Sub Regional RTEP Committee: Western
Dayton d/b/a AES Ohio Supplemental Projects

April 16, 2021

Needs

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Need Number: Dayton-2021-003

Process Stage: Need Meeting 04/16/2021

Project Driver:

Operational performance

Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

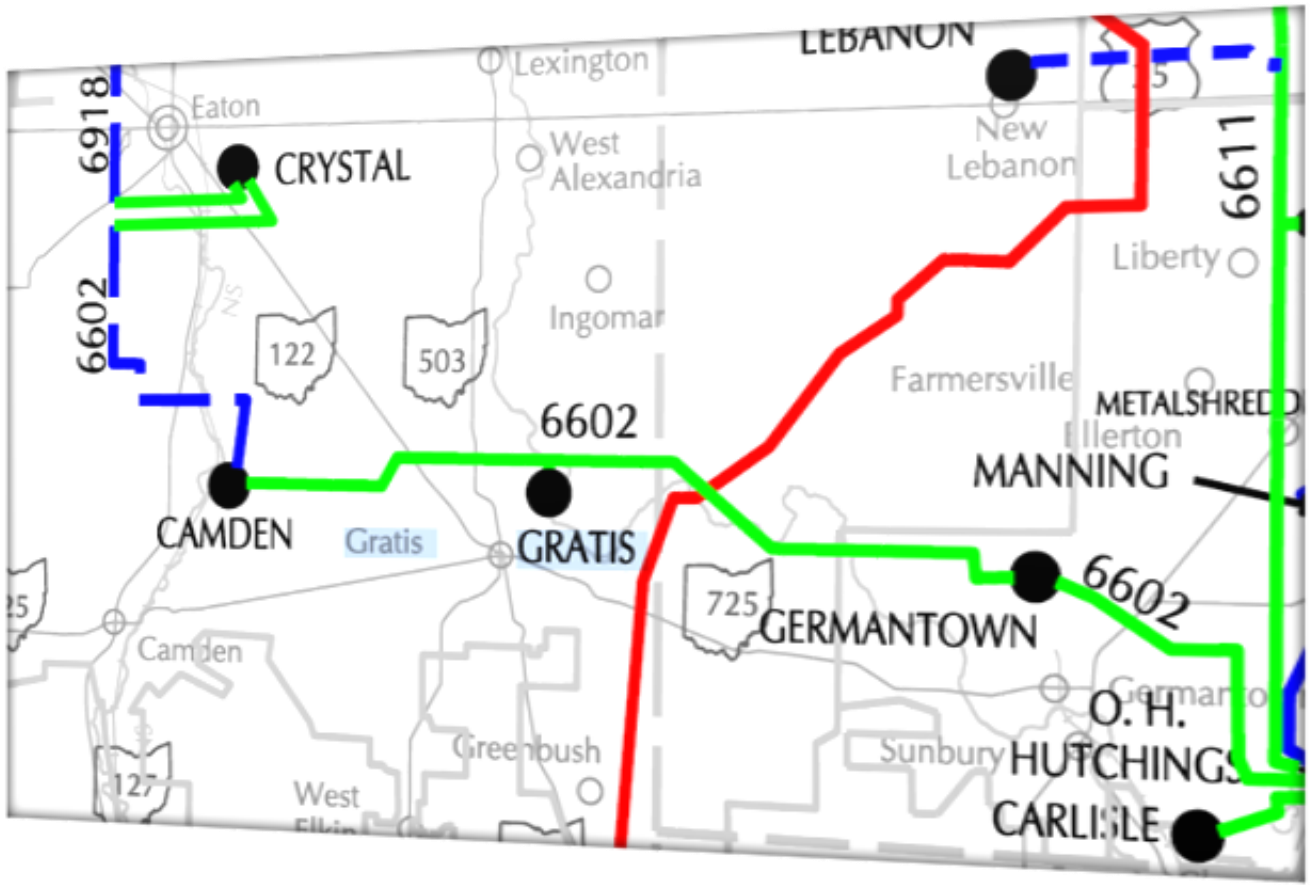
Problem Statement:

- The existing 30.88-mile 69kV transmission line (6602) from Hutchings-Germantown-Gratis-Camden-Crystal was primarily constructed using wood pole, cross-arm and brace design in 1964.

- This line provides transmission and distribution level service to 5 different substations serving approximately 11,500 customers in Montgomery and Preble Counties totaling approximately 33MW of load.
    - A fault occurring anywhere on this line will result in at least a temporary outage and possible permanent outage to all 11,500 customers.

-This line is one of the worst performing 69kV transmission lines in the Dayton zone.
- The line has experienced 25 outages (3 permanent and 22 momentary) since 2016.
- Equipment related issues are the primary cause of permanent outages on the line and weather has been the primary cause of momentary issues.

-There are two existing automatic sectionalizing switches at Germantown to help reduce outage time, but the switches have not operated reliably during outage conditions due to alignment issues and the switches are not centrally located on the circuit.



Solutions

Stakeholders must submit any comments within 10 days of this meeting in order to provide time necessary to consider these comments prior to the next phase of the M-3 process

Dayton Transmission Zone M-3 Process
Northwest Dayton Zone

Need Number: Dayton-2020-005

Process Stage: Solution Meeting 04/16/2021

Previously Presented: Need Meeting 03/19/2020

Supplemental Project Driver(s):

Requested customer upgrade, Operational performance

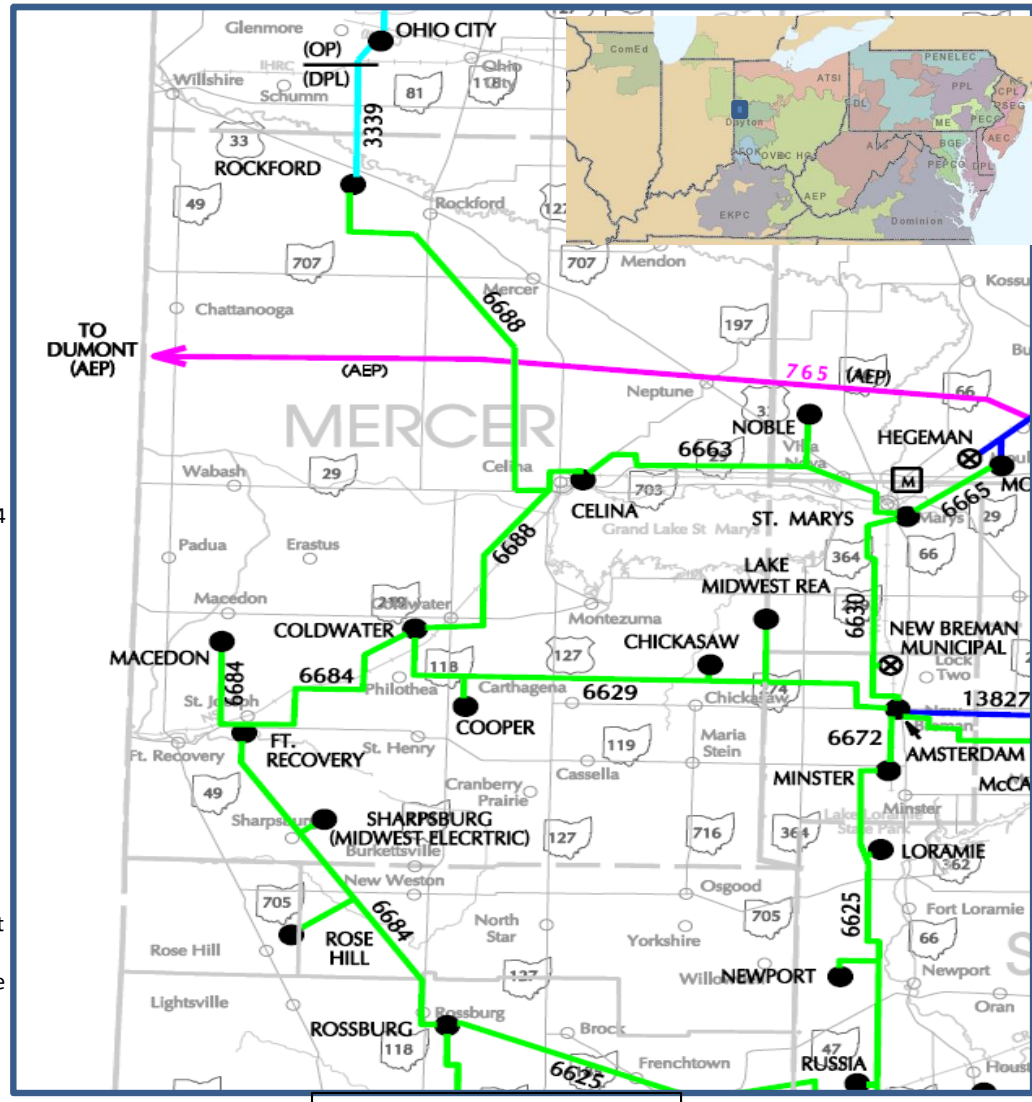
Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

The NW portion of the Dayton transmission system has experienced several real-time performance events over the last 5 years as a result of aging infrastructure and legacy system design.

- The Coldwater to Rossburg 69kV line (6684) is ~28 miles long and was built in 1967 with wood poles.
  - The line provides transmission and distribution service to 4 tapped substations including 1 Dayton delivery point and 3 cooperative delivery points. The line serves approximately 3,500 customers representing approximately 30 MW of peak load.
  - This line has experienced 8 permanent outages and 23 momentary outages in the last 3 years. The most common outage cause was equipment failures, particularly on the Macedon tap and between Sharpsburg and Rose Hill.
  - DP&L has a related project in the vicinity, s0327, which would help provide a source into the NW system on the Coldwater -Rossburg 6684 line.
- The Celina-Coldwater-Rockford 69kV line (6688) is ~23 miles long and was constructed in 1990 with wood poles and crossarm design.
  - The 6688 line provides service to 2 delivery points, serving approximately 1,900 customers and 12 MW of peak load.
  - This line has experienced 10 permanent and 12 momentary outages since 2016, with the primary causes being equipment failure and weather.
  - Dayton has a normally open 33kV tie (3339) with Ohio Power at Rockford Sub that is built to 69kV standards. This is an out of phase tie point and can only be closed if the 12kV Rockford bus is de-energized and 3339 line is energized from Ohio Power. Since this is a normally open point, the Rockford load is radial under most operating conditions since a manual process must take place to switch the load to the Ohio Power source if there is an issue with the Celina-Coldwater-Rockford 6688 69kV line.
  - The Rockford Substation is one of the most remote areas on the Dayton system and lacks nearby sources.
- The Amsterdam-Coldwater 69kV line (6629) is ~17 miles long and was constructed in 1991 with wood poles and crossarm design.
  - The line provides transmission and distribution service to 3 tapped substations including 1 Dayton delivery point and 2 cooperative delivery points. The line serves approximately 3,500 customers representing approximately 18 MW of peak load.
  - This line has experienced 6 permanent outages and 8 momentary outages since 2016. The most common outage causes were equipment failures and weather.
- DP&L provides 69kV service to the City of Celina from a very small 69kV switching station. This legacy design has a single point of failure that has become problematic for equipment maintenance and outages.
  - The peak load for the City of Celina is ~43 MW.
  - A bus or line fault on Celina's system interrupts both of the 69kV deliveries to Celina.
  - Due to the size of the switching station, there is very limited ability to expand or improve the configuration.



Potential Solution Slide

Dayton Transmission Zone M-3 Process
Northwest Dayton Zone

Need Number: Dayton-2020-005

Process Stage: Solutions Meeting 3/19/2021

Proposed Solution:

Rockford Substation: In coordination with AEP, DP&L will retire the Rockford 69/34.5kV transformer and construct a new 69kV three breaker ring configuration to close in this normally open tie at 69kV in the future.

Estimated Transmission Cost: $3.6M, ISD 12/01/2025

Celina – Coldwater – Rockford 69kV: Rebuild 2.5 miles of the existing 69kV line to double circuit and construct of 1.0 mile of new 69kV line to reroute the Celina – Coldwater - Rockford 69kV extension into the relocated Celina 69kV substation.

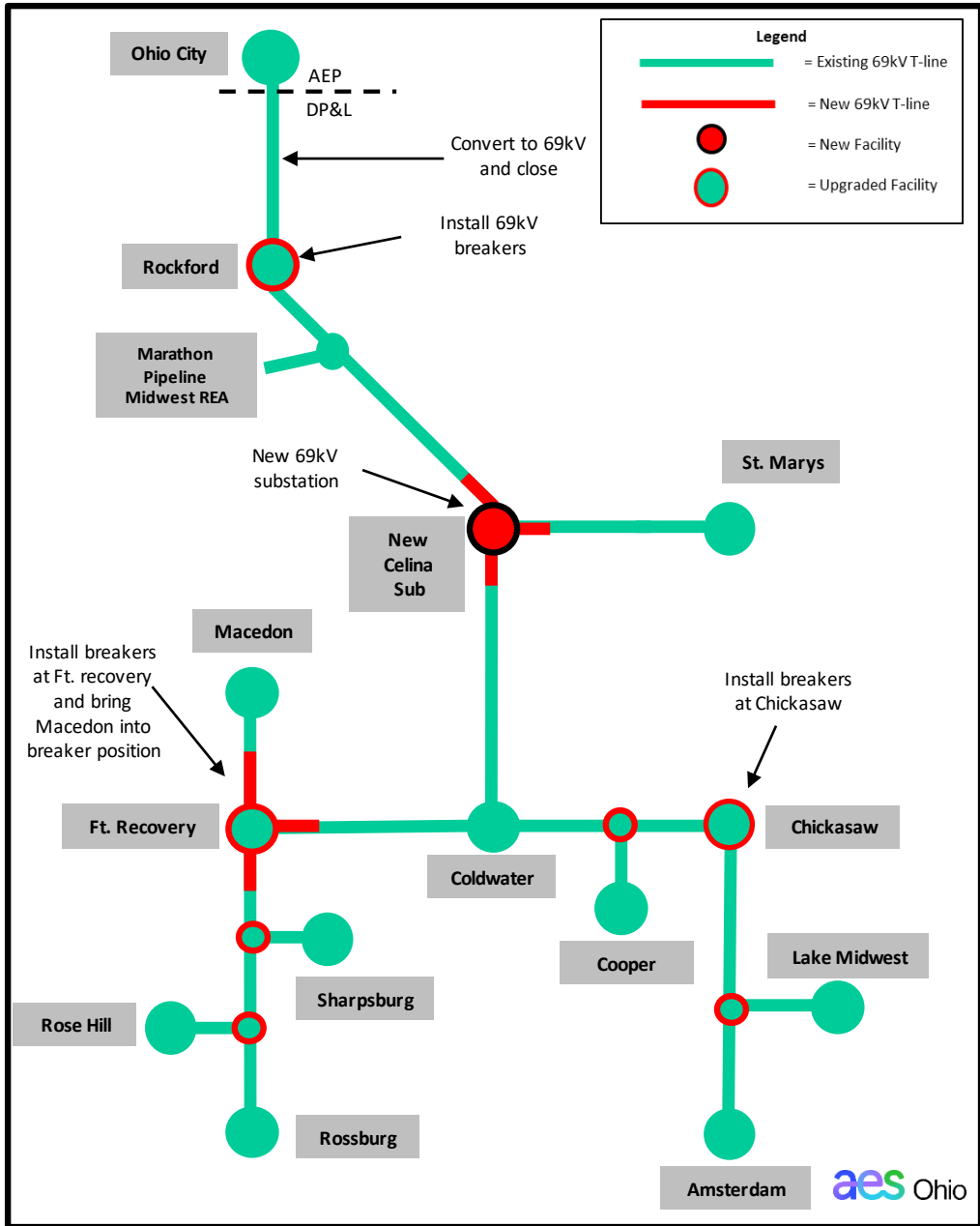
Estimated Transmission Cost: $6.3M, ISD 12/01/2025

Celina Substation: Retire the existing Celina 69kV substation due to condition and the limitations to expand at the current location. Establish a new 69kV breaker and one-half configuration and two new 69kV capacitor banks at a new substation located on the western edge of Celina. The associated breaker and one-half configuration will reduce the total line exposure, eliminate the three-terminal line arrangement, and provide localize reactive compensation to the Celina load.

Estimated Transmission Cost: $10.2M, ISD 12/01/2025

Chickasaw Circuit Breaker (6629): Circuit breakers will be installed at Chickasaw Substation to decrease the exposure on the Amsterdam-Coldwater 69kV 6629 line to improve reliability.

Estimated Transmission Cost: $5.0M, ISD 12/31/2025



Potential Solution Slide

Ft. Recovery Sub & 6684: 69kV circuit breakers will be installed at Ft. Recovery Substation to decrease the exposure on the line to improve reliability. The tap to Macedon will be brought into a breaker position within Ft. Recovery which will further decrease exposure on the system. This will require rebuilding approximately 0.15 miles of 69kV line as double circuit into the sub. The capacitor proposed as part of s0327 will be installed at Ft. Recovery as 2-15MVAR cap banks. The Ft. Recovery-Jay line and transformer (s0327, s0328) will be delayed until 12/31/2025.
Estimated Transmission Cost: $3.5M, ISD 12/31/2025

Sharpsburg, Rosehill, Cooper, & Lake Sectionalizing
New automatic 69kV MOABs switches with supervisory control will be installed at each delivery point to reduce local area interruptions during outage conditions on their associated circuits.
Estimated Transmission Cost: $2.5M, ISD 12/31/2023

Total Estimated Transmission Cost: $31.1M

Alternatives Considered:
Alternative #1: In lieu of relocating the Celina substation, expand the existing Celina substation to a four-breaker ring with cap banks sharing breaker positions with Celina deliveries, and rebuild the 1.5 miles of the Celina – Coldwater 69kV line to loop in and out of the expanded substation. This option was determined to be unfeasible due to site limitation of the existing Celina substation which sets directly between a rail line, a city street, and other infrastructure.

- **Estimated Transmission Cost: $28.35M**

Other Area Considerations: The proposed solution is focused on improving the foundational area design and sectionalization. Improved sectionalizing will enhance reliability by decreasing exposure to outages and providing more operational switching capability in the local network. More extensive line rebuilds may still be required in the future but these core sectionalizing improvements are needed to minimize the impact of outages, allow for system maintenance, and provide switching capability at several key area substations and delivery points.

Projected In-Service: 12/31/2025
Project Status: Conceptual
Model: 2020 RTEP – 2025 Summer Case

Appendix

High Level M-3 Meeting Schedule

Assumptions

Activity	Timing
Posting of TO Assumptions Meeting information	20 days before Assumptions Meeting
Stakeholder comments	10 days after Assumptions Meeting

Needs

Activity	Timing
TOs and Stakeholders Post Needs Meeting slides	10 days before Needs Meeting
Stakeholder comments	10 days after Needs Meeting

Solutions

Activity	Timing
TOs and Stakeholders Post Solutions Meeting slides	10 days before Solutions Meeting
Stakeholder comments	10 days after Solutions Meeting

Submission of Supplemental Projects & Local Plan

Activity	Timing
Do No Harm (DNH) analysis for selected solution	Prior to posting selected solution
Post selected solution(s)	Following completion of DNH analysis
Stakeholder comments	10 days prior to Local Plan Submission for integration into RTEP
Local Plan submitted to PJM for integration into RTEP	Following review and consideration of comments received after posting of selected solutions

Revision History

4/2/2021 – V1 – Original version posted to pjm.com