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October 15, 2021  
File: 21.0056983.00

Mr. George Streit  
[george.streit@nrgenergy.com](mailto:george.streit@nrgenergy.com)  
Huntley Power LLC  
3500 River Road  
Tonawanda, New York 14150

Re: Five-Year Plan Review for Inflow Design Flood Control System Plan for  
CCR Surface Impoundments  
Huntley Generating Station  
Tonawanda, New York

Dear Mr. Streit:

GZA GeoEnvironmental of New York (GZA) presents this Five-Year Review of the Inflow Design Flood Control System Plan to Huntley Power LLC (Huntley) for the existing coal combustion residuals (CCR) surface impoundment (identified as the South settling pond) located at the Huntley facility in Tonawanda New York (Site) as shown on **Figure 1**. This periodic plan review is required by the United States Environmental Protection Agency's (USEPAs) Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, as presented in the Federal Register Volume 80 No 74 dated April 17, 2015. In accordance with the CCR Rule (40 CFR §257.82(c)(4)), owners/operators of CCR units must periodically prepare a revised inflow design flood control system plan for the CCR unit to document how the inflow design flood control system has been designed and constructed to meet the specific requirements outlined in the CCR Rule and supported by engineering calculations. The information in this report is subject to the Limitations in **Attachment 1**.

In accordance with §257.82, the owner or operator of an existing CCR surface impoundment must design, construct, operate and maintain an inflow design flood control system as follows:

- The inflow design flood control system must adequately manage the flow into the CCR unit during and following the peak discharge of the inflow design flood. As this surface impoundment has been identified as a "low hazard potential", the specified inflow design flood is the 100-year flood.
- The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood, which for this impoundment is the 24-hour, 100-year flood.



## Site Background

The Huntley CCR surface impoundment is identified as the South Settling Pond that was used for discharge of plant-generated process water including CCR sluice water and non-CCR water collected from sump pumps, non-contact cooling water, storm water and other various sources. As of February 29, 2016, the facility boilers were removed from service and no longer contributed discharge to the South Settling Pond. The last of the CCR sluice water was discharged into the South Settling Pond by late March 2016. In March 2021, plant associated non-CCR water also ceased being discharged into the south pond. The plant no longer contributes any CCR or non-CCR water to the pond and the only source of inflow is from precipitation within the pond footprint. As a result, the flows into the pond have been reduced significantly after the CCR sluice water and non-contact water was eliminated. The outfall for the South Pond is an approximate 92-inch by 65-inch oval pipe identified as Outfall 008 that is designed to discharge into the Niagara River and is regulated under the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) permit #9-1464-00130/00003. The limits of the Huntley south settling pond included in this inflow design flood control plan is shown on the attached **Figure 2**.

### Inputs for South Pond

This analysis uses the same HEC-HMS hydrologic analysis model previously developed for GZA's "Hydrologic & Hydraulic Analysis, North Ponds & South Ponds, NRG Huntley Station, Tonawanda, New York" dated 2016. Some minor changes to the inputs for the HMS model were made by GZA due to the plant boilers being removed from service, non-contact cooling water not discharged into the pond, and changes in elevation between the two years (i.e., 2016 and 2021). The HMS model input parameters for this five-year plan review are provided below.

As shown on **Figure 2**, the South Ponds consists of three basins- the North and South Equalization (EQ) Basins and the South Ash Settling Pond. The North and South EQ Basins only occasionally receives process inflow water from the former coal pile which ultimately discharges to the municipal wastewater treatment facility. The EQ ponds do share a 12-in diameter outflow pipe to the South Ash Settling Basin; however, this outflow pipe has been valved off and is no longer used to discharge water into the south settling pond. Water from the two EQ basins could only overflow to the South Settling Pond by overtopping the crest of the EQ Ponds. Because they no longer share a single outflow, the EQ Basins were modeled by GZA as two separate reservoirs in HEC-HMS. The water levels in the EQ basins are also controlled by an outflow pump. Pump specifics and operational rules were not available; therefore, the outflow pump was not included in the analysis. Previously, the South Settling Pond received a maximum CCR and non-CCR inflow of 6,800 gpm (15.15 cfs) at the north end when the plant's boilers were operational. However, since the plant has been removed from service on February 29, 2016 and discharge of non-CCR water ceased in March 2021, precipitation is the only contributor to the South Settling pond. Discharge of pond water is into the Niagara River through a large 92-in by 65-in steel pipe (identified as SPDES Outfall 008) arch located at the extreme southerly corner of the pond. GZA's



modeling effort included a sensitivity analysis to evaluate the impact of varying initial water levels in the equalization ponds.

Key elevations and dimensions are as follows:

<u>North &amp; South EQ Basins</u>	<u>Dimension or Elevation (ft, IGLD 1955)</u>
Crest (i.e., top of berm)	580.0
In Invert of 12" Ø Outflow Pipe to South Settling Basin	579.3
Out Invert of 12" Ø Outflow Pipe to South Settling Basin	570±
Length of 12"Ø Outflow Pipe to South Settling Basin	120±
<u>South Ash Settling Basin</u>	
Crest	575.4
In Invert of 92"x65" Outflow Pipe to Niagara River	568.92
Out Invert of 92"x65" Outflow Pipe to South Settling Basin	568.25
Length of 92"x65" Outflow Pipe to South Settling Basin	55.0±

Key input parameters for the watershed areas in the HEC-HMS model are summarized in **Table C-1** below:

**Table C-1: HEC-HMS Watershed Input – South Ponds**

HEC-HMS Model	Subbasin	Drainage Area		Runoff Potential (SCS Curve Number)*	Watershed Lag Time (min)
		(sq mi)	(sq ft)		
<i>South Ponds</i>	North EQ Basin	0.00239	66,497	99	6
	South EQ Basin	0.00236	65,691	99	6
	South Ash Settling Basin	0.01202	335,191	95	6

\*Note: Composite curve numbers with CN of 99 for water and 89 for land.

**Tables C-2** and **C-3** present the elevation-area and elevation-storage relationships that GZA developed for the subbasins for the South Ponds.



**Table C-2: Reservoir Elevation-Area Function for North & South EQ Basins**

North EQ Basin				South EQ Basin			
Elevation (ft, IGLD 1955)	Area		Storage (acre-ft)	Elevation (ft, IGLD 1955)	Area		Storage (acre-ft)
	(sq ft)	(ac)			(sq ft)	(ac)	
571.8	30,320	0.696	0.00	572.3	36,800	0.845	0.00
579.9	66,497	1.527	9.00	579.6	65,691	1.508	8.59

**Table C-3: Reservoir Elevation-Area Function for South Ash Settling Basin**

Elevation (ft, IGLD 1955)	Area		Storage (acre-ft)
	(sq ft)	(ac)	
563.0	114,000.00	2.617	0.00
574.0	210,230.65	4.826	40.94

*Initial Water Surface*

The initial water surface elevation for the North and South EQ Basins are assumed to be at the elevation of the overflow structure, El. 579.30 which is a conservative assumption, in GZA’s opinion. The EQ Basins are typically maintained at lower elevations by utilizing the outflow pump. A sensitivity study was performed to evaluate the influence of varying the initial water surface elevation at and below the outlet invert.

The initial water surface elevation in the South Ash Settling Pond is assumed to be coincident with the 500-year water surface in the Niagara River, El. 570.65.

*Tailwater Conditions*

Tailwater for the pipe from the EQ Basins to the South Ash Settling Pond was set at El.571.5 for the runs for South Ponds. The tailwater for South Ash Settling Basin was constantly set at El.570.65, the 500-year flood in Niagara River, which is a conservative assumption, in GZA’s opinion.

In summary, three key changes in the input parameters to the existing HEC-HMS model are:

1. The analysis used 100-year, 24-hour precipitation based on NOAA’s Atlas 14. The total depth is 5.05 inches for the 24-hour duration. The hyetograph was constructed using the SCS Type III distribution, with a peak intensity occurring around Hour 12.



2. Previously used plant process inflows of 1,500 gpm into the South Ash Settling Pond and 500 gpm into the Equalization Ponds were eliminated, and only precipitation from the 100-year 24-year storm was considered as inflow to the ponds.
3. The shared 12-inch diameter outflow pipe has been closed and the Equalization Ponds no longer discharge to the South Ash Pond except for the unlikely event of overtopping the berm at approximately El. 580.0 ft.

Results for South Ponds

**Table C-4: HEC-HMS Results for South Ponds (100-year, 24-hour Rainfall)**

Case	Pond	Initial WSEL (ft)	Drainage Area (acre)	Watershed Runoff (in)	Peak Inflow (cfs)	Peak Outflow (cfs)	Max WSEL (ft)	Minimum Freeboard (ft)
1	N. EQ	577	1.53	4.93	3.1	0.00	577.6	2.4
	S. EQ		1.51	4.93	3.1	0.00	577.5	2.5
	S. Sett	570.65	3.04	4.47	15.5	15.1	570.7	4.7
2	N. EQ	578	1.53	4.93	3.1	0.00	578.6	1.4
	S. EQ		1.51	4.93	3.1	0.00	578.5	1.5
	S. Sett	570.65	3.04	4.47	15.5	15.1	570.7	4.7
3	N. EQ	579.3	1.53	4.93	3.1	0.00	579.9	0.1
	S. EQ		1.51	4.93	3.1	0.00	579.8	0.2
	S. Sett	570.65	3.04	4.47	15.5	15.1	570.7	4.7

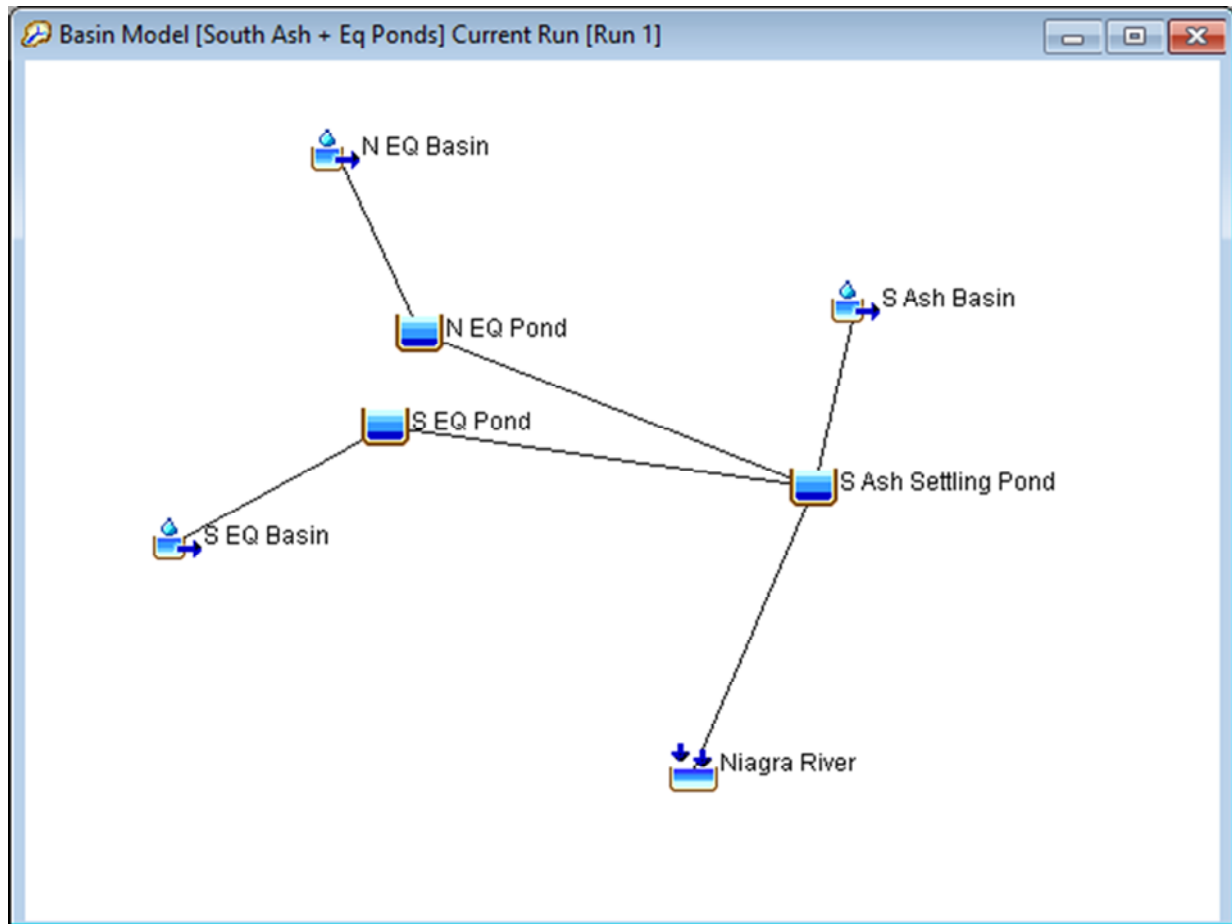
Notes for Table C-4:

1. Various initial water levels at the equalization ponds were used as a sensitivity test.
2. Assumed top of berm at El.580.0 ft for North and South EQ Basins; assumed top of berm at El. 575.4 ft for South Ash Settling Basin.

The HEC-HMS model results indicate that the equalization ponds and the ash settling pond will not be overtopped by a 100-year, 24-hour rainfall, even under scenarios with high water surface elevation at the Equalization Ponds. No outflow was observed from the North and South equalization ponds (pipe closed) but South Ash Settling Pond is expected to have a peak outflow of 15.1 cfs from the 100-year, 24-hour design storm. There will be more than 4 feet of minimum freeboard for the settling pond under all three modeled conditions. The highest initial WSEL assumed for the Equalization Ponds is at 579.3 ft and resulted in around 0.2 ft of freeboard before reaching the berm top.



## Basin Model for South Ponds - N. & S. Eq. Basins & S. Ash Settling Basin



### Conclusions

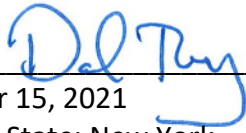
As per 40 CFR §257.82(c)(4), owners/operators of CCR units must periodically prepare a revised inflow design flood control system plan for the CCR unit to document how the inflow design flood control system has been designed and constructed. The south settling pond is currently only subject to inflow associated with storm water as all plant process flows have been eliminated, and the historically used discharge culvert remains in place and in good working order. GZA reviewed the impact of a 100-year storm on the south settling pond and surrounding areas, which results in a flow from the pond that is much lower than historical routine flows, and well within the capacity of the existing culvert.



**PROFESSIONAL ENGINEER CERTIFICATION 56798.**

The undersigned registered professional engineer is familiar with the requirements of §257.82(c) *Inflow design flood control system plan*. The undersigned registered professional engineer attests that this periodic CCR Inflow design flood control system plan has been prepared in accordance with good engineering practice, including consideration of applicable state regulatory requirements and meets the requirements of §257.82(c), and that this plan is adequate for the NRG - Huntley Power. This certification was prepared as required by §257.81(c)(5).

Name of Professional Engineer: Daniel J. Troy, P.E.  
Company: GZA GEOENVIRONMENTAL OF NEW YORK

Signature:   
Date: October 15, 2021  
PE Registration State: New York  
PE Registration Number: 081139-1





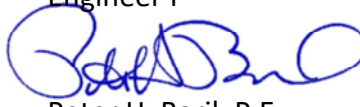
Professional Engineer Seal:


We trust this information satisfies your needs for this project.

Sincerely,

GZA GEOENVIRONMENTAL OF NEW YORK

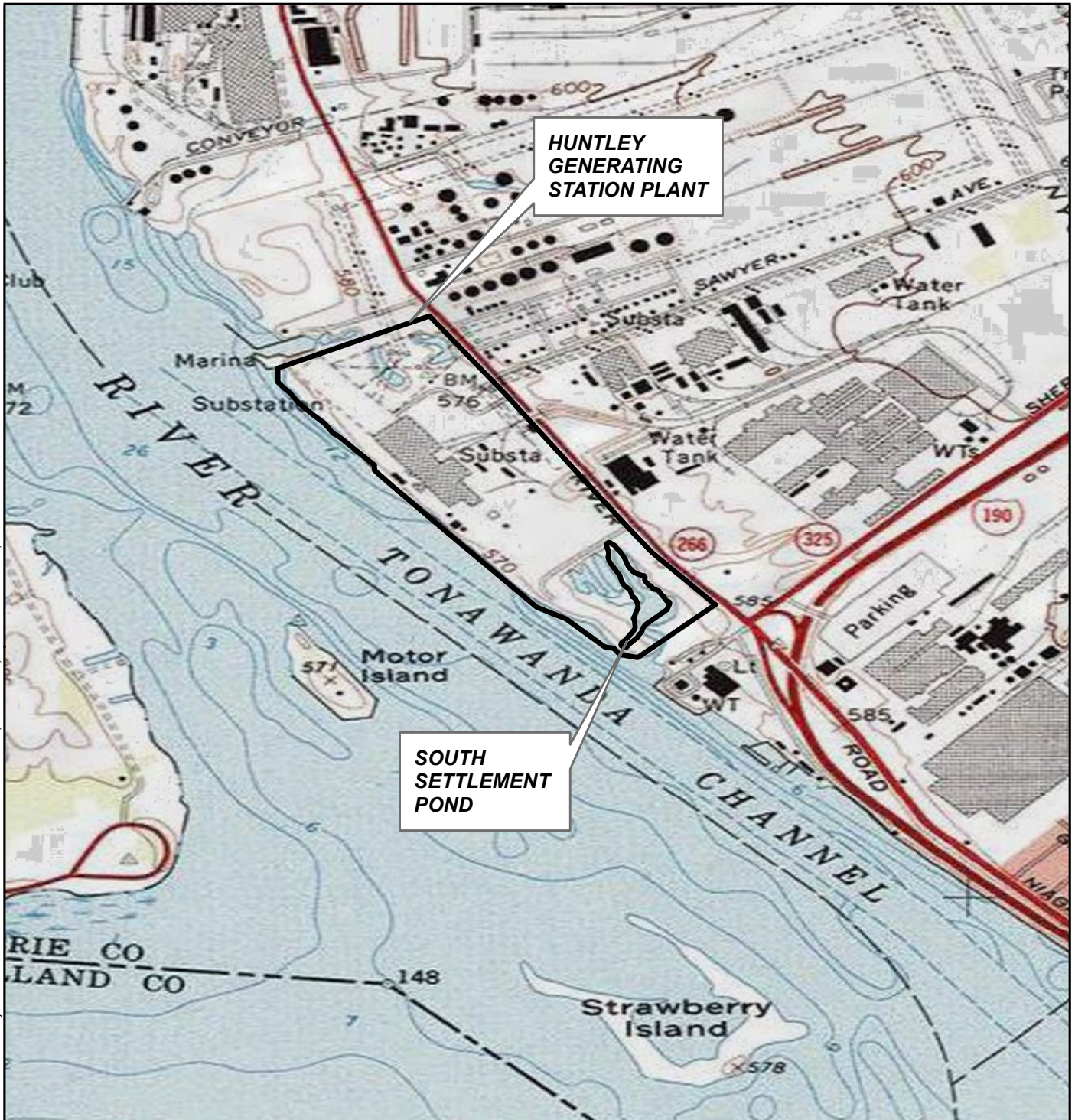
  
Daniel J. Troy, P.E.  
Senior Project Manager

  
Firas M. Rabahaa  
Engineer I  
  
Peter H. Baril, P.E.  
Consultant Reviewer

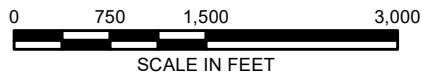
  
Bart A. Klettke, P.E.  
Principal

- Attachments: Figure 1 – Site Location Plan
- Figure 2 – South Settling Pond Plan
- Attachment 1 - Limitations

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**NOTE:**  
BASEMAP ADAPTED FROM USA TOPO  
MAPS USING ArcGIS AUTOCAD PLUGIN



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5-yr Plan Review for Inflow Design Flood Control System Plan for CCR Surface Impoundments  
**NRG HUNTLEY PLANT  
TONAWANDA, NEW YORK**

NO.	ISSUE / DESCRIPTION	BY	DATE

PREPARED BY: <b>GZA GeoEnvironmental, Inc.</b> Engineers and Scientists <a href="http://www.gza.com">www.gza.com</a>	PREPARED FOR: <b>NRG HUNTLEY POWER, LLC</b> 3500 RIVER ROAD TONAWANDA, NEW YORK		
PROJ MGR: DJT DESIGNED BY: DJT DATE: SEPTEMBER 2021	REVIEWED BY: BAK DRAWN BY: FMR PROJECT NO: 21.0056983.00	CHECKED BY: DJT SCALE: AS SHOWN REVISION NO:	FIGURE <h1>1</h1> SHEET NO: 01 OF 02



© 2021 - GZA GeoEnvironmental, Inc. - C:\Users\friras.rababaa\OneDrive - GZA\Desktop\Huntley\GIS\SPOND-SITEPLAN.mxd, October 01, 2021 - 1:22:00 PM, Firas Rababaa



PROCES INFLOW PIPES:  
ORIGINAL MAXIMUM FLOW (2016): ±  
2,500.00 GPM  
CURRENT INFLOW: 0.00

EQUALIZATION BASINS CONTROL STRUCTURE  
WITH 12-INCH STEEL PIPE (VALVED OFF)

MAXIMUM ORIGINAL MAXIMUM FLOW INTO  
SOUTH ASH BASIN (2016) = 500.0 GPM  
CURRENT FLOW INTO BASINS = 0.00

NORTH EQUALIZATIION BASIN (#1)  
BOTTOM ELEV.: 571.8'  
BOTTOM AREA: 30,320.00 FT<sup>2</sup>

TOP OF BERM ELEVATION.: 580.0'  
TOP AREA (STORMWATER  
CONTRIBUTORY AREA): 66,497.00 FT<sup>2</sup>

NORTH EQUALIZATIION BASIN (#2)  
BOTTOM ELEV.: 572.3'  
BOTTOM AREA: 36,800.00 FT<sup>2</sup>

TOP OF BERM ELEVATION.: 580.0'  
TOP AREA (STORMWATER  
CONTRIBUTORY AREA): 65,691.27 FT<sup>2</sup>

SOUTH ASH SETTLING BASIN:  
ESTIMATED BOTTOM ELEVATION: 563' TO  
564.5'±  
ESTIMATED BOTTOM AREA: 114,000.00 FT<sup>2</sup>

ESTIMATED TOP ELEVATION: 574.0'  
ESTIMATED TOP AREA: 210,230.65 FT<sup>2</sup>  
ESTIMATED CONTRIBUTORY WATERSHED  
AREA (RED BOUNDARY): 335,191.34

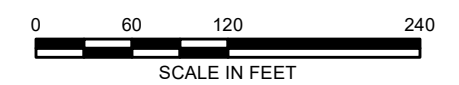
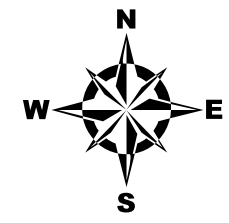
92" x 65" STEEL PIPE ARCH (OUTFALL 008)  
LENGTH: ± 55.0  
INLET INVERT ELEV.: 568.92'  
OUTLET @ NIAGARA RIVER: 568.25  
RIVER ELEV. @ ±566' (MEASURED APRIL  
2009)  
TOP OF BERM ELEVATION: 575.4'

NIAGARA RIVER  
FLOW



**Legend**

Pond\_Boundaries



Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c)

NO.	ISSUE / DESCRIPTION	BY	DATE

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5-yr Plan Review for Inflow Design Flood Control System Plan for CCR Surface Impoundments

**NRG HUNTLEY PLANT  
TONAWANDA, NEW YORK**

**SOUTH SETTLING POND  
SITE PLAN**

PREPARED BY: **GZA GeoEnvironmental, Inc.**  
Engineers and Scientists  
www.gza.com

PREPARED FOR:  
**NRG HUNTLEY POWER, LLC**  
3500 RIVER ROAD  
TONAWANDA, NEW YORK

PROJ MGR: DJT	REVIEWED BY: BAK	CHECKED BY: DJT	FIG/DWG
DESIGNED BY: DJT	DRAWN BY: FMR	SCALE: AS SHOWN	<b>2</b>
DATE: SEPTEMBER 2021	PROJECT NO: 21.0056983.00	REVISION NO:	SHEET NO: 02 OF 02



## ATTACHMENT 1 - LIMITATIONS

### USE OF REPORT

1. GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Client for the stated purpose(s) and location(s) identified in the Report. Use of this Report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

### STANDARD OF CARE

2. Our findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and/or proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).
3. The interpretations and conclusions presented in the Report were based solely upon the services described therein, and not on scientific tasks or procedures beyond the scope of the described services. The work described in this report was carried out in accordance with the agreed upon Terms and Conditions of Engagement.
4. GZA's flood evaluation was performed in accordance with generally accepted practices of qualified professionals performing the same type of services at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. The findings of the risk characterization are dependent on numerous assumptions and uncertainties inherent in the risk assessment process. The findings of the flood evaluation are not an absolute characterization of actual risks, but rather serve to highlight potential sources of risk at the site(s).
5. Unless specifically stated otherwise, the flood evaluations performed by GZA and associated results and conclusions are based upon evaluation of historic data, trends, references, and guidance with respect to the current climate and sea level conditions. Future climate change may result in alterations to inputs which influence flooding at the site (*e.g.* rainfall totals, storm intensities, mean sea level, *etc.*). Such changes may have implications on the estimated flood elevations, wave heights, flood frequencies and/or other parameters contained in this report.

### RELIANCE ON INFORMATION FROM OTHERS

6. In conducting our work, GZA has relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Any inconsistencies in this information which we have noted are discussed in the Report.

### COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations with codes and regulations by other parties are beyond our control.



**ADDITIONAL INFORMATION**

8. In the event that the Client or others authorized to use this report obtain information on conditions at the site(s) not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the opinions stated in this report.

**ADDITIONAL SERVICES**

9. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.