

Coal Combustion Residual (CCR) Rule Compliance

Periodic Inflow Design Flood Control System Plan



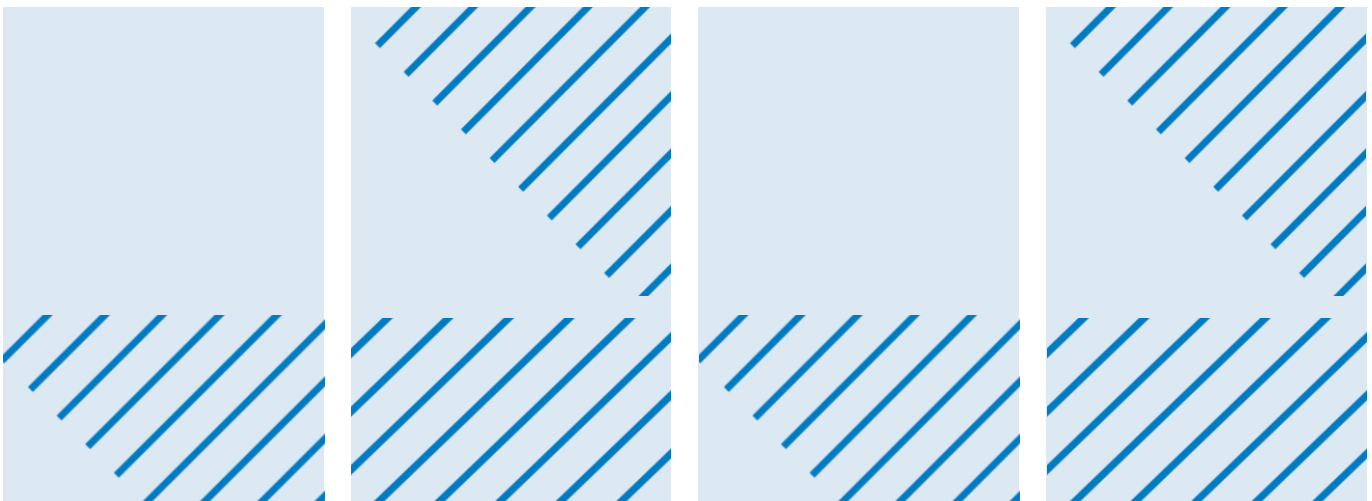
Prepared for
Minnkota Power Cooperative, Inc.
Milton R. Young Station

Prepared by
Barr Engineering Co.

September 2026

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Certification

I hereby certify that I, or my agent, have examined the facility and, being familiar with the provisions of NDAC 33.1-20-08, attest that this Coal Combustion Residuals inflow design flood control system plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and the requirements of NDAC 33.1-20-08-05.3. I certify that the plan is adequate for this facility and that procedures for recordkeeping and reporting have been established.

Revision	Date	Summary of Revisions
0	September 27, 2016	Initial Plan
1	September 24, 2021	2021 Periodic Revision
2	September 24, 2026	2026 Periodic Revision



Seth W. Hueckman
Barr Engineering Co.
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9/24/2026
Date

1 Introduction

Minnkota Power Cooperative, Inc. (MPC) operates the Milton R. Young Station (MRY), near Center, North Dakota. MRY operates two lignite-fired cyclone boilers, resulting in production of coal combustion residuals (CCR). Cell 3 is permitted through the North Dakota Department of Environmental Quality (NDDEQ) per North Dakota Administrative Code (NDAC) 33.1-20-08.

This CCR inflow design flood control system plan has been developed to satisfy the requirements described in NDAC 33.1-20-08-05.3, hydrologic and hydraulic capacity requirements for CCR surface impoundments, as they apply to MPC's Cell 3 CCR surface impoundment.

2 Objectives

Hydrologic and hydraulic capacity requirements for CCR surface impoundments, 33.1-20-08-05.3, requires the owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment (unit) to design, construct, operate, and maintain an inflow design flood control system. In addition, owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit.

In order to fulfill these objectives, the inflow design flood control system plan must:

- define the inflow design flood event for the CCR unit;
- provide documentation that the inflow design flood control system adequately manages flow into the CCR unit during and following the peak discharge of the inflow design flood;
- provide documentation that the inflow design flood control system adequately manages flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood;
- define recordkeeping requirements;
- define reporting requirements; and
- include a certification from a qualified professional engineer.

3 Cell 3 Surface Impoundment

Cell 3 is a CCR surface impoundment at MRY. The Cell 3 surface impoundment is operated by MPC and the water surface elevation is maintained using a siphon return pipeline network to return water to the plant and manage/draw down the water level in the impoundment. Following sluicing to the cell, the surface water remaining in the cell is pumped or siphoned to Cell 4. In addition, an existing dewatering sump at the base of the cell and sidewall riser pump system is used to continue subsurface dewatering during closure activities. Cell 3 dewatering was initiated in 2020 and is ongoing.

Cell 3 was constructed in phases to allow for two embankment raises over the life of the impoundment. Phase 1 was completed in 2012 and established the initial footprint for the impoundment. Phase 2 was the first embankment raise and was completed in 2013. Phase 3 was the second and final embankment raise which was completed in 2016. After completion of Phase 3, the final crest elevation of the Cell 3 embankment is 2100 feet mean sea level (msl). The impoundment has a composite liner system that

extends to elevation 2098 feet msl. The maximum operating water surface elevation in the cell is 2093 feet msl which is seven feet below the crest elevation of the impoundment embankment.

In 2020, Cell 3 reached its FGD storage capacity and dewatering activities began in preparation for final closure. Final closure grades of Cell 3 will consist of 5% cover slopes graded to direct runoff to the East and West with a peak in the center of the Cell. At the time of this periodic update, nearly all surface water has been removed from Cell 3 through evaporation or transfer to the active surface impoundment at the Facility. Fill has begun to be placed to achieve the final cover grades, during fill placement, placed fill is graded to drain to the south towards the Cell 4 surface impoundment. The west side of Cell 3 has reached closure grades and was covered with temporary cover to promote clean run-off from the cell.

A location map of MRY and the Cell 3 surface impoundment are shown in Figure 1.

4 Inflow Design Flood Event

The inflow design flood event for CCR surface impoundments is based on hazard potential classifications. Guidance for the hazard potential classification is provided in NDAC 33.1-20-08-01 stating that *“Hazard potential classification means the possible adverse incremental consequences that result from the release of water or stored contents due to failure of the diked CCR surface impoundment or mis-operation of the diked CCR surface impoundment or its appurtenances. The hazardous potential classifications include high hazard potential CCR surface impoundment, significant hazard potential CCR surface impoundment, and low hazard potential CCR surface impoundment.”*

NDAC 33.1-20-08-01 further goes on to define these terms:

“High hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life”

“Significant hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.”

“Low hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.”

Failure or mis-operation of the MPC Cell 3 CCR surface impoundment is not likely to cause loss of human life, however economic loss, environmental damage, disruption of lifeline facilities, or other impacts could occur. Therefore the MPC Cell 3 CCR surface impoundment is classified as a significant hazard potential CCR surface impoundment. The inflow design flood for a significant hazard potential CCR surface impoundment is the 1,000-year flood, 24 hour event (NDAC 33.1-20-08-05.3.a(3)(b))

5 Flow into CCR Unit

The 1,000-year, 24-hour storm event at MRY produces 7.64 inches of rainfall (reference: Atlas 14). The Cell 3 surface impoundment has a contributing drainage area of 37.1 acres, which is comprised of 2.5

acres of Cell 2 active landfill area, 30.7 acres Cell 3 former pool area, and 3.9 acres of adjacent embankment.

Hydrologic modeling of Cell 3 for the 1000-year event produces a runoff volume of approximately 17 acre-feet. As previously discussed, surface water within Cell 3 has been removed therefore, there is no active pool within Cell 3. Assuming a solids elevation equal to the maximum operating level during wet FGD disposal of 2093.0', this storm event would result in a peak elevation of approximately 2093.6', equating to 6.4' of freeboard from the embankment crest. At the time of this report, dry fill placement has begun to achieve closure grades. As fill is placed, and the grade of solids within Cell 3 exceed elevation 2093' all run-off will be directed south into Cell 4 via fill grading, ditches, and clean soil berms. Figure 2 shows the current contributing acreage and drainage paths. As areas of Cell 3 are brought to final closure grades, sequential partial closure will be constructed to promote clean run-off and further reduce acreage contributing runoff during the flood event.

6 Flow from CCR Unit

During active operation, the magnitude of the freeboard minimized the potential for overtopping of cell embankments by creating excess storage that exceeded the volume of runoff that could be expected from an extreme precipitation event. For this reason, the design does not include an overflow spillway; there are no spillways or downstream hydraulic structures because Cell 3 was designed to not overtop during extreme precipitation events like the 1,000-year flood event.

As previously discussed, the surface water in Cell 3 has been pumped or directed to Cell 4 which will contain surface water and run-off within the Facility boundaries. Furthermore, the dewatering system (sump and sidewall riser pump system) is used to draw down the subsurface water levels in the cell. Water from the dewatering system is also discharged to Cell 4. The dewatering system sidewall riser pipes should be kept unobstructed to provide proper operations of the surface impoundment during closure activities.

7 Recordkeeping

MPC will maintain a copy of the most recent version of the inflow design flood control system plan in the facility's operating record. According to NDAC 33.1-20-08-05.3.c(2), MPC *"must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect."* In addition, MPC can *"amend the written inflow design flood control system plan at any time provided the revised plan is placed in the facility's operating record."* If the plan is updated, the new version of the inflow design flood control system plan will be put in the operating record *"as it becomes available"* in accordance with NDAC 33.1-20-08-08.1.g. Additionally, MPC must *"prepare periodic inflow design flood control system plans every five years."* *"The deadline for completing a subsequent plan is based on the date of completing the previous plan."* The plan is considered complete when it *"has been placed in the MPC facility operating record."*

MPC will retain a copy of each file *"for at least five years following the date of each occurrence, measurement, maintenance, corrective action, report, record, or study,"* in accordance with NDAC 33.1-20-08-08.1.b.

8 Reporting

When the initial plan, and successive amendments to the plan, are placed in the operating record they will be made publicly available on the MPC CCR web site in compliance with NDAC 33.1-20-08-08.3.e, Publicly Accessible Internet Site Requirements. Additionally, to comply with NDAC 33.1-20-08-08.2.d, Record Submission Requirements, MPC will submit to the department the updated Inflow Design Flood Control System Plan, within 30 days of placing the completed document in the operating record via electronic submittal procedures for the Facility (CERIS).

9 References

NOAA Atlas 14 Point Precipitation Frequency Estimates: North Dakota. National Weather Service.
https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nd. Accessed August 31, 2026



Figure 1 – Site Layout



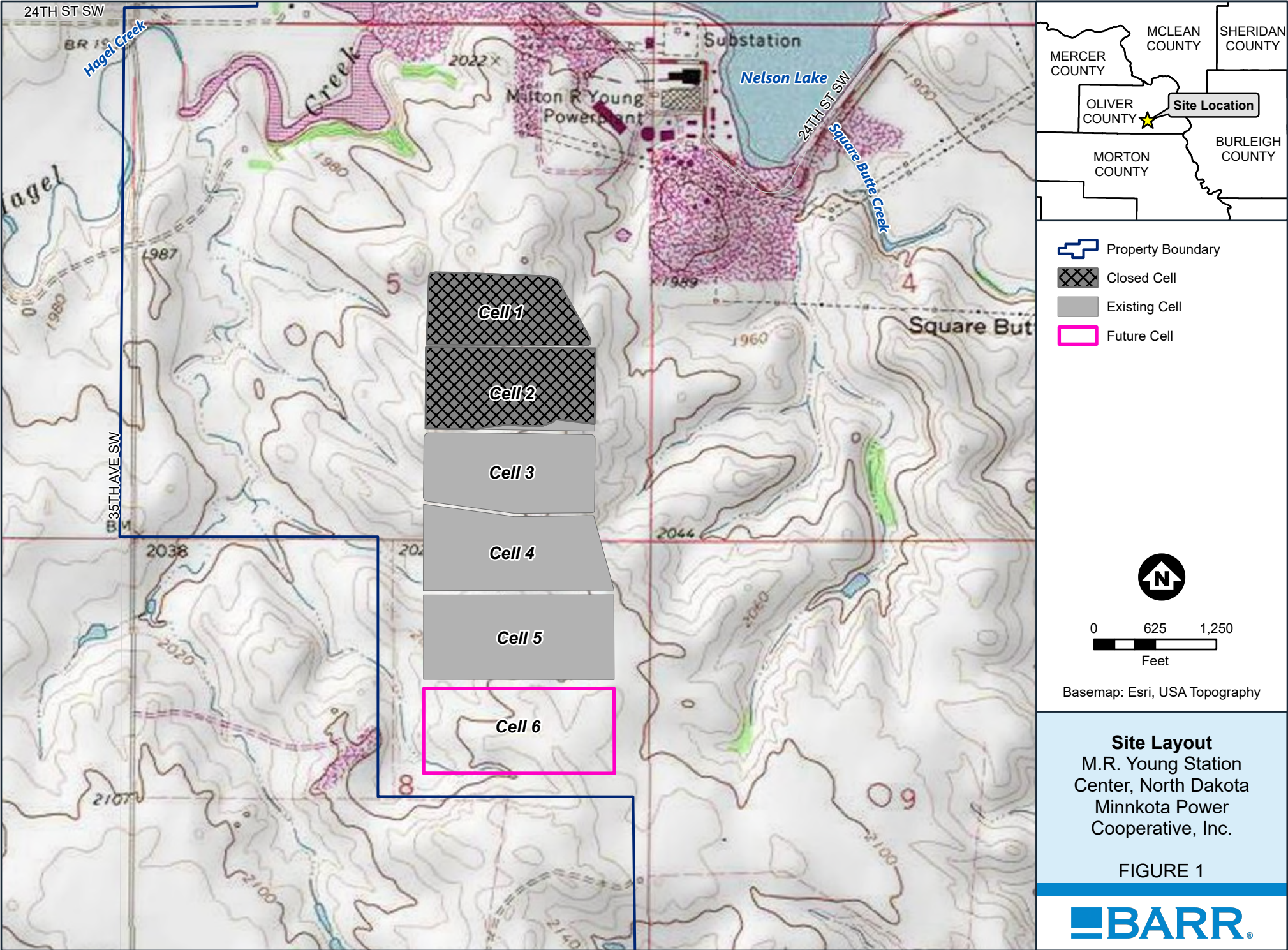
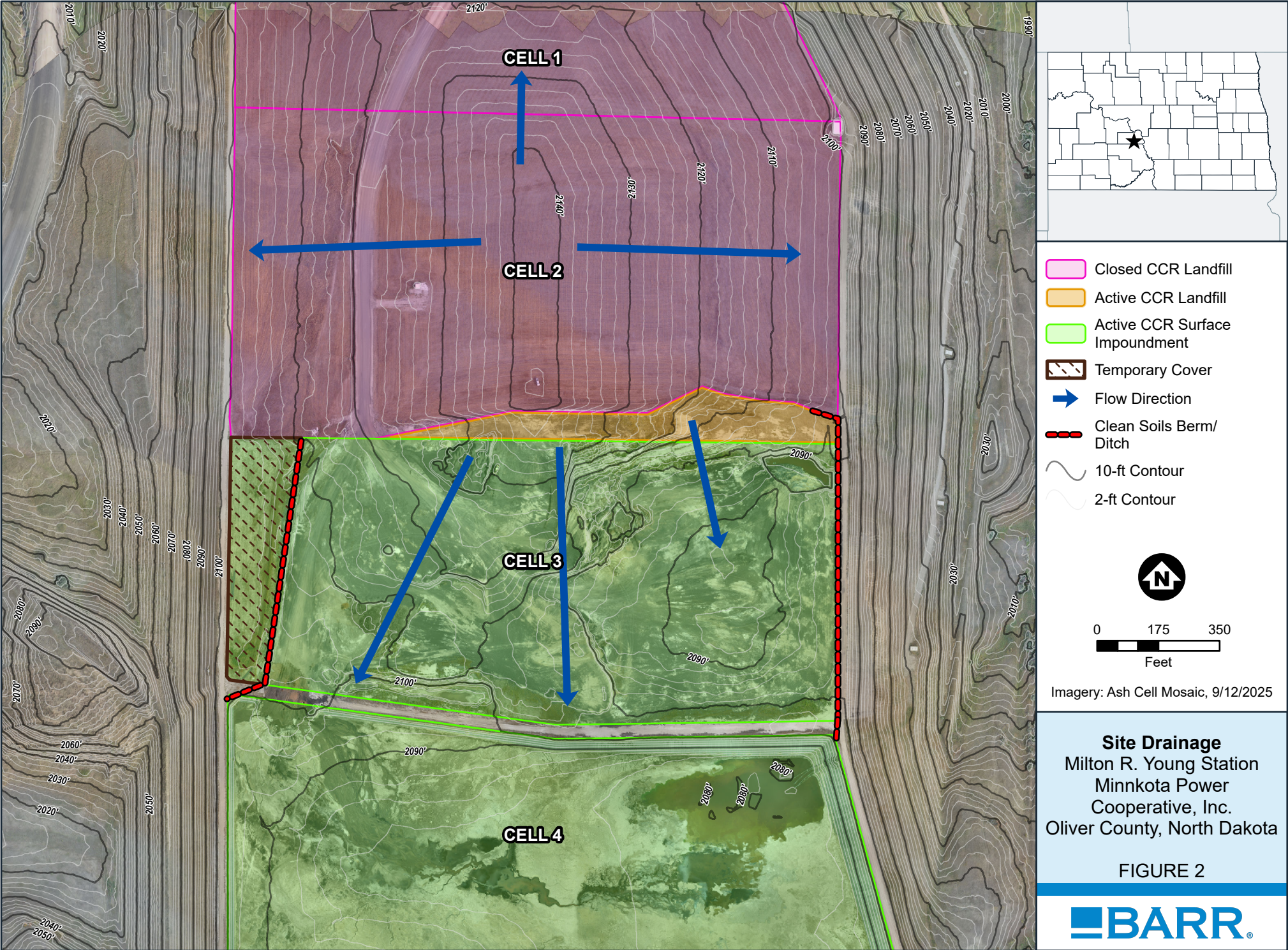




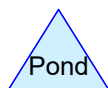
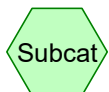
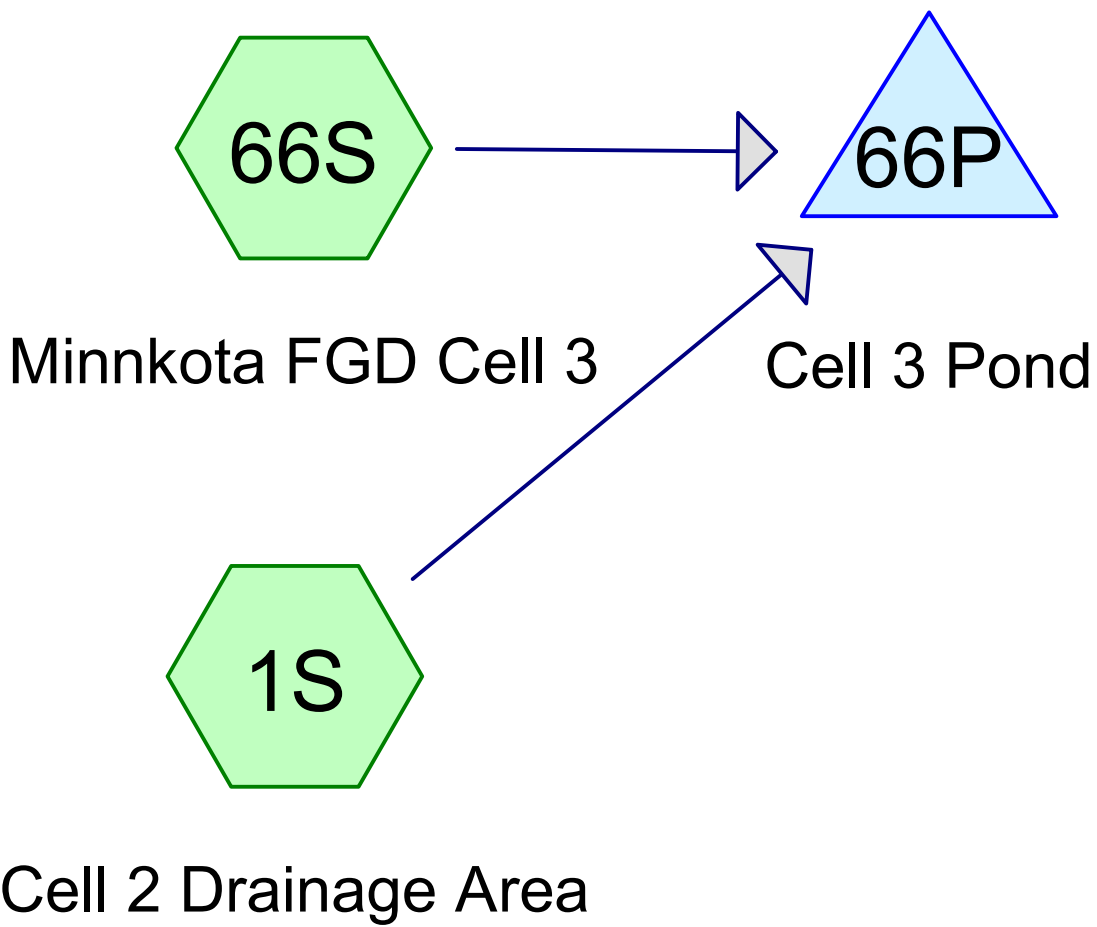
Figure 2 – Site Drainage







Appendix A – HydroCAD Report



Storm Water Model_2026

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
37.123	82	(1S, 66S)
37.123	82	TOTAL AREA

Storm Water Model_2026

Type II 24-hr 1000yr-24hr Rainfall=7.64"

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Time span=0.00-30.00 hrs, dt=0.01 hrs, 3001 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Cell 2 Drainage Area

Runoff Area=2.500 ac 0.00% Impervious Runoff Depth=5.52"

Tc=6.0 min CN=82 Runoff=23.45 cfs 1.150 af

Subcatchment 66S: Minnkota FGD Cell 3

Runoff Area=34.623 ac 0.00% Impervious Runoff Depth=5.52"

Tc=10.0 min CN=82 Runoff=283.98 cfs 15.923 af

Pond 66P: Cell 3 Pond

Peak Elev=2,093.58' Storage=663.618 af Inflow=304.20 cfs 17.072 af

Outflow=0.00 cfs 0.000 af

Total Runoff Area = 37.123 ac Runoff Volume = 17.072 af Average Runoff Depth = 5.52"

100.00% Pervious = 37.123 ac 0.00% Impervious = 0.000 ac

Storm Water Model_2026

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Type II 24-hr 1000yr-24hr Rainfall=7.64"

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Summary for Subcatchment 1S: Cell 2 Drainage Area

Runoff = 23.45 cfs @ 11.97 hrs, Volume= 1.150 af, Depth= 5.52"
Routed to Pond 66P : Cell 3 Pond

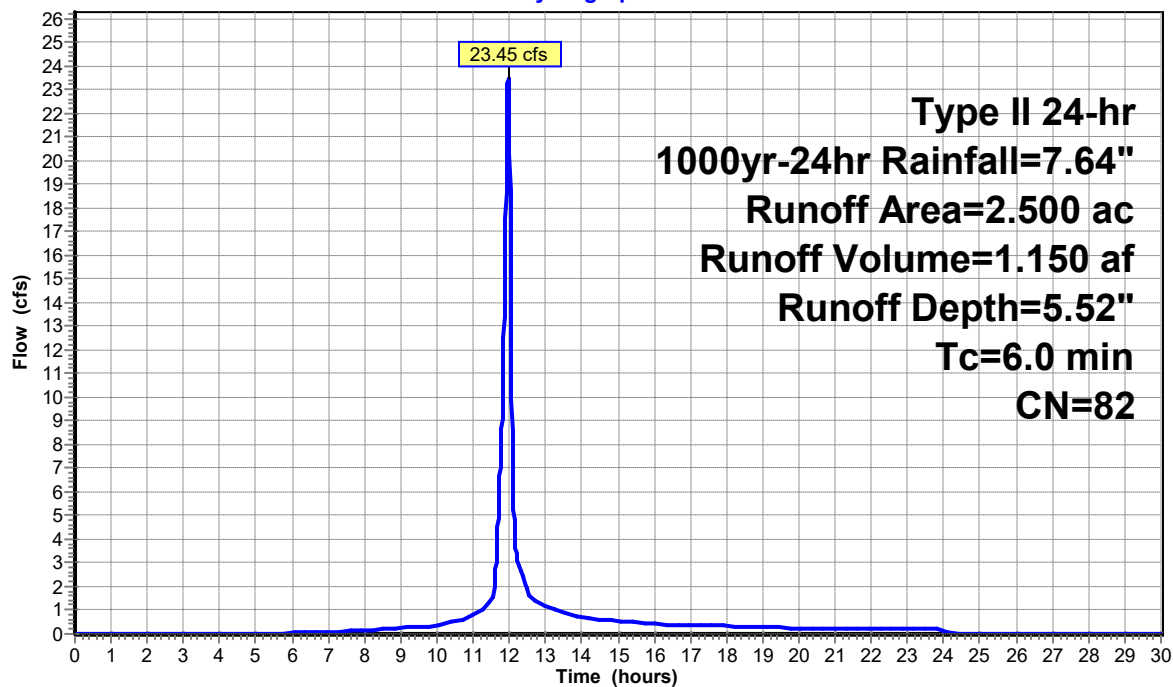
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1000yr-24hr Rainfall=7.64"

Area (ac)	CN	Description
* 2.500	82	
2.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min value = 0.1 hr

Subcatchment 1S: Cell 2 Drainage Area

Hydrograph



Storm Water Model_2026

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Type II 24-hr 1000yr-24hr Rainfall=7.64"

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Summary for Subcatchment 66S: Minnkota FGD Cell 3

Runoff = 283.98 cfs @ 12.01 hrs, Volume= 15.923 af, Depth= 5.52"
Routed to Pond 66P : Cell 3 Pond

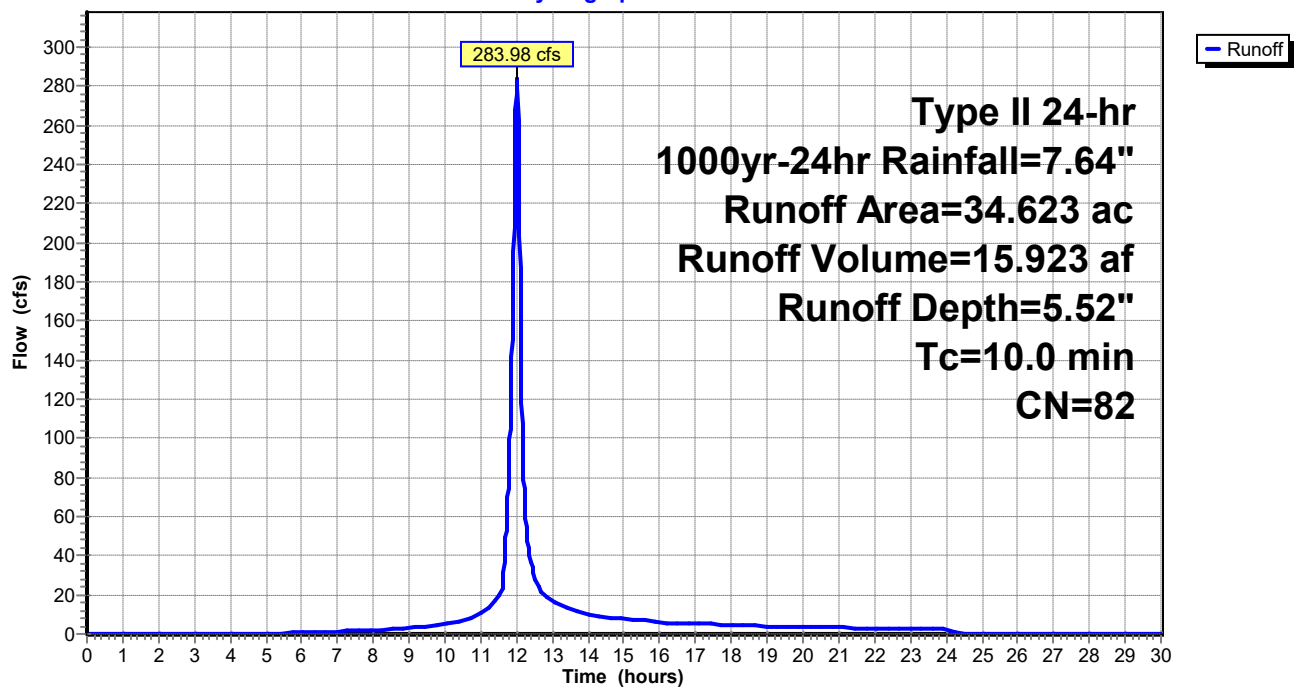
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs
Type II 24-hr 1000yr-24hr Rainfall=7.64"

Area (ac)	CN	Description
* 34.623	82	
34.623		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 66S: Minnkota FGD Cell 3

Hydrograph



Storm Water Model_2026

Type II 24-hr 1000yr-24hr Rainfall=7.64"

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Summary for Pond 66P: Cell 3 Pond

Inflow Area = 37.123 ac, 0.00% Impervious, Inflow Depth = 5.52" for 1000yr-24hr event
 Inflow = 304.20 cfs @ 12.01 hrs, Volume= 17.072 af
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.01 hrs

Starting Elev= 2,093.00' Storage= 646.546 af

Peak Elev= 2,093.58' @ 24.57 hrs Storage= 663.618 af (17.072 af above start)

Flood Elev= 2,098.00' Storage= 796.562 af (150.016 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	2,066.00'	858.609 af	Custom Stage Data Listed below

Elevation (feet)	Cum.Store (acre-feet)
2,066.00	0.000
2,066.01	8.773
2,066.51	17.536
2,068.00	23.698
2,070.00	66.615
2,072.00	110.520
2,074.00	155.423
2,076.00	201.331
2,078.00	248.254
2,080.00	296.201
2,082.00	345.179
2,084.00	395.199
2,086.00	447.873
2,088.00	503.225
2,090.00	559.670
2,092.00	617.217
2,094.00	675.875
2,096.00	735.654
2,098.00	796.562
2,100.00	858.609

Pond 66P: Cell 3 Pond

Hydrograph

