# KEYSTONE GENERATING STATION

# INITIAL CERTIFICATION STATEMENT
# FOR BOTTOM ASH TRANSPORT WATER SYSTEM

## Keystone-Conemaugh Projects LLC

## Keystone Generating Station

## ARMSTRONG COUNTY, PENNSYLVANIA

Michael Baker INTERNATIONAL


100 Airside Drive, Airside Business Park

Moon Township, PA 15108


**FEBRUARY 2026**

## INDEX AND CERTIFICATION

**Keystone-Conemaugh Projects LLC**
**Keystone Generating Station**

**Initial Certification Statement for Bottom Ash Transport Water System**

### Report Index



### Certification

I hereby certify, as a professional engineer in the State of Pennsylvania, that the information in this document was assembled under my direct personal charge. This report is not intended or represented to be suitable for reuse by Keystone-Conemaugh Projects LLC or others without specific verification or adaptation by the Engineer. I hereby certify that this initial certification was prepared for the Keystone-Conemaugh Projects LLC Keystone Generating Station in accordance with standard engineering practices and based on my knowledge, information, and belief, the content of this Certification when developed in January 2026 is true and meets the requirements of 40 CFR § 423.19(c). I hereby certify that I am familiar with the ELG regulation requirements and Keystone-Conemaugh Projects LLC Keystone Generating Station.


Wesley J. Sipe, P.E.
(Pennsylvania License No. PA085178)

Date: 01/26/2026

**Owner's Certification of Compliance – 40 CFR 122.22**

Pursuant to 40 CFR 122.22, I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

**On behalf of Keystone-Conemaugh Projects LLC:**

John Kosinski
_______________________________

John T. Kosinski
(Printed Name)

General Manager
(Title)

2-6-26
(Date)

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# LIST OF ABBREVIATIONS

| Abbreviation | Term/Phrase/Name |
|---|---|
| BA | Bottom Ash |
| BARS | Bottom Ash Recycling Sump |
| BAT | Best Available Technology Economically Achievable |
| Ca | Calcium |
| $CaCO_3$ | Calcium Carbonate |
| CoC | Cycles of Concentration |
| CTBD | Cooling Tower Blowdown |
| EPA | Environmental Protection Agency |
| ELG Rule | Effluent Limit Guidelines and Standards for the Steam Electric Power Generating Point Source Category |
| FGD | Flue Gas Desulfurization |
| HCl | Hydrochloric Acid |
| HDAS | Hydrobins Drainage Area Sump |
| $H_2SO_4$ | Sulfuric Acid |
| Keystone | Keystone Generating Station |
| LSI | Langelier Saturation Index |
| RSI | Ryznar Stability Index |
| $SiO_2$ | Silicon Dioxide (Silica) |
| TDS | Total Dissolved Solids |
| WWTP | Wastewater Treatment Plant |

# 1.0 EXECUTIVE SUMMARY

On November 3, 2015, the U.S. Environmental Protection Agency (EPA) published the federal Steam Electric Power Generating Effluent Limit Guidelines and Standards (ELG Rule) (see *80 FR 67838*). The 2015 ELG Rule established requirements for discharges associated with flue gas desulfurization (FGD) wastewater, fly ash transport water, bottom ash (BA) transport water, flue gas mercury control wastewater, gasification wastewater, combustion residual leachate, and non-chemical metal cleaning wastes.

EPA later reconsidered the 2015 rule and issued revisions finalized on October 13, 2020 (see *85 FR 64650*), which became effective on December 14, 2020 (the 2020 ELG Rule). These updates modified effluent limitations and standards for two waste streams: BA transport water and FGD wastewater. For BA transport water, the rule identifies Best Available Technology Economically Achievable (BAT) as a high recycle rate system with a site-specific volumetric purge (defined as BA purge water) that cannot exceed 10 percent of the BA transport water system's volume. The permitting authority determines the purge volume and associated effluent limits. EPA based this on a 95th percentile of total system volume calculated as a 30-day rolling average, resulting in a cap of 10 percent of total system volume. The permitting authority must establish a site-specific purge percentage within this limit. EPA acknowledges that some facilities may need to upgrade equipment, improve process controls, or adjust operations to comply, which aligns with the Clean Water Act requirement that BAT standards reflect the best technology economically achievable.

This document provides the certification statement required by 40 CFR § 423.19(d). This certification includes the necessary information for Keystone-Conemaugh Projects LLC's application to discharge BA transport water under 40 CFR § 423.13(k)(2)(i) at the Keystone Generating Station (Keystone) in Armstrong County, Pennsylvania. As required by the 2020 ELG Rule, this plan contains:

A. A statement that the professional engineer is a licensed professional engineer.
B. A statement that the professional engineer is familiar with the regulation requirements.
C. A statement that the professional engineer is familiar with the facility.
D. The primary active wetted bottom ash system volume in 40 CFR § 423.11(aa).
E. Material assumptions, information, and calculations used by the certifying professional engineer to determine the primary active wetted bottom ash system volume.
F. A list of all potential discharges under 40 CFR § 423.13(k)(2)(i)(A)(1) through (4), the expected volume of each discharge, and the expected frequency of each discharge.
G. Material assumptions, information, and calculations used by the certifying professional engineer to

determine the expected volume and frequency of each discharge, including a narrative discussion of why such water cannot be managed within the system and must be discharged.

H. A list of all wastewater treatment systems at the facility currently or otherwise required by a date certain under this section.

I. A narrative discussion of each treatment system including the system type, design capacity, and current or expected operation.

Keystone operates two coal-fired units with a combined capacity of approximately 1.71 gigawatts, using coal as fuel. The facility's BAT recycle system employs sluicing to convey bottom ash to hydrobins, bottom ash settling ponds, and bottom ash recycling sump (BARS) that will direct bottom ash transport water back to bottom ash sluicing pumps and/or to FGD make-up tanks. This system can function as a loop recycling system. The facility's cooling tower blowdown (CTBD) water, previously discharged to the bottom ash system, will be conveyed by default directly to the thermal pond and final settling pond. **Keystone seeks approval to discharge up to 10 percent of the total system volume (approximately 126,000 gallons per day, based on a 30-day average) to maintain water chemistry and material balance, as permitted under 40 CFR § 423.13(k)(2)(i).**

# 2.0 BOTTOM ASH RECYCLING SYSTEM

In accordance with 40 CFR § 423.19(d)(3)(iv) and (v), this section provides an overview of Keystone's bottom ash recycling system, including the assumptions, data, and calculations used by the certifying professional engineer to determine the primary active wetted bottom ash system volume.

## 2.1. Bottom Ash Recycling System Description

Following the combustion process, bottom ash, formed from non-combustible mineral matter, accumulates in hoppers located directly beneath the boiler furnace. This material is subsequently comminuted by clinker grinders integrated within the hopper assembly to reduce particle size. The conditioned ash slurry is then hydraulically conveyed via high-velocity jet pumps through dedicated sluice piping to a remote dewatering system consisting of engineered hydrobins designed for solids-liquid separation.

The bottom ash recycling system is a loop system that includes four (4) dewatering hydrobins, three (3) settling ponds, BARS and pumps, recycling pipes to the bottom ash sluicing pumps header and FGD makeup tanks, and BARS overflow. Bottom ash from the hydrobins is transferred to bottom ash settling ponds by gravity. Leakage from the hydrobins, combined with stormwater that comes into contact with it, is collected and transferred to the bottom ash settling ponds via a hydrobins sump lift station. From the bottom ash settling ponds, bottom ash transport water overflows into the BARS via overflow pipes and manholes. BARS has two sets of pumps: four (4) bottom ash recirculation pumps and two (2) dewatering pumps to FGD makeup tanks. BARS has an overflow that is used, if needed, to discharge up to 10% of the total bottom ash transport water volume per day on a 30-day rolling average to the final settling pond and Crooked Creek downstream. Block flow diagram of the system is shown in Attachment 1. Active bottom wetted bottom ash system volume of each component of the system is shown in Table 2-1 below.

**Table 2-1. Keystone's Active Wetted Volume Summary**

| Description | Qty | Qty Units | Total Volume (Gal) | Total Volume (Gal) |
|---|---|---|---|---|
| Hydrobins | 4 | ea | 212,569 | 850,275 |
| BARS | 1 | ea | 112,200 | 112,200 |
| Bottom Ash Pond Inlet Box | 1 | ea | 6,732 | 6,732 |
| Hydrobin Drainage Sump | 1 | ea | 11,220 | 11,220 |
| Bottom Ash Hoppers | 2 | ea | 60,693 | 121,386 |
| Boiler Sump | 2 | ea | 5,924 | 11,848 |
| Bottom Ash Pit | 2 | ea | 43,702 | 87,404 |
| Piping in BA System | 1 | ea | 60,750 | 60,750 |
| **Total Volume (gallons)** | | | | **1,261,815** |
| **10% gallon/day** | | | | **126,182** |
| **10% gpm** | | | | **87.6** |

A water mass balance for the system is shown in Attachment 1 together with the block flow diagram. Three scenarios are analyzed and shown in Attachment 1:

- A: Two (2) units operating at full capacity with two (2) full bottom ash ponds, no precipitation, and high evaporation
- B: Both units are offline with two (2) empty ponds and high precipitation (0.145 in/hr)
- C: One (1) unit operating at full capacity with two (2) bottom ash ponds at 75% capacity, low precipitation (0.05 in/hr), and moderate evaporation.

# 3.0 LIST OF ALL POTENTIAL DISCHARGES UNDER 40 CFR § 423.13(K)(2)(I)(A)(1) – (4)

In accordance with 40 CFR § 423.19(d)(3)(vi) and (vii), this section provides the assumptions, data, and calculations used by the certifying professional engineer to determine the anticipated discharge volumes and frequencies.

## 3.1 Anticipated Bottom Ash Discharges

This system is designed to prevent any discharges during normal operations and storm events up to the 10-year 24-hour storm event. Excess or out of specification water (high scale potential) in the Bottom Ash Recirculation System will be pumped to the FGD system for use before treatment by the FGD Wastewater Treatment Plant (WWTP). Table 3-1 below summarizes anticipated bottom ash discharges and their frequency.

**Table 3-1. Summary of Anticipated Bottom Ash Discharges and Frequencies**

| Discharge Stream | Average Flow (gpm) | Description | Frequency |
|---|---|---|---|
| Stormwater | 0 | Precipitation into open-top system components and the HDAS will flow into the Bottom Ash Recirculation loop. The system is sized to handle flows up to the 10-year 24-hour storm event with margin. | Intermittent |
| Process Waste Streams | 0 | There are no waste streams that blend with the Bottom Ash Recirculation loop. | None |
| Water Chemistry Purge | 0 | The Bottom Ash Recirculation Loop will forward water to the FGD System to maintain an acceptable conductivity in the loop. This water is not considered a discharge for the sake of this certification as it will be used for FGD Treatment and forwarded to the FGD WWTP. | Intermittent |
| Maintenance Flows | 0 | The Bottom Ash Ponds are sized such that one pond can be taken offline for maintenance. | n/a |

## 3.2. Bottom Ash Recycling System Chemistry Considerations

### 3.2.1. Overview

The primary concerns with the Bottom Ash Recirculation loop at the plant are maintaining a consistent system water volume and maintaining water chemistry to prevent scaling conditions.

Several components of the system including the Bottom Ash Ponds, Bottom Ash Recycle Sump (BARS), and the Hydrobins are open-top and collect water during storm events. Stormwater that falls in the Hydrobins Drainage Area may come into contact with bottom ash and is therefore collected by the Hydrobins Drainage Area Sump (HDAS) and forwarded to the Bottom Ash Recirculation loop to prevent bottom ash water discharges. The operation of the Hydrobins involves a loss of water to the bottom ash slurry that is hauled away for landfill disposal. Maintaining a relatively consistent water volume enables the system to handle incoming water from storm events while supporting effective operation of the bottom ash sluicing operations within the plant.

Maintaining the water chemistry in the Bottom Ash Recirculation loop is also a priority for effective system operation. Particularly during dry weather conditions, evaporation from the Bottom Ash Ponds and water loss at the Hydrobins may result in these constituents becoming more concentrated, leading to scaling in the system.

These concerns have been addressed through the operation of the system to maintain consistent water volumes and chemistry. The sections below go into greater detail regarding the system operations required to maintain appropriate operating conditions in the Bottom Ash Recirculation loop.

### 3.2.2. Water Mass Balance

The Bottom Ash Recirculation loop is designed with two main objectives in relation to water mass balance. First, it aims to maintain an adequate volume of water within the loop to support the required flow and pressure for the Bottom Ash Sluicing Pumps. Second, it seeks to prevent unintended discharge of Bottom Ash Transport Water from the system due to water accumulation during standard operations or storm events.

During periods of normal, dry-weather operations, the plant typically experiences a net reduction in water volume within the Bottom Ash Recirculation loop unless corrective measures are taken. The water mass balance provided quantifies unintended water losses associated with two main factors: the moisture removed in the bottom ash slurry transported from the Hydrobins for landfill disposal, and evaporation occurring from the exposed surfaces of the Bottom Ash Ponds and the BARS.

To maintain an adequate water volume necessary for proper functioning of the recirculation system, the plant utilizes two dedicated tie-ins to the Cooling Tower Blowdown (CTBD) system. One connection is located at the BARS, while the other is positioned at the Bottom Ash Sluicing Pumps Header. The water level within the BARS is continuously monitored by a level transmitter. When this water level reaches a predetermined low threshold, which can be adjusted by operators, an automated control valve is triggered to open. This action enables the CTBD system to supply makeup water to the Bottom Ash Recirculation loop, thereby restoring system water levels and ensuring uninterrupted operation. If the Bottom Ash Sluicing Pumps are not receiving adequate flow and/or pressure from the BARS Pumps, the tie-in between the CTBD system and the Bottom Ash Sluicing Pumps Header will make-up water to the system.

During periods of normal, wet-weather operations, the plant may experience a net increase in water volume within the Bottom Ash Recirculation system. This gain is largely influenced by the intensity and duration of storm events, which introduce additional water into the system. This water enters by way of the open air components such as the Bottom Ash Ponds and BARS, or after being collected by the HDAS. To effectively manage this potential excess and prevent undesirable overflows or releases of Bottom Ash Transport Water, one of the Bottom Ash Ponds remains empty for use as an equalization pond.

When the system water level rises and reaches a high level in the BARS, an operator will open a control valve located at the Flow Splitter from the HMI. This valve is opened to divert the surplus flow into the designated equalization pond, thereby mitigating the risk of uncontrolled discharge. If the water level in the BARS continues to climb and reaches a critical high-high threshold, the Dewatering Pumps are engaged to transfer additional water to the FGD Makeup Tanks.

Once the storm event subsides, the plant utilizes control valves in the outlet structures of the Bottom Ash Ponds to gradually reintroduce the excess water back into the recirculation loop. This controlled release ensures that the system maintains optimal water levels and can efficiently support the required flow for ongoing operations.

### 3.2.3. System Water Chemistry

To estimate the impacts on water quality that transitioning the bottom ash sluice system at Keystone into a recirculating open-loop arrangement would have, the theoretical water quality at various Cycles of Concentration (CoC) was calculated. A CoC is defined as the ratio of the conductivity of the blowdown to the conductivity of the makeup water in an open-loop system that regularly loses water to evaporation but retains solids introduced as a component of the makeup water. These calculations assume the following:

- Creek water quality is relatively constant, and the data provided from a single sample is representative.
- The water quality of the cooling tower is constant and well-mixed, and the towers operate at three (3) CoC at all times.
- Water conductivity and solute concentrations are proportional to one another for the creek, cooling towers, and bottom ash recirculating loop.
- Solubility limits and variations in conductivity as a function of temperature are not considered.

For a process water system, the water quality should be controlled in a range that optimizes the efficiency of resource consumption (e.g., energy, chemistry) and prolongs equipment service life. The primary antagonists to either of these goals are excessive corrosion or scale formation. For each proposed CoC in the table, values were calculated for indices used to predict the likelihood of calcium carbonate ($CaCO_3$) scale formation or corrosive potential of the water. $CaCO_3$ scale is the most ubiquitous form of scale found in surface water fed systems, although silica ($SiO_2$) scale is also common. Generally, $CaCO_3$ scale potential increases with alkalinity, pH and temperature. The higher the residence time for an open-loop system, the more time there is for evaporation to occur and increase the solute concentrations, thereby increasing alkalinity, pH, and subsequently, scale potential. While minor thin-layered scale usually is beneficial for the minimization of corrosion of metallic piping, excess scale formation onto pipe interiors can increase frictional losses and subsequently increase pressure drop. Conversely, corrosive water quality will dissolve protective films leaving metallic surfaces unprotected and open to erosion and corrosion from differences in galvanic potential in multi-metal pipe systems, erosive flow, low pH, or elevated sulfate or chloride concentrations.

The first index used for estimating scale/corrosion potential is the Langelier Saturation Index (LSI) which calculates the potential for $CaCO_3$ precipitation as a function of Total Dissolved Solids (TDS), temperature, calcium hardness, and alkalinity. LSI values are interpreted as follows (Table 3-2):

**Table 3-2. Interpretation of LSI Values**

| LSI | Description |
|---|---|
| < 0 | Water quality will tend towards $CaCO_3$ removal and is thus corrosive. The more negative the value, the more corrosive the water, but some minor corrosion is generally tolerated even in a well-balanced water system. |
| = 0 | Water is considered neutral and is not scale forming or scale removing |
| > 0 | Water quality is supersaturated with respect to $CaCO_3$ and will tend towards scale formation. The more positive the value, the higher the risk and rate of scale formation, but some minor scale is generally encouraged for minimization of corrosion of metallic wetted surfaces. |

The Ryznar Stability Index (RSI) is an alternative method to the LSI method for calculating the potential for $CaCO_3$ precipitation. RSI values are interpreted as follows (Table 3-3):

**Table 3-3. Interpretation of RSI Values**

| RSI | Description |
|---|---|
| < 5.5 | Water quality is heavily $CaCO_3$ scale-forming |
| 5.5 – 6.2 | Water quality is mildly $CaCO_3$ scale-forming |
| 6.2 – 6.8 | Ideal process water quality |
| 6.8 – 7.5 | Water quality is mildly corrosive to metallic wetted surfaces |
| > 7.5 | Water quality is extremely corrosive to metallic wetted surfaces |

Balancing process water quality in the bottom ash recirculating loop requires control of the pH and alkalinity, which are directly related. Higher alkalinity will increase the pH of the water and the buffering capacity of the water to resist changes in pH from additions of acid. It is assumed that Keystone bottom ash when entrained through sluicing operations increases the alkalinity of the sluice water, as bottom ash is generally alkaline. However, in the absence of empirical data, the average alkalinity introduced into the system cannot be quantified. The following Table 3-4 shows the estimated water quality and associated RSI/LSI calculated values for the bottom ash sluice water recirculating loop at various CoC's assuming an operating temperature of 25˚C, no introduction of alkalinity by the bottom ash, and without any pH/alkalinity treatment employed.

**Table 3-4. RSI & LSI Values at Keystone**

| Water | Cycles | Conductivity | TDS | Calcium (Ca) | *Silica (SiO2)* | *Total Hardness (CaCO3)* | Chloride (Cl) | Sulfate (SO4) | Total Alk (CaCO3) | RSI | LSI | pH | Temperature |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (µS/cm) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | (mg/L) | - | - | - | (˚C) |
| Creek | Makeup | 440 | 282 | 55 | 6.8 | 170 | 18 | 11 | 68 | 9.22 | -0.86 | 7.50 | 25 |
| Blowdown | 3.5 | 1540 | 986 | 192.5 | 23.8 | 595.0 | 63.0 | 38.5 | 238.0 | 6.63 | 0.70 | 8.02 | 25 |
| BA | 4.5 | 1980 | 1267 | 247.5 | 30.6 | 765.0 | 81.0 | 49.5 | 306.0 | 6.05 | 1.07 | 8.18 | 25 |
| BA | 5.5 | 2420 | 1549 | 302.5 | 37.4 | 935.0 | 99.0 | 60.5 | 374.0 | 5.59 | 1.36 | 8.31 | 25 |
| BA | 6.5 | 2860 | 1830 | 357.5 | 44.2 | 1105.0 | 117.0 | 71.5 | 442.0 | 5.21 | 1.60 | 8.42 | 25 |
| BA | 7.5 | 3300 | 2112 | 412.5 | 51.0 | 1275.0 | 135.0 | 82.5 | 510.0 | 4.88 | 1.81 | 8.51 | 25 |

Table 3-4 indicates that scale formation is strongly possible for the bottom ash system. While this system does not have a high skim temperature surface to plate out onto (e.g., condenser tubes) like most open loop systems, scale can still build up on pipes over time, decreasing pump efficiency and lifetime. In the absence of pH control, this scale potential will be mitigated primarily via blowdown of the bottom ash system to the FGD system. If scale formation or excessive blowdown becomes an issue in the future, implementation of a pH control system for the bottom ash recirculation loop could be considered.

# 4.0 WASTEWATER TREATMENT SYSTEM

In accordance with 40 CFR § 423.19(d)(3)(viii) and (ix), this section describes the wastewater treatment systems currently in place at Keystone.

Table 4-1 below summarizes the wastewater treatment systems at Keystone:

**Table 4-1. Keystone's Wastewater Treatment Systems**

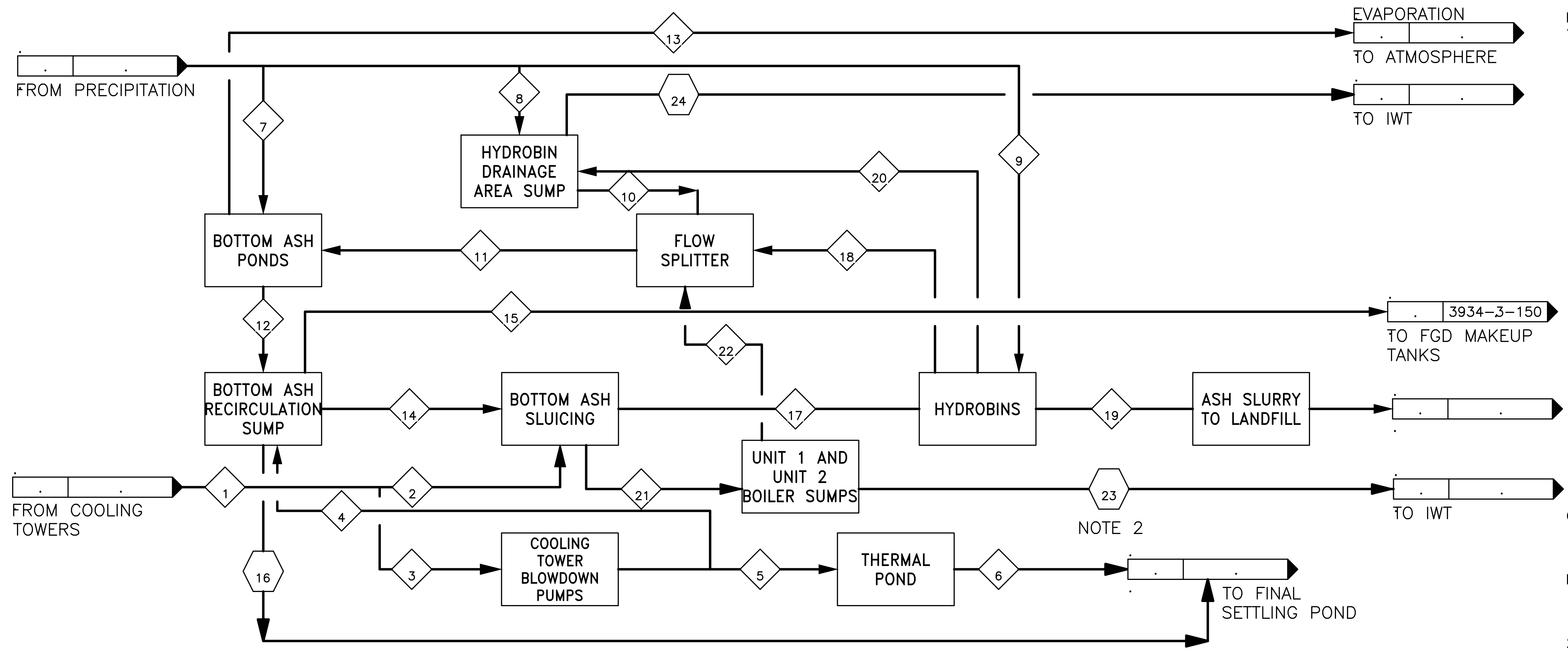
| System Type | Design Capacity | Current Operation | Expected Operation |
|---|---|---|---|
| Industrial Wastewater and Final Wastewater | Maximum: 2,080 GPM<br>Average: 555 GPM | Physical/chemical treatment through pH adjustment, oxidation and clarification | No changes expected |
| Sewage Treatment Plant | 40,000 GPD | Aerobic bacteria, aeration, clarification, chlorination | No changes expected |
| FGD Wastewater Treatment | Maximum: 450 GPM<br>Average: 250 GPM | Physical/chemical treatment | Addition of ultrafiltration, reverse osmosis, and possibly ion exchange |

**ATTACHMENT 1 – BOTTOM ASH EQUIPMENT SYSTEM FLOW DIAGRAMS**

**ATTACHMENT 2 – SITE GENERAL ARRANGEMENT (SITE PLANS)**

# ATTACHMENT 1

## BOTTOM ASH EQUIPMENT
## SYSTEM FLOW DIAGRAM




NOTES:

1. STREAM 9 IS A TOTALIZED FLOW OF PRECIPITATION INTO THE SYSTEM LESS THE HYDROBIN DRAINAGE AREA SUMP. ALTHOUGH THERE ARE MULTIPLE OPEN AIR COMPONENTS TO THE SYSTEM, PRECIPITATION COLLECTION IN THE TOP OF THE HYDROBINS, SUMP, AND FLOW SPLITTER ARE GENERALLY NEGLIGIBLE.

   A: 2 UNITS OPERATING AT FULL CAPACITY WITH TWO FULL PONDS, NO PRECIPITATION, AND HIGH EVAPORATION

   B: BOTH UNITS OFFLINE WITH TWO EMPTY PONDS AND HIGH PRECIPITATION (0.145 IN/HR)

   C: 1 UNIT OPERATING AT FULL CAPACITY WITH TWO PONDS AT 75% CAPACITY, LOW PRECIPITATION (0.05 IN/HR), AND MODERATE EVAPORATION

   Q=VOLUMETRIC FLOWRATE IN GALLONS PER MINUTE (GPM)

   M=MASS FLOWRATE IN KILOGRAMS PER SECOND (lbm/hr)

2. FLOW PATH 23 REPRESENTS THE TOTALIZED OVERFLOW FROM UNIT 1 BOILER SUMP AND UNIT 2 BOILER SUMP.

(hexagon symbol) IDENTIFIES A POTENTIAL DISCHARGE POINT FOR BOTTOM ASH WATER

MASS BALANCE

| Scenario | A | | B | | C | |
|---|---|---|---|---|---|---|
| Flows | Q (GPM) | M (lbm/hr) | Q (GPM) | M (lbm/hr) | Q (GPM) | M (lbm/hr) |
| 1 | 3337 | 1665030 | 3000 | 1496880 | 3093 | 1543034 |
| 2 | 337 | 168390 | 0 | 0 | 93 | 46220 |
| 3 | 3000 | 1496880 | 3000 | 1496880 | 3000 | 1496880 |
| 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 3000 | 1496880 | 3000 | 1496880 | 3000 | 1496880 |
| 6 | 3000 | 1496880 | 3000 | 1496880 | 3000 | 1496880 |
| 7 | 0 | 0 | 148 | 73966 | 51 | 25506 |
| 8 | 0 | 0 | 44 | 22144 | 15 | 7636 |
| 9 | 0 | 0 | 6 | 2872 | 2 | 991 |
| 10 | 25 | 12492 | 69 | 34636 | 40 | 20128 |
| 11 | 6627 | 3311372 | 1080 | 539844 | 3251 | 1624602 |
| 12 | 6575 | 3285577 | 1211 | 605231 | 3284 | 1640845 |

MASS BALANCE

| Scenario | A | | B | | C | |
|---|---|---|---|---|---|---|
| Flows | Q (GPM) | M (lbm/hr) | Q (GPM) | M (lbm/hr) | Q (GPM) | M (lbm/hr) |
| 13 | 52 | 25796 | 17 | 8580 | 19 | 9263 |
| 14 | 6510 | 3252723 | 1030 | 514828 | 3251 | 1624594 |
| 15 | 66 | 32853 | 182 | 90850 | 33 | 16405 |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 |
| 17 | 5647 | 2825759 | 1030 | 514828 | 2744 | 1373098 |
| 18 | 5402 | 2703161 | 1011 | 505209 | 2611 | 1306544 |
| 19 | 220 | 109741 | 0 | 0 | 110 | 54838 |
| 20 | 25 | 12492 | 25 | 12492 | 25 | 12492 |
| 21 | 1200 | 600480 | 0 | 0 | 600 | 300240 |
| 22 | 1200 | 600480 | 0 | 0 | 600 | 300240 |
| 23 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 0 | 0 | 0 | 0 | 0 | 0 |

NOTE:
CONTRACTOR IS RESPONSIBLE FOR ALL LOCAL HIGH POINT VENTS AND LOW POINT DRAINS TO SAFE AREA ON ALL MAIN PROCESS LINES

**ISSUE FOR BID**
1/12/2026 11:23 AM

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| 0 | 8/14/2025 | PROGRESS PRINT | MD/RR | WJS |
| 0 | 1/16/2026 | ISSUE FOR BID | MD/RR | WJS |

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REVIEWED WS
S.O.# 207501
CADD# 207501_KEY_IW101.dwg

NORTH
NOT APPLICABLE

DETAIL DESIGN

KEYSTONE STATION
CAMS
KEYSTONE GENERATING STATION
313 KEYSTONE DRIVE SHELOCTA, PA 15774-2305

Michael Baker INTERNATIONAL
MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER MACY ELIZABETH RICHARD PE094222

KEYSTONE GENERATING STATION
ELG MODIFICATIONS PROJECT
PIPING AND INSTRUMENTATION DIAGRAM (P&ID)
BLOCK FLOW DIAGRAM

SCALE NONE
DATE DECEMBER 2025

SHEET NO.
IW-101
OF

PATH: K:\COMMON\ROHE_RANDY\207501 Keystone ELG\Keystone ELG\PID DWG\207501_KEY_IW101.dwg
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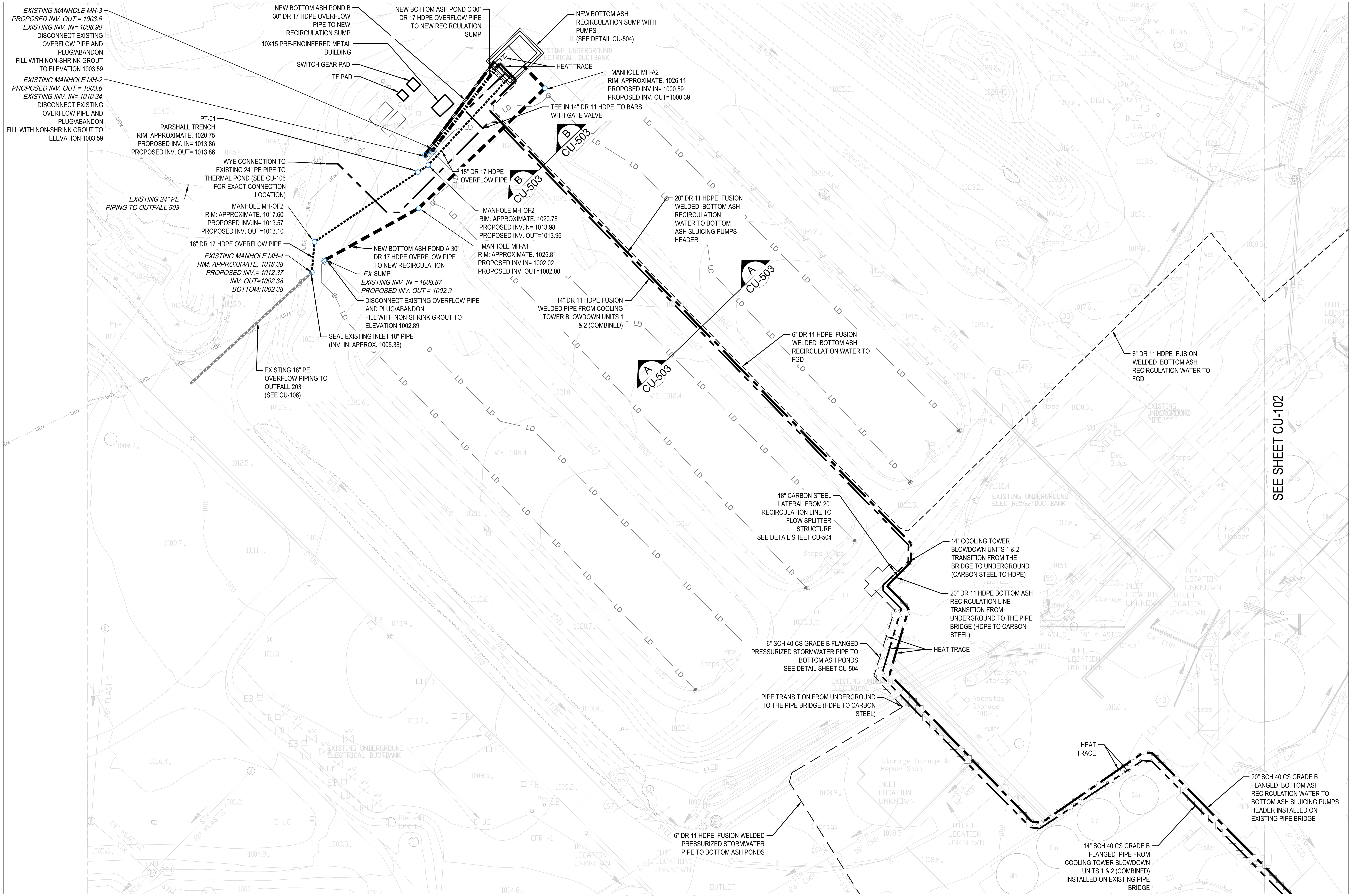
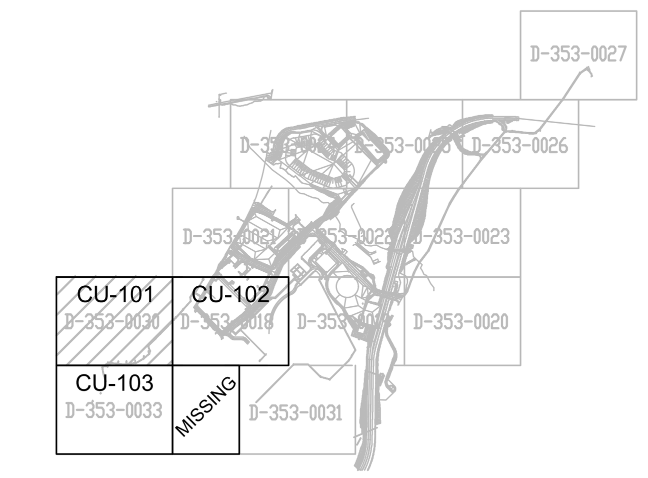
# ATTACHMENT 2

## SITE GENERAL ARRANGEMENT
## (SITE PLANS)




SEE SHEET CU-103




## LEGEND

- 6" FGD RECIRCULATION WATER
- 20" BOTTOM ASH RECIRCULATION WATER
- 14" PIPE FROM COOLING TOWER BLOWDOWN UNITS 1 & 2
- 6" PRESSURIZED STORMWATER PIPE TO BOTTOM ASH PONDS
- 18" OVERFLOW PIPE
- 30" POND A OVERFLOW
- 30" POND B OVERFLOW
- 30" POND C OVERFLOW
- HEAT TRACE

## NOTES

- BOTTOM ASH POND CLEANING WILL BE TEMPORARILY ON-HOLD DURING THE CONSTRUCTION IN THIS AREA. BOTTOM ASH PONDS SHOULD BE CLEANED PRIOR TO THE CONSTRUCTION IN THIS AREA TO PREVENT ANY INTERRUPTIONS IN THE OPERATION OF THE BOTTOM ASH PONDS.
- SEE SHEET CU-106 FOR MORE ACCURATE EXISTING CONDITIONS.
- SEE ELECTRICAL DRAWINGS FOR THE HEAT TRACING SPECIFICATIONS.

0 40' 80' 160'

22x34 full size 1" = 40'
11x17 half size 1" = 80'

| REV. | DATE | PURPOSE | REV. BY | APP'VD. BY |
|---|---|---|---|---|
| A | 1/16/26 | ISSUE FOR BID | AG/RR | WJS |
| B | | | | |

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ISSUE FOR BID

KEYSTONE STATION

CAMS Consolidated Asset Management Services

KEYSTONE GENERATING STATION
313 KEYSTONE DRIVE SHELOCTA, PA 15774-2305

Michael Baker INTERNATIONAL

MICHAEL BAKER INTERNATIONAL
MOON TOWNSHIP, PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ALEN GUSA ENGINEER PE097242

UTILITY PLAN
SHEET 1

SCALE AS SHOWN

DATE JANUARY 2026

SHEET NO.

CU-101

OF

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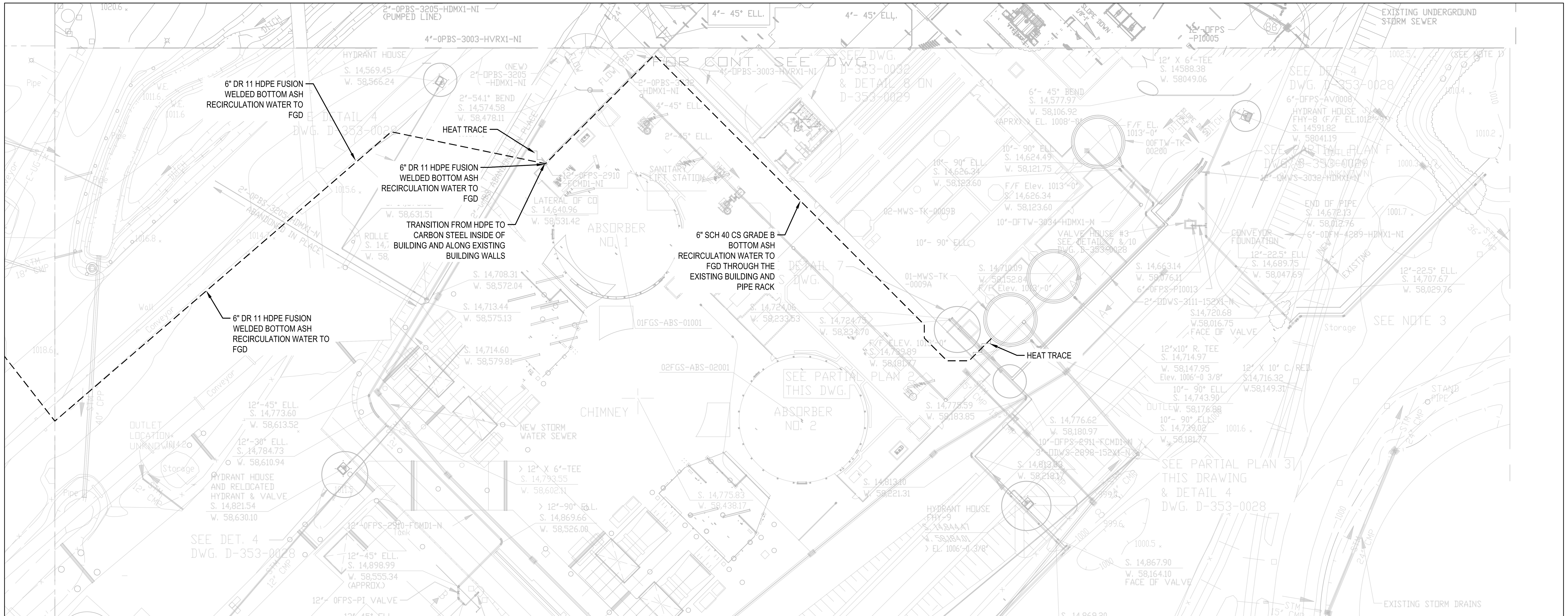
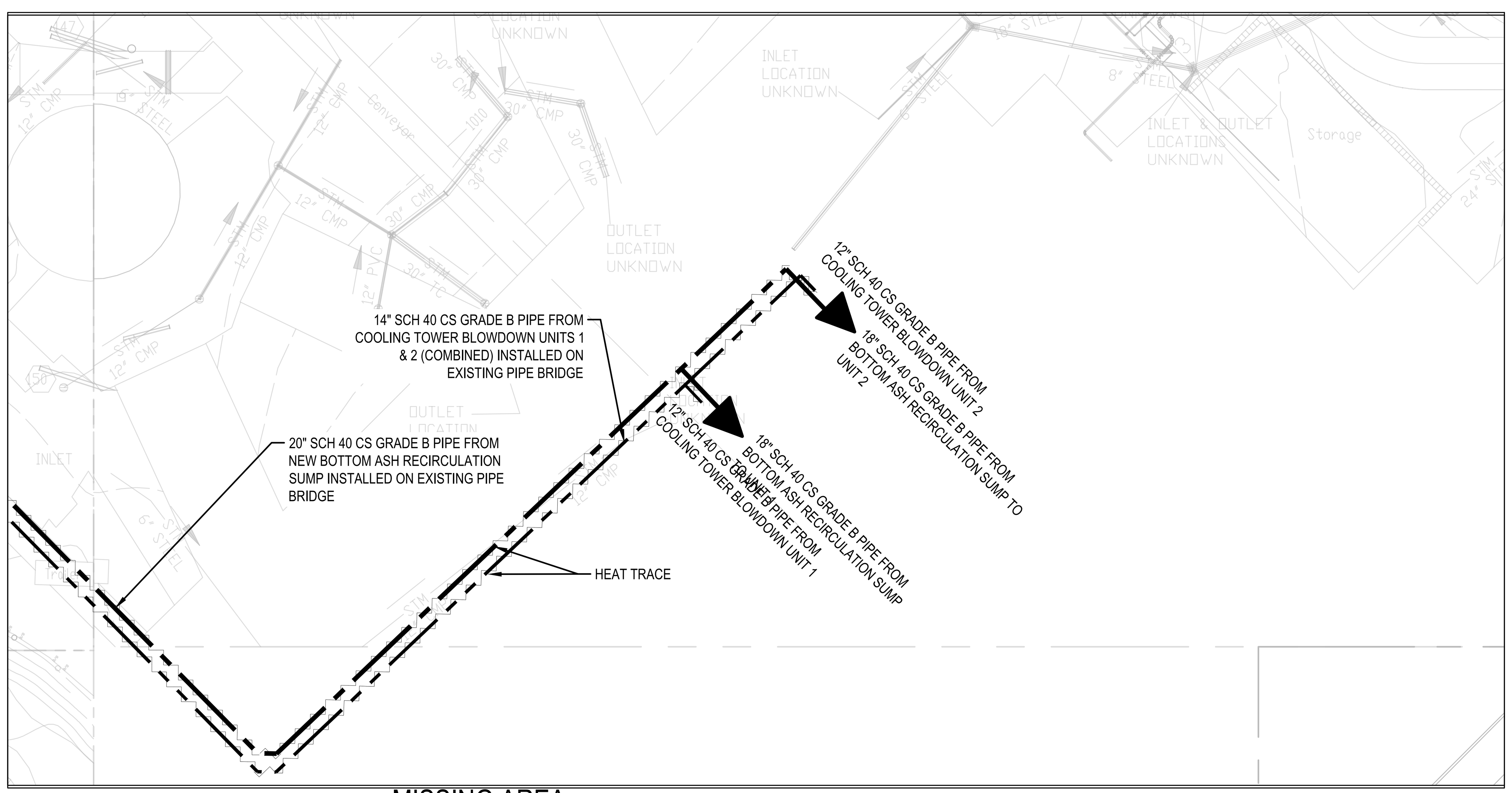
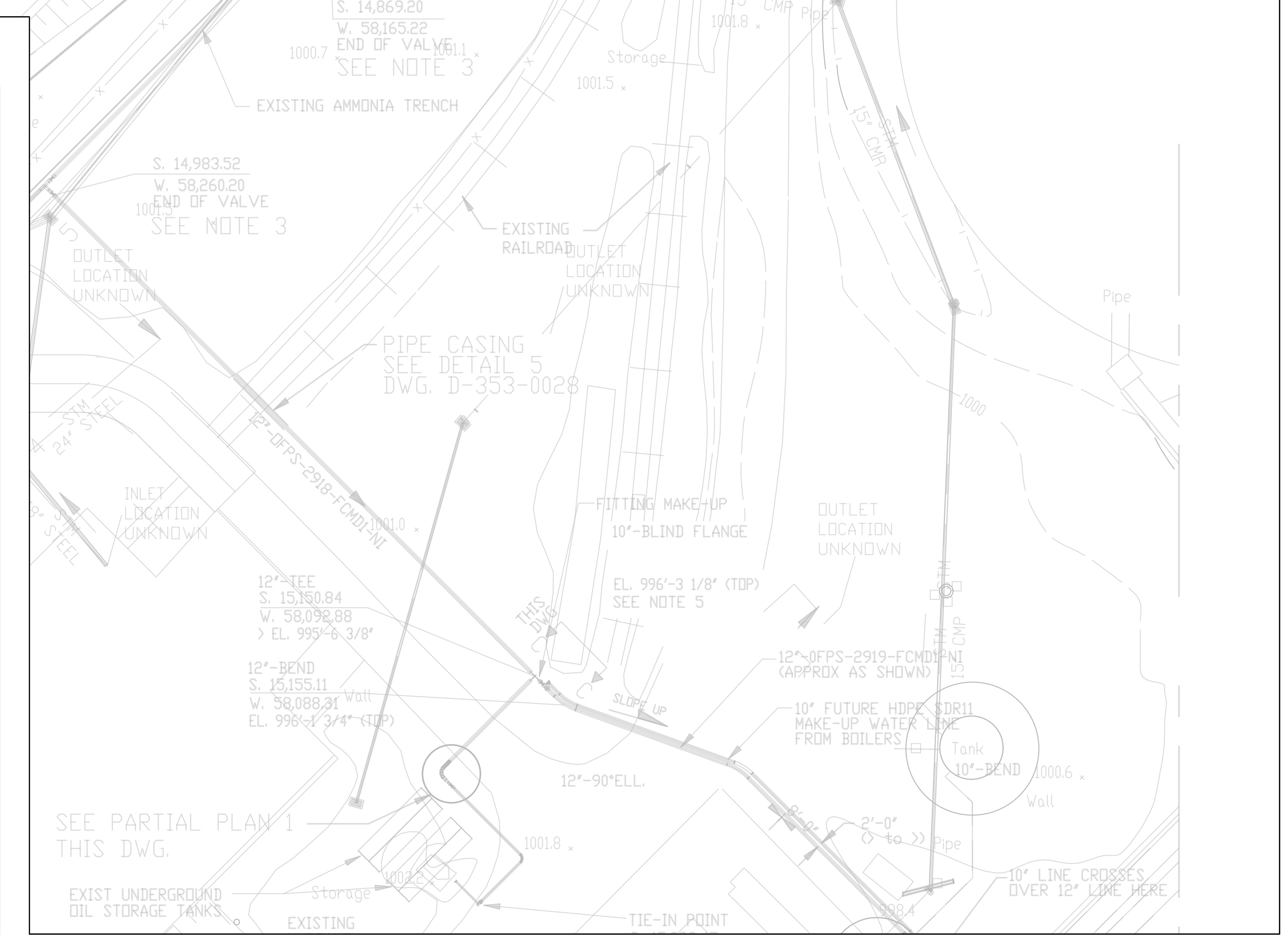
SEE SHEET CU-101

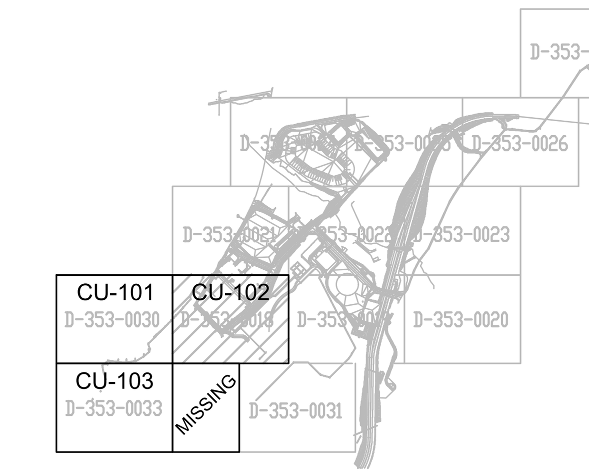



SCHEMATIC ONLY - PLEASE SEE SHEET SHEET CU-104 AND CU-105 FOR PIPE ALIGNMENT AND DETAILS




MISSING AREA






## LEGEND

| | |
|---|---|
| 6" FGD RECIRCULATION WATER | |
| 20" AND 18" BOTTOM ASH RECIRCULATION WATER | |
| 14" AND 12" PIPE FROM COOLING TOWER BLOWDOWN UNITS 1 & 2 | |
| HEAT TRACE | |

0 40' 80' 160'

22x34 full size 1" = 40'
11x17 half size 1" = 80'

| REV. | DATE | PURPOSE | REV. BY | APP'VD. BY |
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KEYSTONE GENERATING STATION
313 KEYSTONE DRIVE SHELOCTA, PA 15774-2305

Michael Baker INTERNATIONAL

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COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ALEN GUSA ENGINEER PE087242

UTILITY PLAN
SHEET 2

SCALE AS SHOWN
DATE JANUARY 2026

SHEET NO.
CU-102
OF

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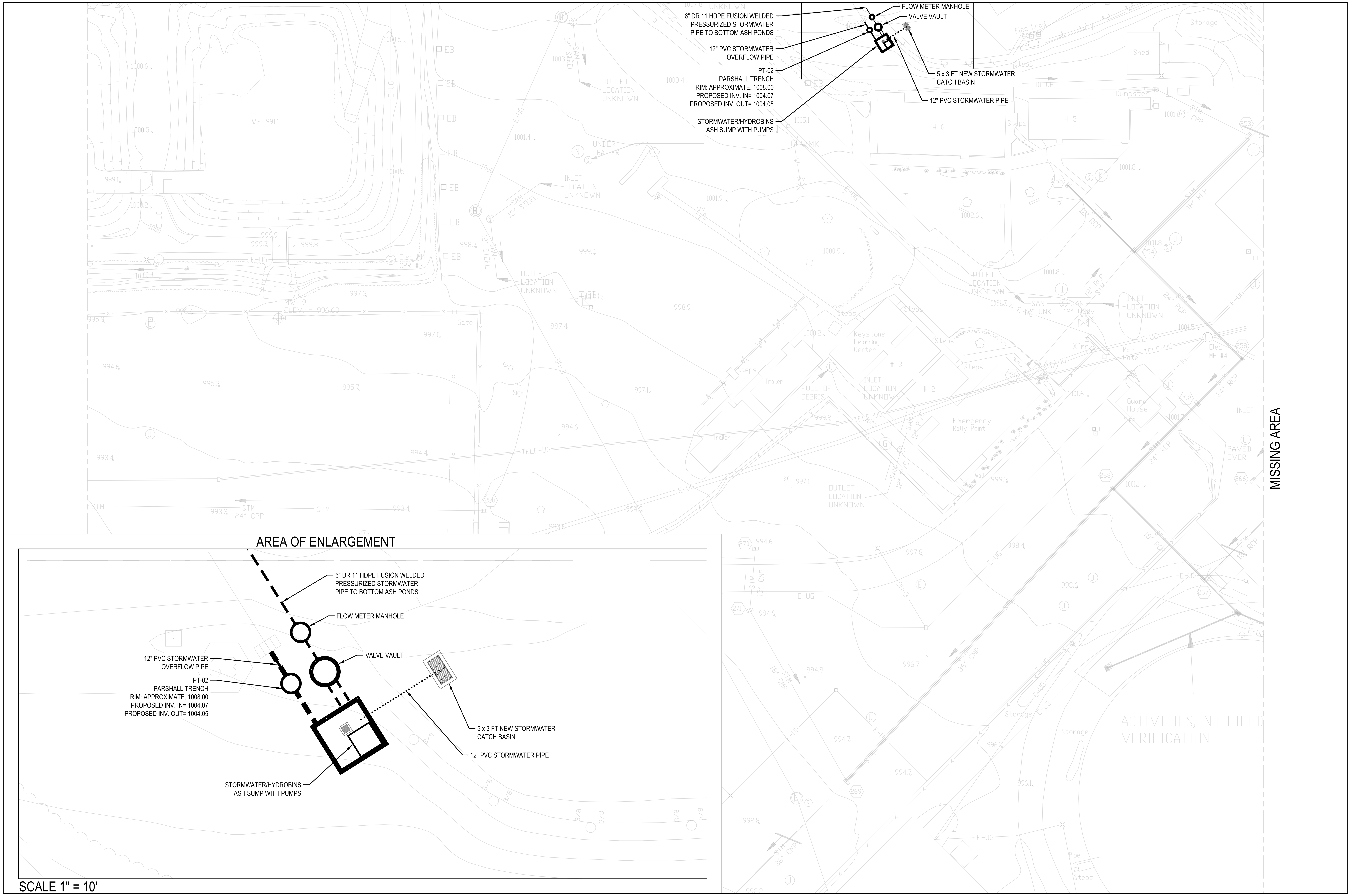


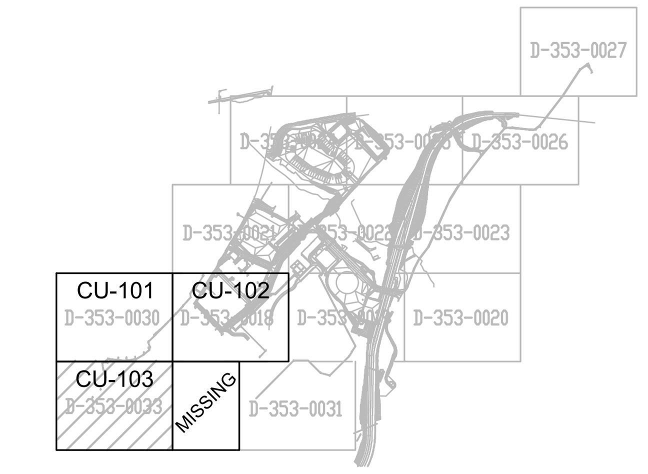


## LEGEND

12" PVC OVERFLOW PIPE

12" PVC STORMWATER PIPE

6" PRESSURIZED STORMWATER PIPE TO BOTTOM ASH PONDS

0 40' 80' 160'

22x34 full size 1" = 40'
11x17 half size 1" = 80'

| REV. | DATE | PURPOSE | REV. BY | APP'VD. BY |
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UTILITY PLAN
SHEET 3

SCALE AS SHOWN

DATE JANUARY 2026

SHEET NO.

CU-103

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