2034931.37	3270.00
109	254631.00	2035000.00	3270.00
110	254618.74	2035000.00	3265.91
111	254561.33	2035000.00	3265.91
112	254546.78	2034975.40	3270.00
113	254549.02	2035000.00	3270.00
114	254558.11	2035100.00	3270.00
115	254573.43	2035100.00	3264.91
116	254618.97	2035100.00	3264.91
117	254634.24	2035100.00	3270.00
118	254637.47	2035200.00	3270.00
119	254619.21	2035200.00	3263.91
120	254585.53	2035200.00	3263.91
121	254567.20	2035200.00	3270.00
122	254619.35	2035227.72	3263.64
123	254638.31	2035225.87	3270.00
124	254650.42	2035300.00	3270.00
125	254628.88	2035300.00	3262.91
126	254597.64	2035300.00	3262.91
127	254576.29	2035300.00	3270.00
128	254583.79	2035382.47	3270.00
129	254604.83	2035359.43	3262.32
130	254631.88	2035359.43	3262.32
131	254647.93	2035382.47	3270.00
132	254658.99	2035352.54	3270.00
133	254635.56	2035350.28	3262.41

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.
2. REFER TO PLAN SHEET 66703-C8 AND C9 FOR PYRITE POND INFLUENT DIVERSION PIPE PROFILE.
3. NOTIFY WOODROW CLIFTON (DOMINION TRANSMISSION SUPERVISOR) AT (540)280-7349 TWO WEEKS PRIOR TO BEGINNING WORK IN AREA OF TOWER.
4. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF THE PYRITE POND DIVERSION PIPE BASED ON THE CONSTRUCTION LOADING CONDITIONS.

2,034,700E
2,034,900E
2,035,100E
2,035,300E
ASPHALT
EXISTING 36" DIA. RCP (FROM COAL YARD)
EXISTING 24" DIA. RCP (STORM WATER)
ABANDON 12" DIA. PIPE
12" DIA. HDPE (FROM HYDROBIN) DIVERT 12" DIA. HDPE INTO TRENCH UPSTREAM OF LVWSP SEE DETAIL 2 C21
TRANSFER PIPE FROM UNIT 3 SCRUBBER
EXISTING 24" DIA. HDPE (FROM ASH SPLIT BOX)
ASH SPLIT BOX
EXISTING 36" OPEN CLAY TILE TRENCH
SPLASH BOARDS SEE DETAIL 3 C21
REMOVE CCR ON SURFACE SURROUNDING PIPE, PLACE 6-INCHES TOPSOIL AND ESTABLISH VEGETATION
ELECTRICAL MANHOLE
EXISTING 36" DIA. CMP (STORM WATER)
SEE SHEETS C8 AND C9 FOR MANHOLE DETAILS
PYRITE POND DIVERSION PIPE SEE SHEETS C8 & C9 FOR PLAN AND PROFILE
MH-1
MH-2
MH-3
MH-4
SWEEP BEND
254,610N (SEE CROSS SECTION ON SHEET C7)
DIVERT EXISTING 6" DIA. PVC PIPE, WILL RUN NEW TEMPORARY PIPE TO MH 4 (EXISTING PIPE AT APPROXIMATE ELEV. 3268.5) SEE DETAIL 2 C8
AFTER RECONSTRUCTING PYRITE POND LINER, OUTLET PIPE DIVERT INTO PYRITE POND SEE SHEETS C8 AND C9
BASE LINER
PYRITE POND
PYRITE POND DITCH ENTRANCE SEE DETAIL 4 C18
REMOVE EXISTING OUTLET STRUCTURE AND PIPE TO PYRITE POND
5' DIA. MANHOLE SEE SHEET C14
254,600N
NEW ACCESS ROAD ELEV 3270 SEE DETAIL 7 C19
REMOVE EXISTING 30" DIA. STEEL PIPE
REMOVE EXISTING 30" DIA. STEEL PIPE
NEW 2" HDPE WATER LINE (SEE BLOW UP PLAN VIEW ON SHEET C12)
LIME
LIME MIX
EXISTING MANHOLE FOR 6" DIA. TRANSFER PIPE
CONTRACTOR TO PROVIDE BRIDGING OVER PIPE IN TRUCK TRAFFIC AREAS, SEE NOTE 4
REMOVE EXISTING STAIRWAYS
V-NOTCH DITCH @ 4% SLOPE SEE DETAIL 1 C20
V-NOTCH DITCH @ 6% SLOPE SEE DETAIL 1 C20
AT REMOVAL OF MH-4, FOLLOWING COMPLETION OF PYRITE POND CONSTRUCTION, EXTEND EXISTING PIPE FOR DISCHARGE INTO PYRITE POND (OUTLET I.E. 3269.8)
EXISTING POND A
2,035,100E (SEE CROSS SECTION ON SHEET C7)
RIPRAP APRON 2' THICK ON SEPARATION GEOTEXTILE SEE SHEET C8
NEW 1 ½" AND 14" DIA. FORCEMAIN PIPES TO FILTER BUILDING (SEE BLOW UP PLAN VIEW ON SHEETS C12 AND C13)
TRANSMISSION TOWER SEE NOTE 3.
6" DIA. HDPE GRADIENT CONTROL FORCEMAIN PIPE, SEE SHEET C11
FILL EXISTING BASIN WITH COMPACTED GENERAL FILL DURING PYRITE POND CONSTRUCTION, REFER TO SHEET C4 FOR DESIGN GRADES.
V-NOTCH DRAINAGE DITCH @ 13% SLOPE SEE DETAIL 1 C20
24" DIA. (SDR 32.5) HDPE DOUBLE WALL CULVERT I.E. = 3254 BOTH SIDES (CAN BE REMOVED AT COMPLETION OF PYRITE POND)
254,400N
REMOVE EXISTING CULVERT (28" AT INLET/18" AT OUTLET)
EXISTING POND B
GRAVEL
GRASS
12" DIA. CMP CULVERT INLET I.E.= 3257.5 OUTLET I.E.= 3257.0
BERM ELEV 3260
DIVERT EXISTING 8" DIA. STEEL PIPES TO POND B DURING PYRITE POND CONSTRUCTION. PROTECT PIPE DURING CONSTRUCTION
EXISTING 8" DIA. STEEL PIPE. AT THIS LOCATION REROUTE EXISTING 8" DIA. PIPE TO RUN IN SAME TRENCH AS 6" DIA. GROUNDWATER PIPE
EXISTING 6" DIA. PVC PIPE (FROM LANDFILL LEACHATE PONDS)
6" DIA. HDPE GRADIENT CONTROL TRANSFER PIPE ENDS HERE. ADD ELBOW AT END OF PIPE AND EXTEND A VERTICAL PIPE TO 6' ABOVE EXISTING GROUND FOR LOCATING DURING FUTURE PIPE INSTALLATION
EXISTING POND C
N
0 30 60 90 120
SCALE IN FEET
R. KENT NILSSON REGISTERED 21543 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 6/16/16

1 REVISED REFERENCE TO TEMPORARY 6" PIPE; REMOVED REFERENCE TO SEE SHEET C8; REVISED OUTLET STRUCTURE.

Dominion

TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

PYRITE POND SUBBASE PLAN

LVWSP CLOSURE & RECONSTRUCTION – PHASE 1
MOUNT STORM POWER STATION, WEST VIRGINIA

REV	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR
1	6 16 2016	DM	LLS	JNH		NA	RKN	CBS	SM			
0	4 29 2016	DM	LLS	JNH	NA		RKN	CBS	CB			

1 RE-ISSUED FOR BID

0 ISSUED FOR BID

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016	
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703-C5	REV. 1
CHKD JHN	PROJ ENGR		
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED	SH C5 OF 23

ABANDON 12" DIA. PIPE
12" DIA. HDPE DIVERTER PIPE TO ASH SPLIT BOX
EXISTING 36" OPEN CLAY TILE TRENCH
TRANSFER PIPE TO UNIT 3 SCRUBBER
ASPHALT
GRASS
GRAVEL
CONTOURS REPRESENT SUBBASE GRADES)
8" WIDE, 2' HIGH CONCRETE WALL SEE DETAIL 6 C18
SPLASH BOARDS SEE DETAIL 3 C21
12" DIA. (SDR 11) HDPE PERFORATED PIPE SEE DETAIL 5 C19
12" DIA. SOLID WALL PUMPOUT INLET SEE DETAIL 6 C19
PYRITE POND DIVERSION PIPE
POST LINER CONSTRUCTION REMOVE AND BACKFILL OR ABANDON WITH NON SHRINK GROUT REMAINING PYRITE POND DIVERSION PIPE DOWNSTREAM OF OUTLET SEE PLAN SHEETS C8 & C9
MH-1
MH-2
MH-3
MH-4
SWEEP BEND
254,610N (SEE CROSS SECTION ON SHEET C7)
AFTER RECONSTRUCTING PYRITE POND LINER, DIVERT OUTLET PIPE INTO PYRITE POND PIPE I.E. = 3268.63
REMOVE DROP INLET AND BACKFILL DURING ABANDONMENT OF PYRITE POND DIVERSION PIPE
BASE LINER SEE DETAILS 1 C18 1 C21
PYRITE POND
OUTLET STRUCTURE, REFER TO SHEETS M10, S5, S6, AND DETAILS 3 C8 3 C19
SEE SHEET C7 FOR CROSS SECTION 254,610N LINER DESIGN
254,600N
PYRITE POND DITCH ENTRANCE SEE DETAIL 4 C18
CONCRETE PIPE SUPPORT SEE DETAIL 5 C21
5' DIA. MANHOLE SEE SHEET C14
24" DIA. RCP EFFLUENT PIPE
NEW ACCESS ROAD SEE DETAIL 7 C19
LIME BUILDING F.F. EL. 3262.7'
LIME MIX
DIVERT EXISTING 6" DIA. PVC PIPE, WILL RUN NEW TEMPORARY PIPE TO MH 4 (EXISTING PIPE AT APPROXIMATE ELEV. 3268.5) SEE DETAIL 2 C8
REINFORCED CONCRETE RAMP SEE DETAIL 4 C19
6" DIA. (SDR 11) SOLID WALL CLEANOUT PIPE SEE DETAILS 1 C19 2 C19
EXISTING MANHOLE FOR 6" DIA. TRANSFER PIPE
THIS SECTION OF PIPE TO BE REMOVED WITH COMPLETION OF PYRITE POND CONSTRUCTION
THIS SECTION OF PIPE (OUTSIDE OF ACCESS ROAD) WILL BE REMOVED DURING FUTURE CONSTRUCTION EVENTS
6" DIA. (SDR 11) HDPE PERFORATED PIPE SEE DETAIL 5 C18
RIPRAP APRON SEE SHEET C8
2,035,100E (SEE CROSS SECTION ON SHEET C7)
EXISTING POND A
AT REMOVAL OF MH-4, FOLLOWING COMPLETION OF PYRITE POND CONSTRUCTION, EXTEND EXISTING PIPE FOR DISCHARGE INTO PYRITE POND (OUTLET I.E. 3269.8)
FILL EXISTING BASIN WITH COMPACTED GENERAL FILL DURING PYRITE POND CONSTRUCTION REFER TO SHEET C4 FOR DESIGN
6" DIA. (SDR 11) HDPE GRADIENT CONTROL FORCEMAIN PIPE REFER TO SHEET C11
254,400N
FORCEMAINS FROM FILTER BUILDING SEE SHEETS C12 AND C13
EXISTING POND B
EXISTING 8" DIA. STEEL PIPE. AT THIS LOCATION REROUTE EXISTING 8" DIA. PIPE TO RUN IN SAME TRENCH AS 6" DIA. GROUNDWATER PIPE
12" DIA. CMP CULVERT
RELOCATE 8" DIA PIPE AT THIS LOCATION SEE SHEET C11
EXISTING 6" DIA. PVC PIPE (FROM LANDFILL LEACHATE PONDS)
EXISTING 8" DIA. STEEL PIPE (FROM STORM POND)
BERM ELEV 3260
6" DIA. HDPE GRADIENT CONTROL TRANSFER PIPE ENDS HERE. ADD ELBOW AT END OF PIPE AND EXTEND A VERTICAL PIPE TO 6' ABOVE EXISTING GROUND FOR LOCATING DURING FUTURE PIPE INSTALLATION
254,200N
EXISTING POND C
2,034,700E
2,034,900E
2,035,100E
2,035,300E
0 30 60 90 120
SCALE IN FEET
R. KENT NILSSON REGISTERED 6/16/16 21543 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.

1 REVISED REFERENCE TO TEMPORARY 6" PIPE; REMOVED REFERENCE TO SEE SHEET C8; ADD TEMPORARY PIPE AT MH-4; REVISED OUTLET STRUCTURE; REMOVED DITCH CONTOUR.

STAGE VS STORAGE MATRIX

ELEVATION	PYRITE POND CAPACITY (GAL)	PYRITE POND CAPACITY (AC FT)
3,265	2,300	0.0
3,266	29,200	0.1
3,267	89,200	0.3
3,268	195,100	0.6
3,269	360,200	1.1
3,270	577,200	1.8

REV	DESCRIPTION	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR
1	RE-ISSUED FOR BID	6 16 2016	DM	LLS	JNH		NA	RKN	CBS	SM			
0	ISSUED FOR BID	4 29 2016	DM	LLS	JNH	NA		RKN	CBS	CB			

Dominion

TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

PYRITE POND BASE AND PIPING PLAN

LVWSP CLOSURE & RECONSTRUCTION – PHASE 1
MOUNT STORM POWER STATION, WEST VIRGINIA

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016 DGNSPEC FOR FILE VERIFICATION	
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703–C6	REV. 1
CHKD JHN	PROJ ENGR		
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED	SH C6 OF 23

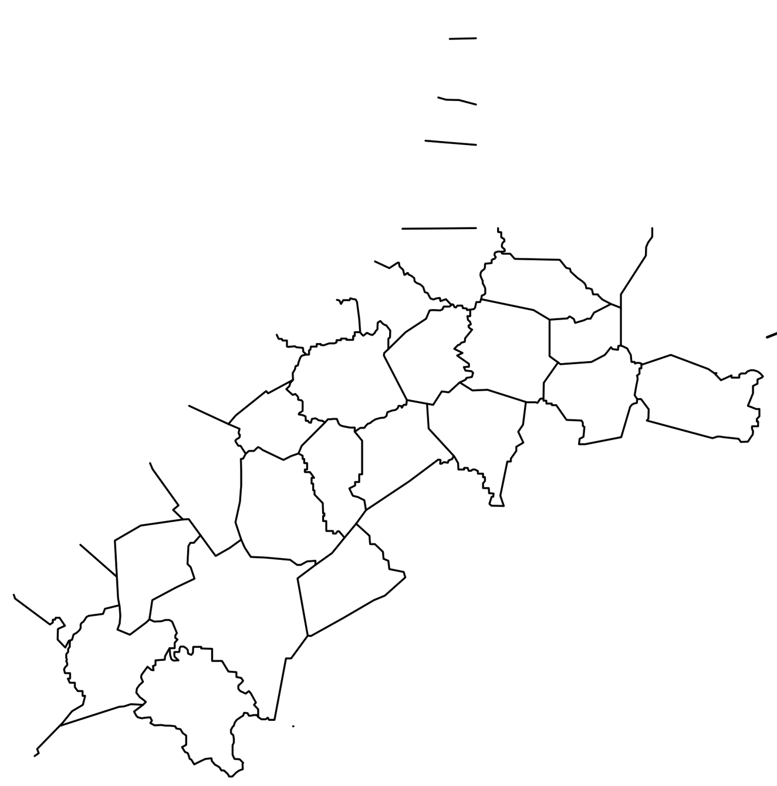
MOUNT STORM POWER STATION

CLOSURE AND RECONSTRUCTION
LOW VOLUME WASTE
SETTLING PONDS
PHASE 2 - 2017/2018 CONSTRUCTION

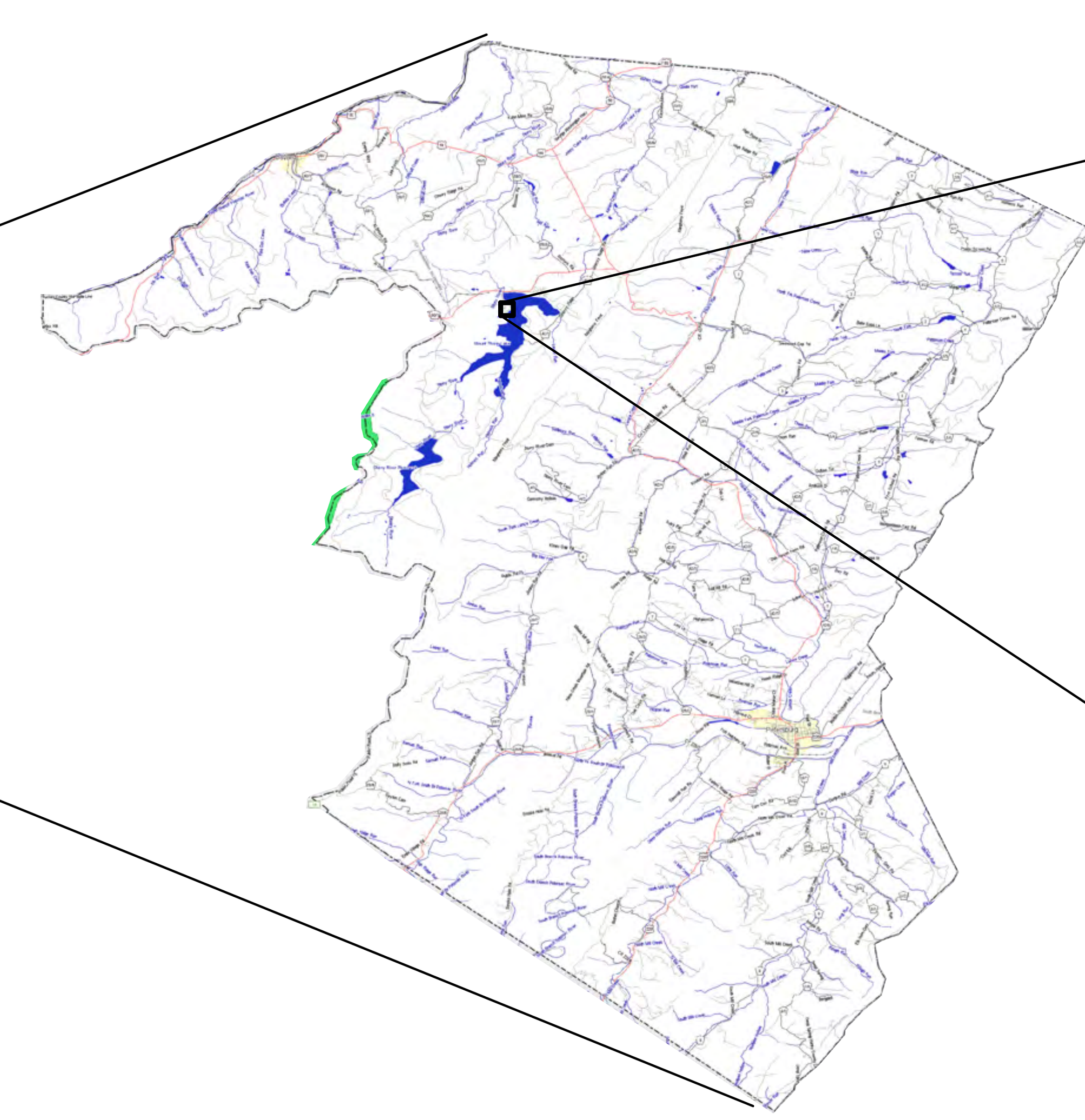
PREPARED FOR: DOMINION RESOURCES SERVICES, INC.
MOUNT STORM POWER STATION
MOUNT STORM, WEST VIRGINIA

PREPARED BY: TRC ENGINEERS INC.
GREENVILLE, SOUTH CAROLINA

DATE: JUNE 2016



WEST VIRGINIA



GRANT COUNTY

SITE LOCATION
1" = 600'

SHEET INDEX

DRAWING NUMBER	SHEET TITLE
66703-1	TITLE SHEET
66703-2	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL
66703-3	GENERAL NOTES - CIVIL, MECHANICAL, STRUCTURAL
66703-4	GENERAL NOTES - STRUCTURAL
66703-5	GENERAL NOTES - STRUCTURAL
66703-C1	CIVIL STANDARD LEGEND
66703-C2	EXISTING CONDITIONS AND DEMOLITION PLAN
66703-C3	PROPOSED HYDRAULIC PROFILE
66703-C4	CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN
66703-C5	PYRITE POND SUBBASE PLAN
66703-C6	PYRITE POND BASE AND PIPING PLAN
66703-C7	CROSS SECTIONS PYRITE POND
66703-C8	PYRITE POND INFLUENT DIVERSION PIPE PLAN VIEW AND DETAILS
66703-C9	PYRITE POND INFLUENT DIVERSION PIPE PROFILE AND DETAILS
66703-C10	PROPOSED YARD PIPING SITE PLAN
66703-C11	GRADIENT CONTROL FORCE MAIN PLAN
66703-C12	WATER LINE & FORCE MAINS PLAN & DETAILS
66703-C13	BACKWASH PUMP FORCE MAIN PLAN & PROFILE
66703-C14	GRAVITY LINES PLAN & PROFILE
66703-C15	FILTER BUILDING CONNECTION PLAN & PROFILE
66703-C16	POND A & B EFFLUENT STA 0+00 - 1+50
66703-C17	POND A & B EFFLUENT STA 1+50 - END
66703-C18	CIVIL DETAILS
66703-C19	CIVIL DETAILS
66703-C20	CIVIL DETAILS
66703-C21	CIVIL DETAILS
66703-C22	CIVIL DETAILS
66703-C23	CIVIL DETAILS
66703-M1	GENERAL MECHANICAL NOTES
66703-MS-0-FL-WWT-120	PROCESS FLOW DIAGRAM I
66703-MS-0-FL-WWT-121	PROCESS FLOW DIAGRAM II
66703-M4	FILTER BUILDING EQUIPMENT PLAN VIEW @ 3253.00
66703-M5	FILTER BUILDING EQUIPMENT SECTIONS I
66703-M6	FILTER BUILDING EQUIPMENT SECTIONS II
66703-M7	FILTER BUILDING PIPING PLAN VIEW @ 3253.00
66703-M8	FILTER PIPING SECTIONS I
66703-M9	FILTER PIPING SECTIONS II
66703-M10	OUTLET STRUCTURE - PYRITE POND
66703-M11	JUNCTION BOX DETAILS
66703-M12	MISCELLANEOUS DETAILS 1
66703-M13	MISCELLANEOUS DETAILS 2
66703-M14	MISCELLANEOUS DETAILS 3
66703-M15	MISCELLANEOUS DETAILS 4
66703-SA1	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA2	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA3	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA4	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA5	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA6	STRUCTURAL/ARCHITECTURAL FILTER STRUCTURE
66703-SA7	STRUCTURAL/ARCHITECTURAL SECTIONS AND DETAILS
66703-SA8	STRUCTURAL/ARCHITECTURAL SECTIONS AND DETAILS
66703-S1	STRUCTURAL FILTER STRUCTURE
66703-S2	STRUCTURAL FILTER STRUCTURE
66703-S3	STRUCTURAL FILTER STRUCTURE
66703-S4	STRUCTURAL FILTER STRUCTURE
66703-S5	STRUCTURAL PYRITE POND OUTFALL
66703-S6	STRUCTURAL PYRITE POND OUTFALL
66703-S7	STRUCTURAL JUNCTION BOX A
66703-S8	STRUCTURAL JUNCTION BOX B
66703-S9	STRUCTURAL JUNCTION BOX C
66703-S10	STRUCTURAL JUNCTION BOX C
66703-S11	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S12	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S13	STRUCTURAL TYPICAL SECTIONS & DETAILS
66703-S14	STRUCTURAL PEDESTRIAN BRIDGE SECTIONS & DETAILS
66703-E-001	ELECTRICAL SYMBOLS AND ABBREVIATIONS
66703-E-4500	ELECTRICAL SITE PLAN
66703-E-4800	ENLARGED ELECTRICAL PLANS #1
66703-E-4801	ENLARGED ELECTRICAL PLANS #2
66703-E-0300	EXISTING PYRITE BLDG. ENLARGED ELECTRICAL PLAN
66703-E-0900	ELECTRICAL DUCT BANK AND RACEWAY ROUTING INTERIOR ELEVATIONS AT FILTER BUILDING
66703-E-4803	ELECTRICAL ONELINE DIAGRAM AND DETAILS
66703-E-1400	PYRITE BLDG. RTU MODIFICATIONS
66703-E-1401	ELECTRICAL PANEL SCHEDULES
66703-E-4805	LIGHTING AND MECHANICAL SCHEDULES
66703-E-6000	ELECTRICAL DUCT BANK SECTIONS
66703-E-4501	ELECTRICAL DETAILS
66703-E13	RACEWAY SCHEDULE
66703-E14	CABLE SCHEDULE

ISSUED FOR BID

TRC

NOTES

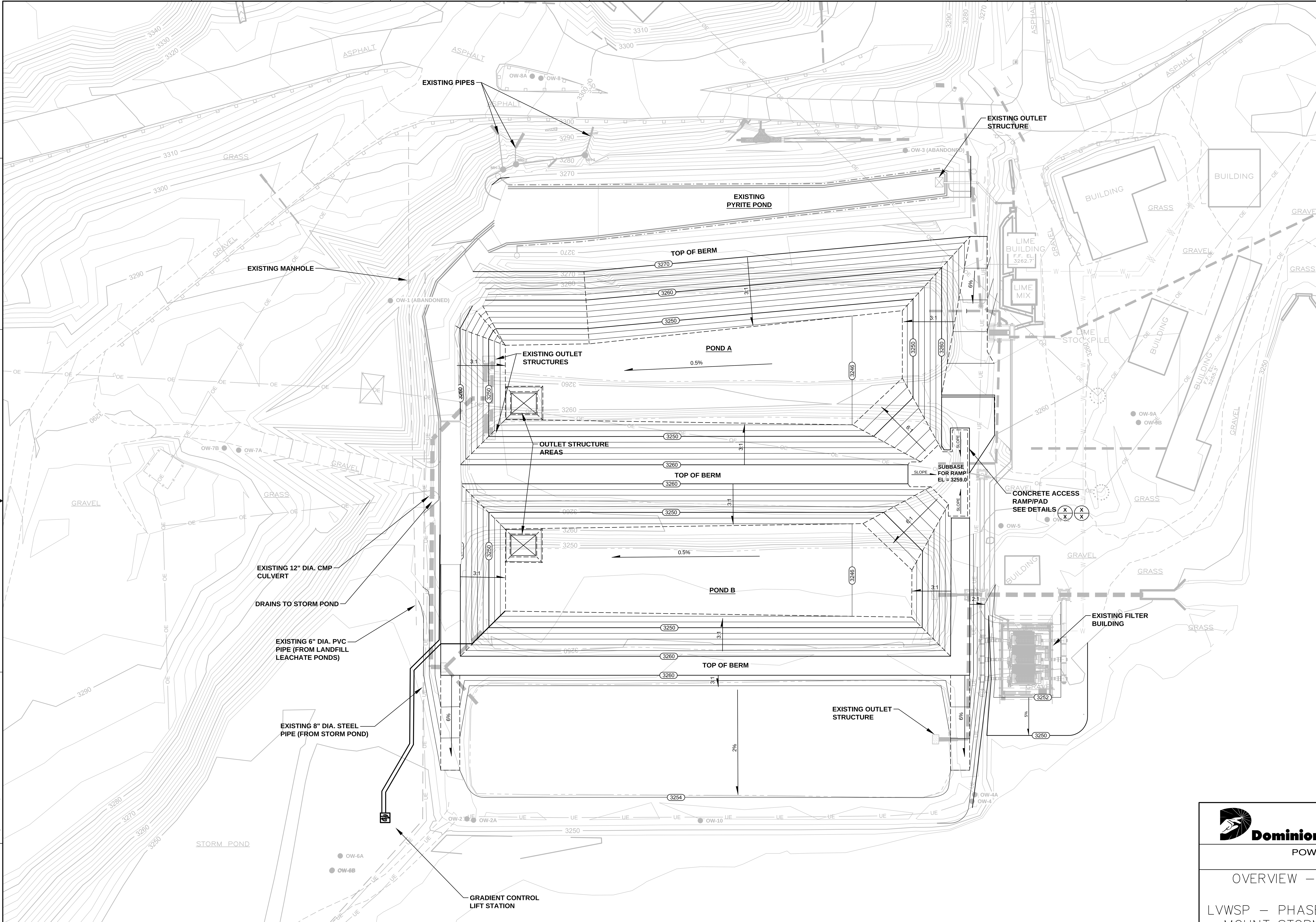
1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.
2. REFER TO PLAN SHEET 66703-C21 FOR NEW PIPING LAYOUTS.

STAGE VS STORAGE MATRIX

ELEVATION	POND A CAPACITY (GAL)	POND A CAPACITY (AC FT)
3,247	40,400	0.1
3,248	198,500	0.6
3,249	502,500	1.5
3,250	844,000	2.6
3,251	1,211,100	3.7
3,252	1,604,100	4.9
3,253	2,023,700	6.2
3,254	2,470,200	7.6
3,255	2,944,000	9.0
3,256	3,445,500	10.6
3,257	3,975,300	12.2

STAGE VS STORAGE MATRIX

ELEVATION	POND B CAPACITY (GAL)	POND B CAPACITY (AC FT)
3,247	43,100	0.1
3,248	207,300	0.6
3,249	507,800	1.6
3,250	846,400	2.6
3,251	1,210,400	3.7
3,252	1,600,400	4.9
3,253	2,016,700	6.2
3,254	2,460,000	7.5
3,255	2,930,600	9.0
3,256	3,429,200	10.5
3,257	3,956,100	12.1



Dominion

TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

OVERVIEW – PYRITE POND, PONDS A AND B SUBGRADE PLAN
LVWSP – PHASE 2 – 2017 & 2018 CONSTRUCTION
MOUNT STORM POWER STATION, WEST VIRGINIA

REV	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR	DESCRIPTION
0	06 06 2016	DM	LLS	JNH	NA		RKN	CBS	SM	BCA			ISSUED FOR BID

DSGN D.MARSHALL | DSGN SUPV
DRWN L. STORMER | ENGR SUPV
CHKD JNH | PROJ ENGR
DISPL ENGR RKN | SCALE: AS NOTED

DATE JUNE 2016
DGNSPEC FOR FILE VERIFICATION
DRAWING NO. 66703–C6
REV. 0
UNLESS OTHERWISE NOTED
SH C6 OF 71

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.

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 Universal Transverse Mercator (UTM) Zone 17. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM 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:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

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 SOURCE: Digital data were obtained from the U.S. Census Bureau, the West Virginia Statewide Addressing and Mapping Board (WV SAMB), the WV Dept. of Environmental Protection (WV DEP), the U.S. Forest Service (USFS), and Michael Baker Jr., Inc.(Baker). Corporation boundaries and road names were obtained from Census Tiger/Line 2000 data sets. The 1:4800 scale 2003 orthophoto base map imagery was obtained from the WV SAMB, as was the orthophoto based hydrographic vector data. County boundaries were digitized by the WV DEP from the U.S. Geological Survey 1:24000 scale topographic map Digital Raster Graphics. National Forest Boundary data were created by the Monongahela National Forest Geographic Information Systems Program, (USFS) Levee data were created by Baker for The Federal Emergency Management Agency.

Based on the above mentioned digital orthophotographs, 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 (where applicable) for South Branch Potomac River in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the 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 (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance 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 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)
4276000 M	1000-meter Universal Transverse Mercator grid values, zone 17
600000 FT	5000-foot grid ticks: West Virginia State Plane coordinate system (FIPSZONE 4701), 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
SEPTEMBER 2, 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" = 1000'
500 0 1000 2000 FEET
300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0135F

FIRM
FLOOD INSURANCE RATE MAP

GRANT COUNTY, WEST VIRGINIA AND INCORPORATED AREAS

PANEL 135 OF 425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
GRANT COUNTY	540038	0135	F

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
54023C0135F

EFFECTIVE DATE
SEPTEMBER 2, 2009

Federal Emergency Management Agency

Appendix C
Storm Water Calculations

Table of Contents

Storm Water Capacity of the Existing LVWSP

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Existing Ponds A through D		230765.0000
PREPARED BY: S. Sellner	DATE: 8/15/2016	FINAL ☐
CHECKED BY: J. Hotstream	DATE: 8/19/2016	REVISION ☐

Purpose: Determine if there is sufficient capacity to contain the runoff volume collected in the LVWSP from the 100 year, 24 hour storm event for the existing LVSWP (Ponds A, B, C, and D)

Methodology: Calculate inflow for the 100 year, 24 hour storm event. Determine the available capacity for the volume of storm water by estimating additional flow that can be provided from the outlet and available freeboard capacity of Ponds A, B, C, and D.

INFLOWS

1.) Determine storm water inflows into the retrofitted Pyrite Pond

- Station storm water flows into Pyrite Pond (Refer to Attached Figure).
- The drainage area is approximately 75.4 acres.

- Volume of runoff determined by HydroCAD output (See Attached). This output was performed based upon values determined in the storm water analysis

V_{Runoff} = Volume of Runoff (acre feet) for the 100 year, 24 hour storm event

V_{Runoff} = 31.0 acre feet

2.) Determine storm water inflow into Ponds A, B, C, and D

- Effective area of storm water based upon midpoint of outside berms from CAD drawing.
- It is assumed that ther is no infiltration

$V_{Pond\ Inflow}$ = iA

V = Storm Water Inflow to Pyrite Pond
i = Precipitation Frequency (inches/day) 100 year, 24 hour storm event
A = Area (acre)

i = 6.19 inches/day
A = 7.5 acres

$V_{Pond\ Inflow}$ = 46.4 acre inches
$V_{Pond\ Inflow}$ = 3.87 acre feet

V_{Inflow} = Volume of Total Inflows
$V_{Inflow} = V_{Runoff} + V_{Pond\ Inflow}$

V_{Inflow} = 34.9 acre feet

Note:

Areas and volumes are from the Civil 3D existing conditions model, refer to attached sheets

Design storm data from NOAA, refer to attached sheets

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Existing Ponds A through D		230765.0000
PREPARED BY: S. Sellner	DATE: 8/15/2016	FINAL ☐
CHECKED BY: J. Hotstream	DATE: 8/19/2016	REVISION ☐

OUTFLOWS

3.) Determine volume out of the LVWSP outlet - Volume of flow based on the difference between the max flow and normal operating flow. This difference provides the additional outflow capacity from the LVWSP that is available during a storm event. The normal operational flow is based on instantaneous readings and assumed to equal the average + 2 standard deviations

- Volumes based upon Settling Capcacity Analysis calculation performed on 9/23/2015, see attachments
- Maximum outflow rate assumed to be 26 million gallons per day (MGD)

$Q_{Outflow}$ = Q_{Max} - Ave.+2σ

$Q_{Outflow}$ = Available Outflow Rate (MGD)
Ave.+2σ = Average + 2 Standard Deviations Flow Rate (MGD)
Q_{Max} = Maximum Outflow Rate (MGD)

Ave.+2σ = 18 MGD
Q_{Max} = 26 MGD

$Q_{Outflow}$ = 8 MGD

-Convert available flow rate to available volume for outflow (Assuming flow for 24 hours - 1 day)

$V_{Outflow}$ = Q_{Ouflow} * Days of Flow

-Convert million gallons per day (MGD) to Acre-Feet

$V_{Outflow}$ = Available Outflow Volume
$Q_{Outflow}$ = Available Outflow Rate

$V_{Outflow}$ = 24.5 acre feet

AVAILABLE FREEBOARD

4.) Determine volume of available freeboard in the existing LVSWP (Pond A, B, C, and D)

- Pond Elevations and Volumes deteremined by Civil 3D, see attached
- Top of operating water level based on station measurements

Pond Elevations (feet NAVD88)

	Pond A	Pond B	Pond C	Pond D
Top of Berm Elevation	3,260	3,260	3,254	3,254
Top of Water Elevation	3,255	3,255	3,252	3,252

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Existing Ponds A through D		230765.0000
PREPARED BY: S. Sellner	DATE: 8/15/2016	FINAL ☐
CHECKED BY: J. Hotstream	DATE: 8/19/2016	REVISION ☐

Pond Capacities

	Pond A	Pond B	Pond C	Pond D
Top of Berm (cubic yards)	20,670	28,120	26,418	27,893
Top of Water (cubic yards)	11,700	18,365	22,080	23,110

Freeboard Volumes (S_{FB}) = Top of Berm Volume (cy) - Bottom of Pond Volume (cy)

S_{FB-A} = 8,970 cy
S_{FB-B} = 9,755 cy
S_{FB-C} = 4,338 cy
S_{FB-D} = 4,783 cy

Total Storage of Existing Freeboard = $S_{FB-A} + S_{FB-B} + S_{FB-C} + S_{FB-D}$

S_{FB} = 27,846 cy
S_{FB} = 17 acre feet

5.) Compare the calculated inflow volumes vs. the outflow volumes considering the volume from the Freeboard Capacity

-Determine the Freeboard Volume Capacity compare to the flow difference

$V_{Inflow} < V_{outflow} + S_{FB}$

V_{Inflow} = 34.9 acre feet
$V_{outflow} + S_{FB}$ = 41.8 acre feet

34.9 < 41.8 OK

Conclusion: Based upon the inflow, outflow, and freeboard capacity of the existing LVWSP, the system has sufficient capacity to accommodate the runoff associated with a 100 year,24 hour storm event.

PROJECT:

DOMINION POWER
MT. STORM POWER STATION
MT. STORM, WV
CIVIL DESIGN

TITLE:

STORM WATER RUNOFF INFLOWING TO PYRITE POND

DRAWN BY:	E. OLSON	PROJ. NO.:	230765
CHECKED BY:	D. ENGSTROM	FIGURE 01	
APPROVED BY:	J. HOTSTREAM		
DATE:	12/10/2015		

TRC

708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600

FILE NO.: X-Drainage Areas.dwg

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.341	84	50-75% Grass cover, Fair, HSG D (S-3, S-4, S-5, S-8)
0.746	98	Paved parking, HSG D (S-3, S-5)
60.862	93	Urban industrial, 72% imp, HSG D (S-1, S-7)
2.499	98	Water Surface, HSG D (S-2, S-6)
75.448	**92**	**TOTAL AREA**

Summary for Subcatchment 1S: Drainage Area to Ponds

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 717.06 cfs @ 11.89 hrs, Volume= 30.960 af, Depth> 4.92"

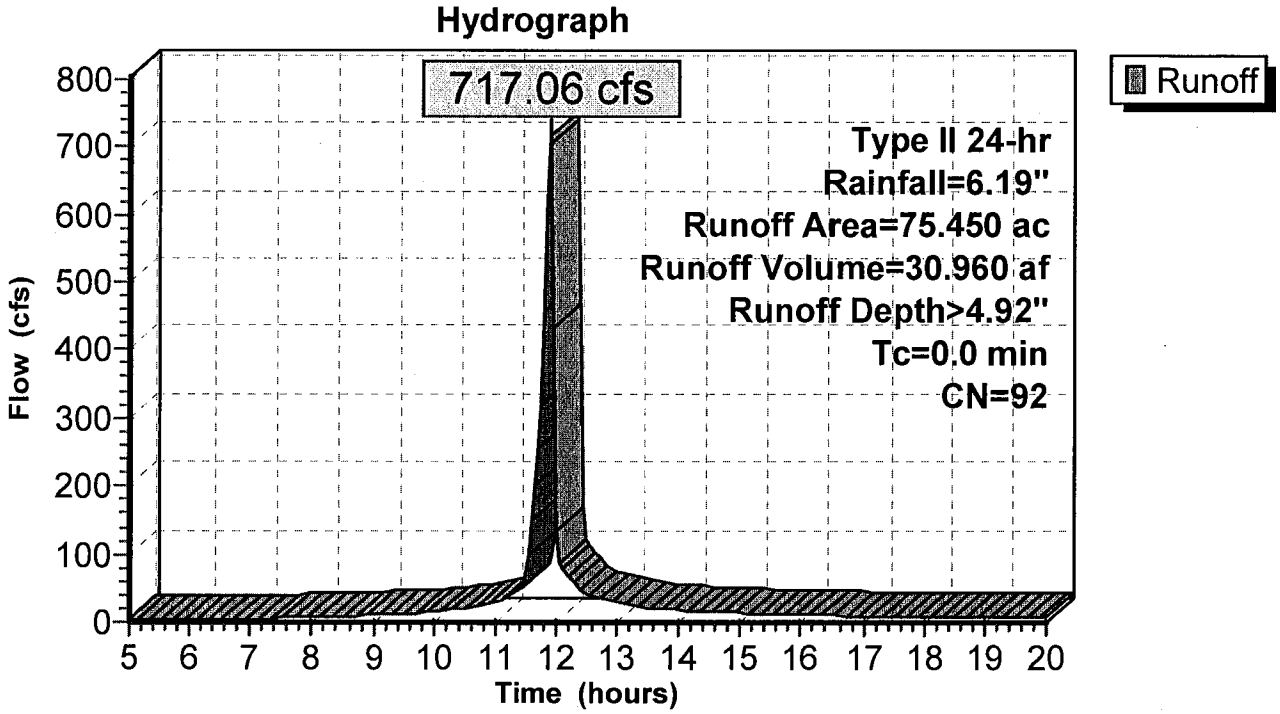
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=6.19"

Calculation Step 1

	Area (ac)	CN	Description
*	75.450	92	Weighted Average from Permit
	75.450		100.00% Pervious Area

Subcatchment 1S: Drainage Area to Ponds

Hydrograph



NOAA Atlas 14, Volume 2, Version 3 MOUNT STORM
Station ID: 46-6293
Location name: Mount Storm, West Virginia, US*
Latitude: 39.2833°, Longitude: -79.2333°
Elevation:
Elevation (station metadata): 2851 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

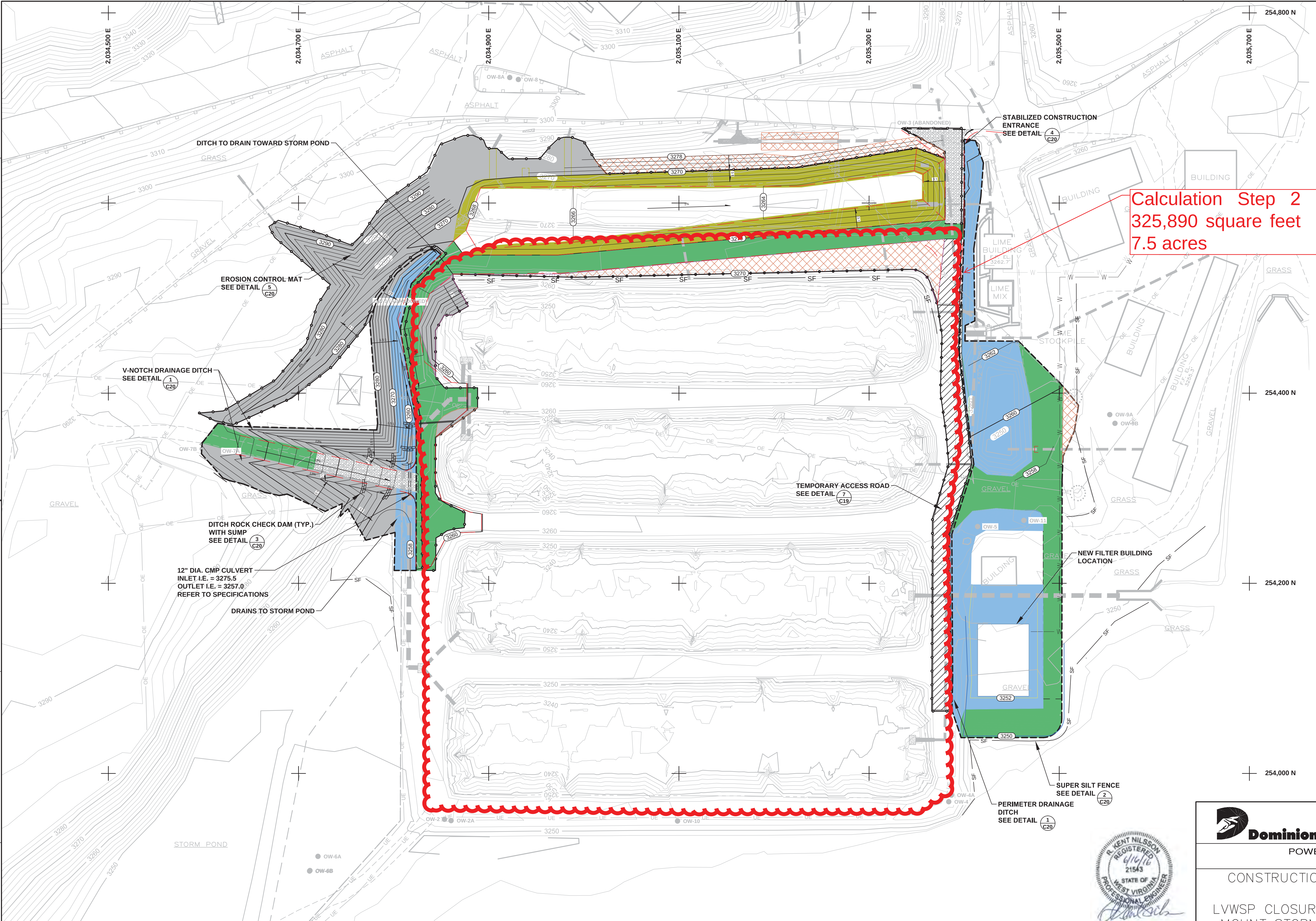
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.301 (0.268-0.339)	0.355 (0.314-0.400)	0.427 (0.378-0.480)	0.488 (0.431-0.549)	0.570 (0.500-0.637)	0.639 (0.559-0.713)	0.708 (0.616-0.790)	0.785 (0.678-0.875)	0.893 (0.764-0.993)	0.981 (0.832-1.09)
10-min	0.469 (0.417-0.527)	0.554 (0.490-0.626)	0.664 (0.587-0.747)	0.755 (0.666-0.848)	0.872 (0.766-0.975)	0.970 (0.848-1.08)	1.07 (0.929-1.19)	1.17 (1.01-1.31)	1.31 (1.13-1.46)	1.44 (1.22-1.60)
15-min	0.575 (0.511-0.646)	0.678 (0.599-0.765)	0.816 (0.722-0.918)	0.929 (0.820-1.04)	1.08 (0.946-1.21)	1.20 (1.05-1.34)	1.33 (1.15-1.48)	1.46 (1.26-1.62)	1.64 (1.40-1.82)	1.79 (1.52-2.00)
30-min	0.761 (0.676-0.856)	0.908 (0.803-1.02)	1.12 (0.989-1.26)	1.29 (1.14-1.45)	1.52 (1.34-1.70)	1.72 (1.50-1.92)	1.92 (1.67-2.14)	2.13 (1.84-2.38)	2.43 (2.08-2.71)	2.69 (2.28-3.00)
60-min	0.930 (0.827-1.05)	1.11 (0.986-1.26)	1.40 (1.24-1.58)	1.64 (1.45-1.85)	1.98 (1.74-2.21)	2.27 (1.98-2.53)	2.57 (2.23-2.86)	2.90 (2.50-3.23)	3.37 (2.88-3.75)	3.79 (3.21-4.22)
2-hr	1.10 (0.976-1.24)	1.32 (1.17-1.49)	1.66 (1.47-1.87)	1.97 (1.74-2.20)	2.39 (2.10-2.66)	2.77 (2.41-3.08)	3.17 (2.75-3.52)	3.61 (3.11-4.00)	4.26 (3.63-4.70)	4.84 (4.08-5.34)
3-hr	1.19 (1.05-1.34)	1.42 (1.26-1.60)	1.77 (1.57-2.00)	2.09 (1.85-2.35)	2.54 (2.23-2.85)	2.94 (2.56-3.28)	3.37 (2.92-3.76)	3.85 (3.32-4.2	4.56	5.20
6-hr	1.48 (1.28-1.73)	1.76 (1.53-2.06)	2.17 (1.88-2.53)	2.55 (2.20-2.96)	3.08 (2.64-3.57)	3.55 (3.04-4.10)	4.07 (3.45-4.69)	4.64 (3.91-5.35)	5.48 (4.57-6.30)	6.24 (5.14-7.16)
12-hr	1.83 (1.60-2.15)	2.17 (1.90-2.54)	2.66 (2.33-3.11)	3.12 (2.72-3.64)	3.79 (3.27-4.40)	4.38 (3.76-5.07)	5.03 (4.28-5.82)	5.76 (4.85-6.64)	6.86 (5.69-7.89)	7.86 (6.44-9.02)
24-hr	2.18 (1.96-2.45)	2.61 (2.34-2.94)	3.25 (2.91-3.65)	3.80 (3.39-4.26)	4.63 (4.09-5.18)	5.37 (4.69-6.0	6.19 (5.33-6.93)	7.11 (6.25-7.97)	8.54 (7.09-9.61)	9.78 (7.98-11.0)
2-day	2.55 (2.32-2.83)	3.05 (2.78-3.38)	3.79 (3.44-4.20)	4.42 (4.00-4.90)	5.39 (4.82-5.97)	6.24 (5.53-6.91)	7.09 (6.30-7.97)	8.26 (7.13-9.18)	9.92 (8.39-11.1)	11.4 (9.45-12.8)
3-day	2.77 (2.56-3.03)	3.31 (3.05-3.61)	4.06 (3.74-4.43)	4.70 (4.31-5.13)	5.64 (5.12-6.16)	6.45 (5.79-7.06)	7.33 (6.51-8.06)	8.30 (7.26-9.23)	9.97 (8.40-11.1)	11.4 (9.49-12.8)
4-day	3.00 (2.80-3.23)	3.57 (3.33-3.85)	4.34 (4.04-4.67)	4.98 (4.62-5.36)	5.89 (5.42-6.36)	6.66 (6.06-7.22)	7.46 (6.72-8.15)	8.33 (7.39-9.27)	10.0 (8.41-11.2)	11.5 (9.54-12.9)
7-day	3.49 (3.27-3.74)	4.14 (3.87-4.44)	4.96 (4.63-5.32)	5.63 (5.24-6.05)	6.57 (6.06-7.07)	7.32 (6.70-7.91)	8.09 (7.34-8.80)	8.89 (7.98-9.75)	10.1 (8.82-11.3)	11.6 (9.63-13.0)
10-day	4.03 (3.80-4.29)	4.75 (4.48-5.06)	5.60 (5.28-5.96)	6.28 (5.90-6.68)	7.19 (6.70-7.67)	7.89 (7.32-8.45)	8.60 (7.91-9.26)	9.32 (8.49-10.1)	10.3 (9.26-11.4)	11.7 (9.91-13.1)
20-day	5.65 (5.37-5.96)	6.61 (6.28-6.98)	7.60 (7.22-8.04)	8.41 (7.96-8.90)	9.47 (8.92-10.0)	10.3 (9.63-11.0)	11.1 (10.3-11.9)	11.9 (11.0-12.8)	12.9 (11.8-14.1)	13.7 (12.3-15.0)
30-day	7.11 (6.78-7.46)	8.28 (7.90-8.71)	9.40 (8.95-9.89)	10.3 (9.78-10.8)	11.4 (10.8-12.0)	12.3 (11.6-13.0)	13.1 (12.3-13.9)	13.9 (13.0-14.8)	14.9 (13.8-16.0)	15.6 (14.3-16.9)
45-day	9.09 (8.70-9.50)	10.5 (10.1-11.0)	11.8 (11.3-12.4)	12.8 (12.3-13.5)	14.1 (13.4-14.8)	15.1 (14.3-15.9)	15.9 (15.1-16.9)	16.8 (15.8-17.8)	17.8 (16.6-19.0)	18.5 (17.1-19.9)
60-day	10.9 (10.5-11.4)	12.7 (12.2-13.3)	14.1 (13.5-14.8)	15.3 (14.6-16.0)	16.7 (15.9-17.5)	17.7 (16.8-18.7)	18.7 (17.7-19.7)	19.6 (18.4-20.8)	20.6 (19.3-22.0)	21.4 (19.9-22.9)

Calculation Step 2

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.



LEGEND

- SECTION 704 CLASS 3 AGGREGATE OVER SECTION 704 CLASS 2 AGGREGATE (ACCESS ROAD)
- RIPRAP D_{50} = 8" OVER DENSE AGGREGATE BASE SECTION 704, CLASS 10.
- 6" THICK COVER GRAVEL SECTION 703 COURSE AGGREGATE GRADATION #24 OVER SEPARATION GEOTEXTILE.
- EROSION CONTROL MAT, TOPSOIL, AND VEGETATION
- 6" TOPSOIL AND VEGETATION
- TEMPORARY ACCESS ROAD SECTION 704 CLASS 3 AGGREGATE (8" THICK) OVER SEPARATION GEOTEXTILE
- LIMITS OF DISTURBANCE FOR AREA FLOWING TO PONDS (2.4 ACRES) (COVERED UNDER CURRENTLY ACTIVE INDIVIDUAL NPDGS PERMIT NO. WV0005525)
- LIMITS OF DISTURBANCE FOR AREA NOT FLOWING TO PONDS (1.7 ACRES) (COVERED UNDER GENERAL NPDES PERMIT NO. WV0115924)
- SF — SUPER SILT FENCE

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.

Dominion

TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN
LVWSP CLOSURE & RECONSTRUCTION – PHASE 1
MOUNT STORM POWER STATION, WEST VIRGINIA

R. KENT NILSSON REGISTERED 21543 STATE OF WEST VIRGINIA PROFESSIONAL ENGINEER 6/16/16

REV	DESCRIPTION	DATE	DSGN	DRWN	CHKD	PROJ ENGR	CIVIL ENGR
1	RE-ISSUED FOR BID	6 16 2016	DM	LLS	JNH	RKN	CBS
0	ISSUED FOR BID	4 29 2016	DM	LLS	JNH	RKN	CBS

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016	
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703–C4	REV. 1
CHKD JHN	PROJ ENGR		
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED	SH C4 OF 23

708 Heartland Trail, Suite 3000, Madison, WI 53717 • www.TRCsolutions.com

PROJECT / PROPOSAL NAME / LOCATION:		PROJECT / PROPOSAL NO.	FINAL
Mount Storm - Settling Capacity Analysis		230765.0000 Phase 4	
PREPARED BY:	D. Engstrom	DATE: 9/21/2015	REVISION
CHECKED BY:	J. Hotstream	DATE: 9/23/2015	10/28/2015

SUMMARY OF FLOW DATA AND CALCULATIONS

Method:

Flow data into the primary settling ponds (Ponds A and B) were not available to estimate treatability of influent. Flow ranges are estimated based on monthly monitoring of the permited outfall to Mt. Storm Lake since 2001 and calculated flows from the weir in the Pond A/B distribution box.

Data from Monitoring Point 401 represents the outfall after Ponds C and D. It is assumed that this flow is equal to the inflow to the ponds. Calculated influent flow values are based on water heights over the weir in the Pond A/B distribution box obtained on 8/24, 8/25, and 8/27/15. Several calculated flows are plotted on Figure 1

Figure 1:

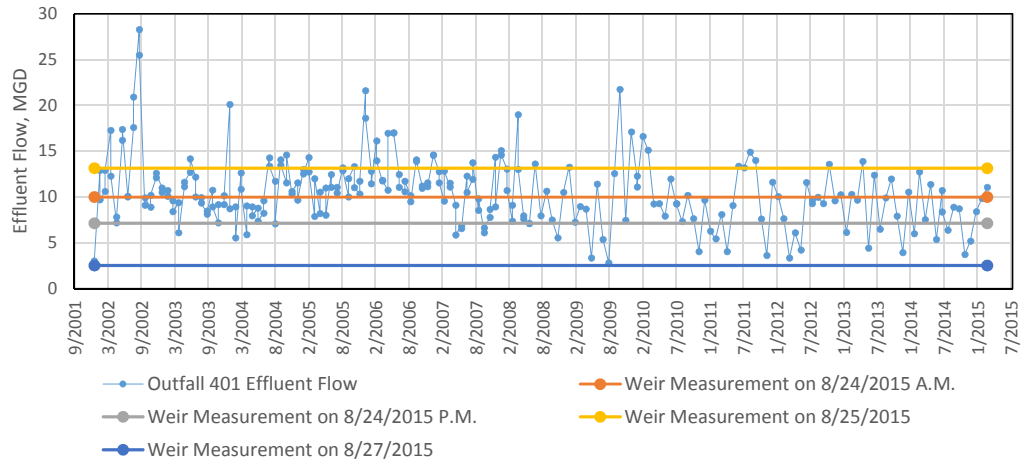


Table 1. Statistical summary of the Outfall 401 flow data.

STATISTICAL PARAMETER	FLOW (MGD)
Average	10.6
Maximum	28.3
Minimum	2.8
Median	10.3
Standard Deviation	3.7
Lower Quartile	8.04
Upper Quartile	13.5
Average Plus Two Standard Deviations	18.0
Adjusted Maximum	28.3

Calculation Step 3.

Discussion:

Fifteen years of data from Outfall 401 provides maximum flow of 28.3 MGD, a minimum flow of 2.8 MGD, and an average flow of 10.6 MGD. These data from Outfall 401 are normally distributed. Therefore considering a value of the mean and 2 standard deviations, 18 MGD, captures 95%+ of the population. Recent data, from 2010 to present, suggest maximum flows of 15 MGD. Comparing this analysis to field measurements at the weir support a maximum flow value of 18 MGD (27.85 cfs).

Cut/Fill Report

Generated: 2016-08-19 09:56:48

By user: LStormer

Drawing: J:\Dominion Resources\Mt. Storm\230765 - Liner Construction\000004 \DTM\Volumes\J:\Dominion Resources\Mt. Storm\230765 - Liner Construction\000004 \DTM\Volumes\Pond Hydraulic Height Volumes.dwg

Calculation Step 4

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Pond A Existing to Elev 3255	full	1.000	1.000	43601.65	0.00	11692.46	11692.46<Fill>
Pond B Existing to Elev 3255	full	1.000	1.000	48576.36	0.00	18361.99	18361.99<Fill>
Pond C Existing to Elev 3252	full	1.000	1.000	56818.44	0.00	22078.87	22078.87<Fill>
Pond D Existing to Elev 3252	full	1.000	1.000	62375.13	0.00	23108.98	23108.98<Fill>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	211371.58	0.00	75242.30	75242.30<Fill>

* Value adjusted by cut or fill factor other than 1.0

Cut/Fill Report

Generated: 2016-08-18 14:25:17

By user: LStormer

Drawing: J:\Dominion Resources\Mt. Storm\230765 - Liner Construction\000004 \DTM\Volumes\J:\Dominion Resources\Mt. Storm\230765 - Liner Construction\000004 \DTM\Volumes\Pond Hydraulic Height Volumes.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Pond C Existing to Elev 3254	full	1.000	1.000	60355.76	0.00	26417.68	26417.68<Fill>
Pond D Existing to Elev 3254	full	1.000	1.000	66865.99	0.00	27893.24	27893.24<Fill>
Pond A Existing to Elev 3260	full	1.000	1.000	53379.92	0.00	20670.05	20670.05<Fill>

Calculation Step 4

Pond B Existing to Elev 3260	full	1.000	1.000	56868.31	0.00	28119.69	28119.69<Fill>

Calculation Step 4

Totals

	2d Area (Sq. Ft.)	**Cut** (Cu. Yd.)	**Fill** (Cu. Yd.)	**Net** (Cu. Yd.)
Total	452032.86	11.85	144860.13	144848.27<Fill>

* Value adjusted by cut or fill factor other than 1.0

Storm Water Capacity of Reconstructed Ponds A and B

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Reconstructed Pond A and Pond B		230765.0000
PREPARED BY: S. Sellner	DATE: 8/18/2016	FINAL ☐
CHECKED BY: J. Hotstream	DATE: 8/18/2016	REVISION ☐

Purpose: Determine if there is sufficient capacity to contain the runoff volume collected in the LVWSP from the 100 year, 24 hour storm event for the reconstructed LVWSP (Pond A and Pond B)

Methodology: Calculate inflow for the 100 year, 24 hour storm event. Determine the available capacity for the volume of storm water by estimating additional flow that can be provided from the outlet and available freeboard capacity of the reconstructed Ponds A and B.

INFLOWS

1.) Determine storm water inflows into the retrofitted Pyrite Pond

- Site storm water flows into Pyrite Pond (Refer to Attached Figure).
- The drainage area is approximately 75.4 acres.

- Volume of runoff determined by HydroCAD output (See Attached). This output was performed based upon values determined in the storm water analysis

V_{Runoff} = Volume of Runoff (acre feet)

V_{Runoff} = 31.0 acre feet

2.) Determine storm water inflow into Pond A and Pond B

- Effective area of storm water based upon midpoint of outside berms from CAD drawing. Runoff coefficient assumed to be 1.0 as the entire area flows inward and there is no infiltration

$V = iA$

V = Storm Water Inflow to Pyrite Pond
i = Precipitation Frequency (inches/day) 100 year, 24 hour storm event
A = Area (acre)

i = 6.19 inches/day
A = 5.5 acres

$V_{Pond\ Inflow}$ = 34.05 acre inches
$V_{Pond\ Inflow}$ = 2.84 acre feet

V_{Inflow} = Volume of Total Inflows
$V_{Inflow} = V_{Runoff} + V_{Pond\ Inflow}$

V_{Inflow} = 33.8 acre feet

Note:

Areas and volumes are from the Civil 3D pond reconstruction model, refer to attached sheets

Design storm data from NOAA, refer to attached sheets

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Reconstructed Pond A and Pond B		230765.0000
PREPARED BY: S. Sellner	DATE: 8/18/2016	FINAL ☐
CHECKED BY: J. Hotstream	CHECKED BY: J. Hotstr	REVISION ☐

OUTFLOWS

3.) Determine volume out of the LVWSP outlet - Volume of flow based on the difference between the max flow and normal operating flow. This difference provides the additional outflow capacity from the LVWSP that is available during a storm event. The normal operational flow is based on instantaneous readings and assumed to equal the average + 2 standard deviations

- Volumes based upon Settling Capcacity Analysis calculation performed on 9/23/2015, see attachments
- Maximum design outflow rate is 26 million gallons per day (MGD)

$$Q_{Outflow} = Q_{Max} - Ave.+2\sigma$$

$Q_{Outflow}$ = Available Outflow Rate (MGD)
$Ave.+2\sigma$ = Average + 2 Standard Deviations Flow Rate (MGD)
Q_{Max} = Maximum Outflow Rate (MGD)

$Ave.+2\sigma$ = 18 MGD
Q_{Max} = 26 MGD

$Q_{Outflow}$ = 8 MGD

-Convert available flow rate to available volume for Outflows (Assuming flow for 1 day)

$$V_{Outflow} = Q_{Ouflow} * \text{Days of Flow}$$

-Convert million gallons per day (MGD) to Acre-Feet

$V_{Outflow}$ = Available Outflow Volume
$Q_{Outflow}$ = Available Outflow Rate

$V_{Outflow}$ = 24.5 acre feet

AVAILABLE FREEBOARD

4.) Determine volume of available freeboard in the reconstructed LVSWP (Pond A and B)

- Pond Elevations and Volumes deteremined by Civil 3D, see attachments
- Top of operating water level based on design maximum levels.

Pond Elevations (feet NAVD88)

	Pond A	Pond B
Top of Berm Elevation	3,260	3,260
Top of Water Elevation	3,255	3,255

PROJECT / LOCATION: Mount Storm Power Station - Mount Storm, West Virginia - LVWSP		PROJECT / PROPOSAL NO.
SUBJECT: Storm Water Capacity of Reconstructed Pond A and Pond B		230765.0000
PREPARED BY: S. Sellner	DATE: 8/18/2016	FINAL ☐
CHECKED BY: J. Hotstream	CHECKED BY: J. Hotstr	REVISION ☐

Pond Capacities

	Pond A	**Pond B**
Top of Berm (cubic yards)	35,559	35,358
Top of Water (cubic yards)	14,577	14,511

Freeboard Volumes (S_{FB}) = Top of Berm Volume (cy) - Top of Water Volume (cy)

S_{FB-A} = 20,982 cy

S_{FB-B} = 20,847 cy

Total Storage of Existing Freeboard = $S_{FB-A} + S_{FB-B} + S_{FB-C} + S_{FB-D}$

S_{FB} = 41,829 cy

S_{FB} = 26 acre feet

5.) Compare the calculated inflow volumes vs. the outflow volumes considering the volume from the Freeboard Capacity

-Determine the Freeboard Volume Capacity compare to the flow difference

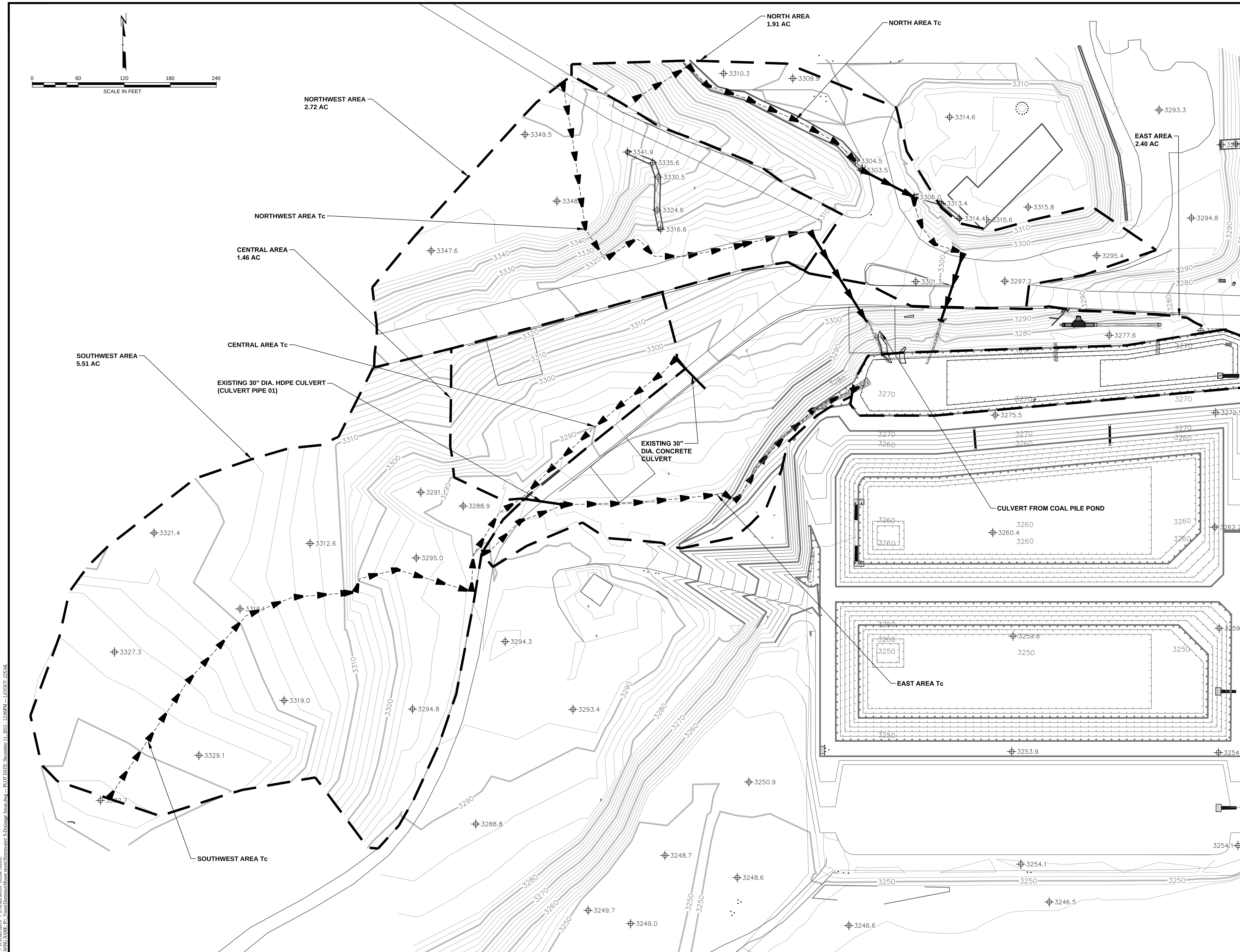
$V_{Inflow} < V_{outflow} + S_{FB}$

V_{Inflow} = 33.8 acre feet

$V_{outflow} + S_{FB}$ = 50.4 acre feet

33.8 < 50.4 OK

Conclusion: Based upon the inflow, outflow, and freeboard capacity of the reconstructed LVWSP, the system has sufficient capacity to accommodate the runoff associated with a 100 year,24 hour storm event.



PROJECT: DOMINION POWER
MT. STORM POWER STATION
MT. STORM, WV
CIVIL DESIGN

TITLE: STORM WATER RUNOFF INFLOWING TO PYRITE POND

DRAWN BY:	E. OLSON	PROJ. NO.:	230765
CHECKED BY:	D. ENGSTROM	FIGURE 01	
APPROVED BY:	J. HOTSTREAM		
DATE:	12/10/2015		

TRC

708 Heartland Trail
Suite 3000
Madison, WI 53717
Phone: 608.826.3600

FILE NO.: X-Drainage Areas.dwg

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
11.341	84	50-75% Grass cover, Fair, HSG D (S-3, S-4, S-5, S-8)
0.746	98	Paved parking, HSG D (S-3, S-5)
60.862	93	Urban industrial, 72% imp, HSG D (S-1, S-7)
2.499	98	Water Surface, HSG D (S-2, S-6)
75.448	**92**	**TOTAL AREA**

Summary for Subcatchment 1S: Drainage Area to Ponds

[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 717.06 cfs @ 11.89 hrs, Volume= 30.960 af, Depth> 4.92"

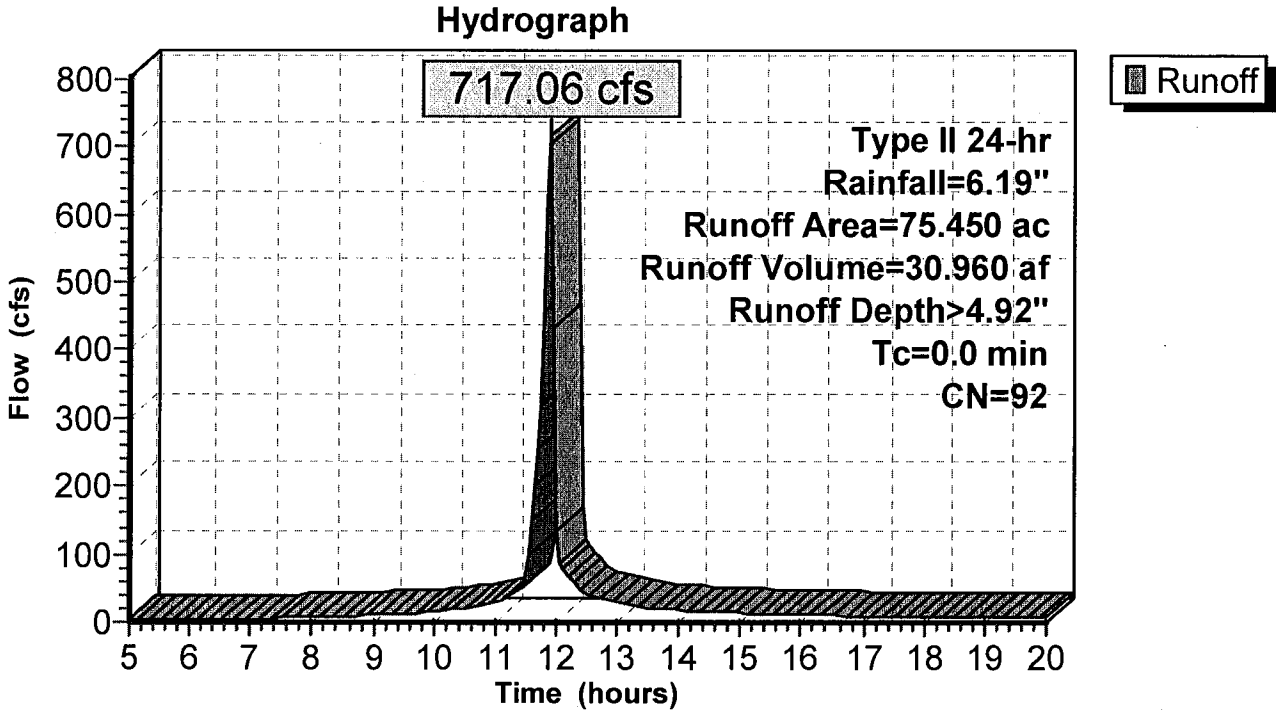
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=6.19"

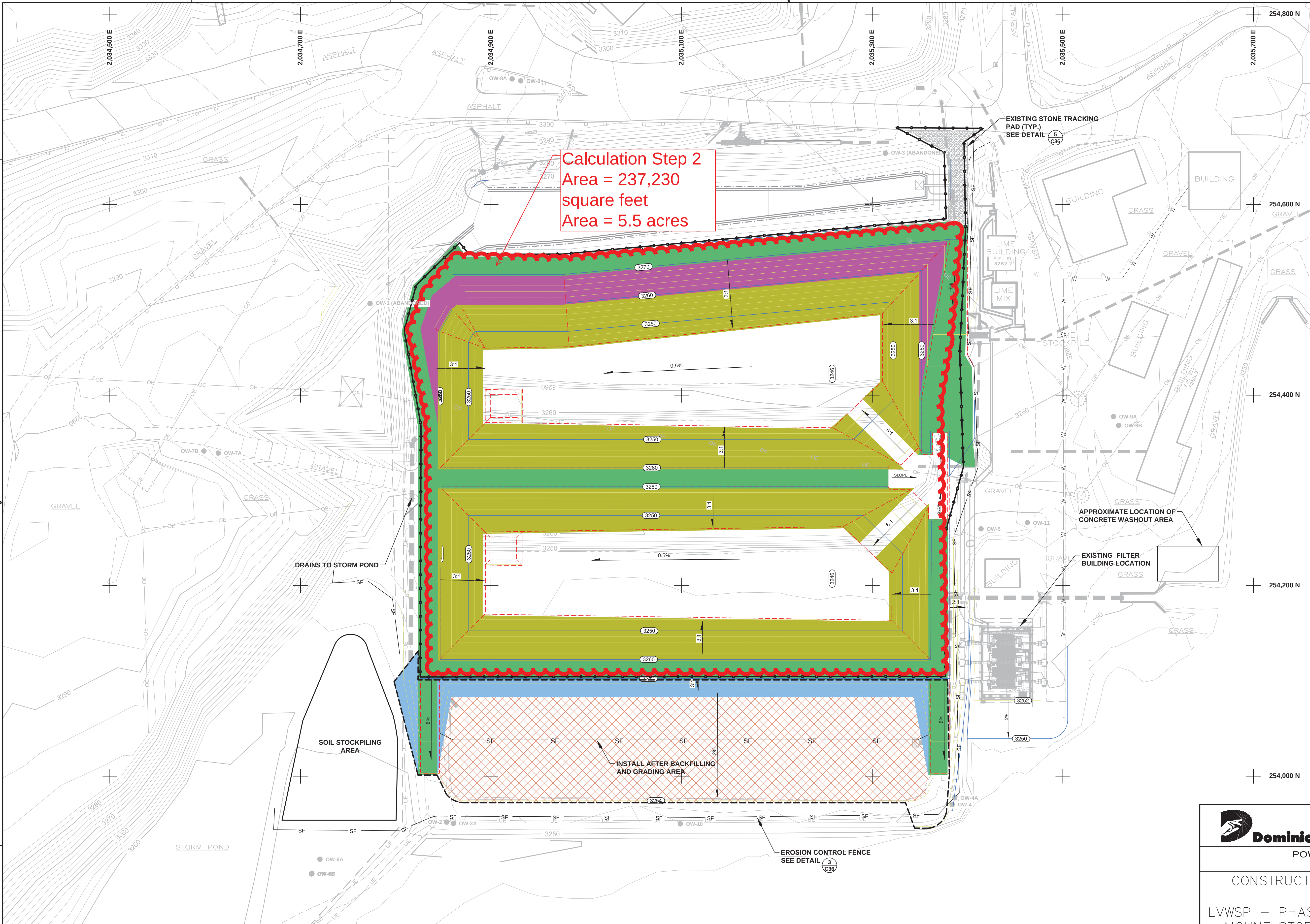
Calculation Step 1

	Area (ac)	CN	Description
*	75.450	92	Weighted Average from Permit
	75.450		100.00% Pervious Area

Subcatchment 1S: Drainage Area to Ponds

Hydrograph





LEGEND

- SECTION 704 CLASS 3 AGGREGATE OVER SECTION 704 CLASS 2 AGGREGATE (ACCESS ROAD)
- RIPRAP D_{50} = 8" OVER DENSE AGGREGATE BASE SECTION 704, CLASS 10.
- 6" THICK COVER GRAVEL SECTION 703 COURSE AGGREGATE GRADATION #24 OVER SEPARATION GEOTEXTILE.
- DENSE AGGREGATE BASE (SECTION 704, CLASS 10)
- 6" TOPSOIL AND VEGETATION
- LIMITS OF DISTURBANCE FOR AREA FLOWING TO PONDS (6.0 ACRES) (COVERED UNDER CURRENTLY ACTIVE INDIVIDUAL NPDGS PERMIT NO. WV0005525)
- LIMITS OF DISTURBANCE FOR AREA NOT FLOWING TO PONDS (7.7 ACRES) (COVERED UNDER GENERAL NPDES PERMIT NO. WV0115924)

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.

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POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

CONSTRUCTION EROSION AND SEDIMENTATION CONTROL PLAN
LVWSP – PHASE 2 – 2017 & 2018 CONSTRUCTION
MOUNT STORM POWER STATION, WEST VIRGINIA

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016 DGNSPEC FOR FILE VERIFICATION
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703–C5 — REV. 0
CHKD JNH	PROJ ENGR	
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED — SH C5 OF 71

REV	DESCRIPTION	DATE	DSGN	DRWN	CHKD	DSGN SUPV	PROJ ENGR	CIVIL ENGR	ELEC ENGR	MECH ENGR	ARCH	E.M. ENGR	I&C ENGR
0	ISSUED FOR BID	06 06 2016	DM	LLS	JNH	NA		RKN	CBS	SM	BCA		

NOAA Atlas 14, Volume 2, Version 3 MOUNT STORM
Station ID: 46-6293
Location name: Mount Storm, West Virginia, US*
Latitude: 39.2833°, Longitude: -79.2333°
Elevation:
Elevation (station metadata): 2851 ft*
* source: Google Maps

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.301 (0.268-0.339)	0.355 (0.314-0.400)	0.427 (0.378-0.480)	0.488 (0.431-0.549)	0.570 (0.500-0.637)	0.639 (0.559-0.713)	0.708 (0.616-0.790)	0.785 (0.678-0.875)	0.893 (0.764-0.993)	0.981 (0.832-1.09)
10-min	0.469 (0.417-0.527)	0.554 (0.490-0.626)	0.664 (0.587-0.747)	0.755 (0.666-0.848)	0.872 (0.766-0.975)	0.970 (0.848-1.08)	1.07 (0.929-1.19)	1.17 (1.01-1.31)	1.31 (1.13-1.46)	1.44 (1.22-1.60)
15-min	0.575 (0.511-0.646)	0.678 (0.599-0.765)	0.816 (0.722-0.918)	0.929 (0.820-1.04)	1.08 (0.946-1.21)	1.20 (1.05-1.34)	1.33 (1.15-1.48)	1.46 (1.26-1.62)	1.64 (1.40-1.82)	1.79 (1.52-2.00)
30-min	0.761 (0.676-0.856)	0.908 (0.803-1.02)	1.12 (0.989-1.26)	1.29 (1.14-1.45)	1.52 (1.34-1.70)	1.72 (1.50-1.92)	1.92 (1.67-2.14)	2.13 (1.84-2.38)	2.43 (2.08-2.71)	2.69 (2.28-3.00)
60-min	0.930 (0.827-1.05)	1.11 (0.986-1.26)	1.40 (1.24-1.58)	1.64 (1.45-1.85)	1.98 (1.74-2.21)	2.27 (1.98-2.53)	2.57 (2.23-2.86)	2.90 (2.50-3.23)	3.37 (2.88-3.75)	3.79 (3.21-4.22)
2-hr	1.10 (0.976-1.24)	1.32 (1.17-1.49)	1.66 (1.47-1.87)	1.97 (1.74-2.20)	2.39 (2.10-2.66)	2.77 (2.41-3.08)	3.17 (2.75-3.52)	3.61 (3.11-4.00)	4.26 (3.63-4.70)	4.84 (4.08-5.34)
3-hr	1.19 (1.05-1.34)	1.42 (1.26-1.60)	1.77 (1.57-2.00)	2.09 (1.85-2.35)	2.54 (2.23-2.85)	2.94 (2.56-3.28)	3.37 (2.92-3.76)	3.85 (3.32-4.2	4.56	5.20
6-hr	1.48 (1.28-1.73)	1.76 (1.53-2.06)	2.17 (1.88-2.53)	2.55 (2.20-2.96)	3.08 (2.64-3.57)	3.55 (3.04-4.10)	4.07 (3.45-4.69)	4.64 (3.91-5.35)	5.48 (4.57-6.30)	6.24 (5.14-7.16)
12-hr	1.83 (1.60-2.15)	2.17 (1.90-2.54)	2.66 (2.33-3.11)	3.12 (2.72-3.64)	3.79 (3.27-4.40)	4.38 (3.76-5.07)	5.03 (4.28-5.82)	5.76 (4.85-6.64)	6.86 (5.69-7.89)	7.86 (6.44-9.02)
24-hr	2.18 (1.96-2.45)	2.61 (2.34-2.94)	3.25 (2.91-3.65)	3.80 (3.39-4.26)	4.63 (4.09-5.18)	5.37 (4.69-6.0	6.19 (5.33-6.93)	7.11 (6.25-7.97)	8.54 (7.09-9.61)	9.78 (7.98-11.0)
2-day	2.55 (2.32-2.83)	3.05 (2.78-3.38)	3.79 (3.44-4.20)	4.42 (4.00-4.90)	5.39 (4.82-5.97)	6.24 (5.53-6.91)	7.09 (6.30-7.97)	8.26 (7.13-9.18)	9.92 (8.39-11.1)	11.4 (9.45-12.8)
3-day	2.77 (2.56-3.03)	3.31 (3.05-3.61)	4.06 (3.74-4.43)	4.70 (4.31-5.13)	5.64 (5.12-6.16)	6.45 (5.79-7.06)	7.33 (6.51-8.06)	8.30 (7.26-9.23)	9.97 (8.40-11.1)	11.4 (9.49-12.8)
4-day	3.00 (2.80-3.23)	3.57 (3.33-3.85)	4.34 (4.04-4.67)	4.98 (4.62-5.36)	5.89 (5.42-6.36)	6.66 (6.06-7.22)	7.46 (6.72-8.15)	8.33 (7.39-9.27)	10.0 (8.41-11.2)	11.5 (9.54-12.9)
7-day	3.49 (3.27-3.74)	4.14 (3.87-4.44)	4.96 (4.63-5.32)	5.63 (5.24-6.05)	6.57 (6.06-7.07)	7.32 (6.70-7.91)	8.09 (7.34-8.80)	8.89 (7.98-9.75)	10.1 (8.82-11.3)	11.6 (9.63-13.0)
10-day	4.03 (3.80-4.29)	4.75 (4.48-5.06)	5.60 (5.28-5.96)	6.28 (5.90-6.68)	7.19 (6.70-7.67)	7.89 (7.32-8.45)	8.60 (7.91-9.26)	9.32 (8.49-10.1)	10.3 (9.26-11.4)	11.7 (9.91-13.1)
20-day	5.65 (5.37-5.96)	6.61 (6.28-6.98)	7.60 (7.22-8.04)	8.41 (7.96-8.90)	9.47 (8.92-10.0)	10.3 (9.63-11.0)	11.1 (10.3-11.9)	11.9 (11.0-12.8)	12.9 (11.8-14.1)	13.7 (12.3-15.0)
30-day	7.11 (6.78-7.46)	8.28 (7.90-8.71)	9.40 (8.95-9.89)	10.3 (9.78-10.8)	11.4 (10.8-12.0)	12.3 (11.6-13.0)	13.1 (12.3-13.9)	13.9 (13.0-14.8)	14.9 (13.8-16.0)	15.6 (14.3-16.9)
45-day	9.09 (8.70-9.50)	10.5 (10.1-11.0)	11.8 (11.3-12.4)	12.8 (12.3-13.5)	14.1 (13.4-14.8)	15.1 (14.3-15.9)	15.9 (15.1-16.9)	16.8 (15.8-17.8)	17.8 (16.6-19.0)	18.5 (17.1-19.9)
60-day	10.9 (10.5-11.4)	12.7 (12.2-13.3)	14.1 (13.5-14.8)	15.3 (14.6-16.0)	16.7 (15.9-17.5)	17.7 (16.8-18.7)	18.7 (17.7-19.7)	19.6 (18.4-20.8)	20.6 (19.3-22.0)	21.4 (19.9-22.9)

Calculation Step 2

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

708 Heartland Trail, Suite 3000, Madison, WI 53717 • www.TRCsolutions.com

PROJECT / PROPOSAL NAME / LOCATION:		PROJECT / PROPOSAL NO.	FINAL
Mount Storm - Settling Capacity Analysis		230765.0000 Phase 4	
PREPARED BY:	D. Engstrom	DATE: 9/21/2015	REVISION
CHECKED BY:	J. Hotstream	DATE: 9/23/2015	10/28/2015

SUMMARY OF FLOW DATA AND CALCULATIONS

Method:

Flow data into the primary settling ponds (Ponds A and B) were not available to estimate treatability of influent. Flow ranges are estimated based on monthly monitoring of the permited outfall to Mt. Storm Lake since 2001 and calculated flows from the weir in the Pond A/B distribution box.

Data from Monitoring Point 401 represents the outfall after Ponds C and D. It is assumed that this flow is equal to the inflow to the ponds. Calculated influent flow values are based on water heights over the weir in the Pond A/B distribution box obtained on 8/24, 8/25, and 8/27/15. Several calculated flows are plotted on Figure 1

Figure 1:

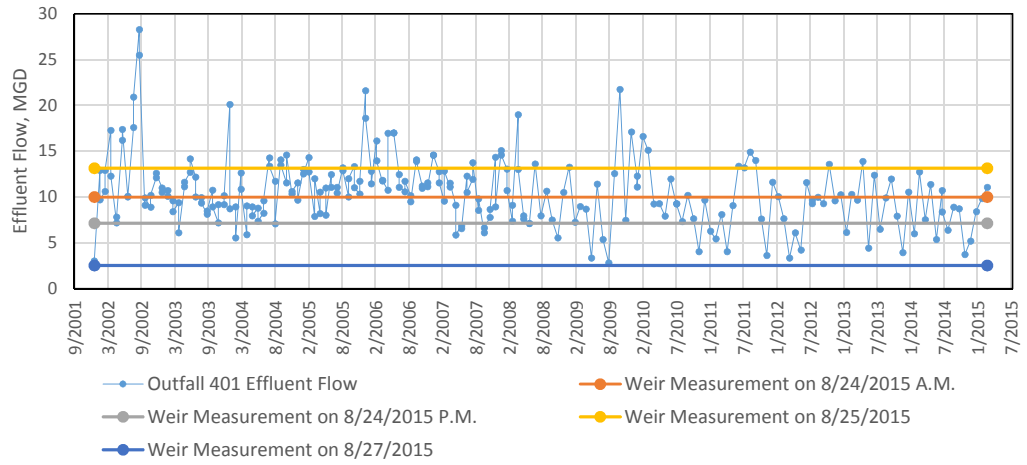

Table 1. Statistical summary of the Outfall 401 flow data.

STATISTICAL PARAMETER	FLOW (MGD)
Average	10.6
Maximum	28.3
Minimum	2.8
Median	10.3
Standard Deviation	3.7
Lower Quartile	8.04
Upper Quartile	13.5
Average Plus Two Standard Deviations	18.0
Adjusted Maximum	28.3

Calculation Step 3.

Discussion:

Fifteen years of data from Outfall 401 provides maximum flow of 28.3 MGD, a minimum flow of 2.8 MGD, and an average flow of 10.6 MGD. These data from Outfall 401 are normally distributed. Therefore considering a value of the mean and 2 standard deviations, 18 MGD, captures 95%+ of the population. Recent data, from 2010 to present, suggest maximum flows of 15 MGD. Comparing this analysis to field measurements at the weir support a maximum flow value of 18 MGD (27.85 cfs).

NOTES

1. REFER TO PLAN SHEET 66703-2 AND C1 OF THIS PLAN SET FOR GENERAL NOTES AND CIVIL STANDARD LEGEND.
2. REFER TO PLAN SHEET 66703-C21 FOR NEW PIPING LAYOUTS.

STAGE VS STORAGE MATRIX		
ELEVATION	POND A CAPACITY (GAL)	POND A CAPACITY (AC FT)
3,247	40,400	0.1
3,248	198,500	0.6
3,249	502,500	1.5
3,250	844,000	2.6
3,251	1,211,100	3.7
3,252	1,604,100	4.9
3,253	2,023,700	6.2
3,254	2,470,200	7.6
3,255	2,944,000	9.0
3,256	3,445,500	10.6
3,257	3,975,300	12.2

STAGE VS STORAGE MATRIX		
ELEVATION	POND B CAPACITY (GAL)	POND B CAPACITY (AC FT)
3,247	43,100	0.1
3,248	207,300	0.6
3,249	507,800	1.6
3,250	846,400	2.6
3,251	1,210,400	3.7
3,252	1,600,400	4.9
3,253	2,016,700	6.2
3,254	2,460,000	7.5
3,255	2,930,600	9.0
3,256	3,429,200	10.5
3,257	3,956,100	12.1

Calculation Step 4

0 50 100 150 200
SCALE IN FEET

REV	DATE	DESCRIPTION
0		ISSUED FOR BID
	06 06 2016	DM LLS JNH NA RKN CBS SM BCA

Dominion — TRC

POWER GENERATION ENGINEERING
RICHMOND, VIRGINIA

OVERVIEW – PYRITE POND, PONDS A AND B SUBGRADE PLAN
LVWSP – PHASE 2 – 2017 & 2018 CONSTRUCTION
MOUNT STORM POWER STATION, WEST VIRGINIA

DSGN D.MARSHALL	DSGN SUPV	DATE JUNE 2016 DGNSPEC FOR FILE VERIFICATION	
DRWN L. STORMER	ENGR SUPV	DRAWING NO. 66703-C6	REV. 0
CHKD JNH	PROJ ENGR		
DISPL ENGR RKN	SCALE: AS NOTED	UNLESS OTHERWISE NOTED	SH C6 OF 71