Submission of Supplemental Projects for Inclusion in the Local Plan

Dayton Local Plan-2023

Dayton Transmission Zone M-3 Process

Need Number: Dayton-2021-010

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/7/2023

Previously Presented: Need Meeting 08/16/2021

Solution Meeting 08/19/2022

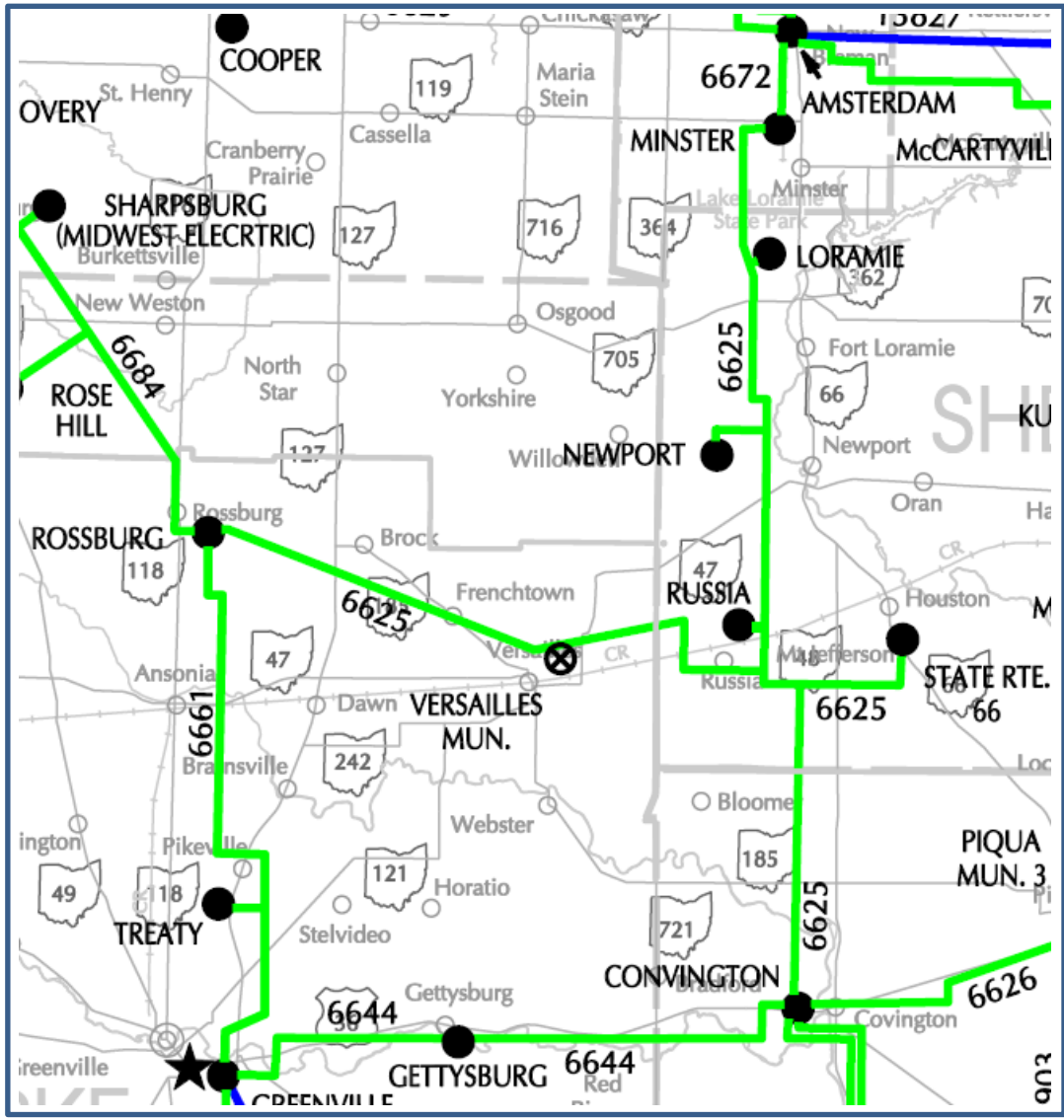
Project Driver: Requested Customer Upgrade, Operational Performance

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- The Village of Versailles has requested additional sectionalizing improvements to improve local delivery point reliability. Currently Versailles' peak load totals to 16.5MWs and is served via two-way 69kV MOABs switch arrangement.
- Presently, Versailles is the largest served via the 42-mile 69kV transmission circuit and are projected to increase to 17.6 MWs by 2025.
- Also, Buckeye Electric cooperatives served at Newport (peak load of 6.3MWs) and St. Rt. 66 (peak load of 6.2MWs) have delivery points along this line.
- AES Ohio serves distribution via the Loramie (peak load of 8.5MWs) and Russia (peak load of 3.2MWs) Substations.
- The existing 42 mile 69kV transmission line (6625) from Covington-Minster-Rossburg was constructed using wood pole, cross-arm and brace design in 1971. This line provides transmission and distribution level service to 6 different substations serving nearly 7,000 customers in Darke, Mercer, Miami, and Shelby Counties in Ohio and totaling approximately 40MWs of load.
- Since 2016, the line has experienced 41 outages (11 permanent and 30 momentary), with a total outage duration of ~6,400 minutes. A vast majority of the permanent outages were equipment related issues while most of the momentary outages have been the result of weather.
- Additionally, in 2020 AES Ohio committed to a local area upgrade (Russia 4-breaker ring: S2254). This project also targets to minimize impacts associated with 6625 circuit outages by splitting the 42 miles 69kV circuit into three 69kV circuits:
  - Rossburg – Versailles - Russia: 12.0 miles
  - Minster – Russia: 13.0 miles
  - Covington – Russia: 17 miles
- There is a need here to further evaluate the condition and sectionalizing improvements along 6625 after the Russia 4-breaker ring is complete in 2023 for more localized sections of this line where cross-arm and tap design is prevalent.

Model: 2021 RTEP Series, 2026 Summer Case



Dayton Transmission Zone M-3 Process

Need Number: Dayton-2021-010

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 2/7/2023

Previously Presented: Need Meeting 08/16/2021

Solution Meeting 08/19/2022

Project Driver: Requested Customer Upgrade, Operational Performance

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Proposed solution:

Russia – Minster 69kV Line Rebuild: Rebuild and reconductor the 13-mile 69kV line from Russia – Minster utilizing 1351 AAC conductor and ductile iron poles. This project will directly improve one of the worst performing circuits in the AES Ohio footprint. This rebuild along with other area improvements will greatly reduce both permanent and momentary outages to the co-op delivery points along this line and will help improve the reliability area by reinforcing this important south to north 69kV corridor on the AES Ohio system. **(S2809.1)**

Estimated Transmission Cost: $18.2M, ISD 12/31/2026

Russia – Covington 69kV Line Rebuild: Rebuild and reconductor the 14-mile 69kV line from Russia - Covington. Like above, this project will reinforce a historic poor performing circuit and reduce permanent and momentary outages to customers served in this area. Replacing the wood pole cross-arm and brace design with ductile iron poles will significantly improve reliability for the customers served from this line. **(S2809.2)**

Estimated Transmission Cost: $19.6M, ISD 6/1/2027

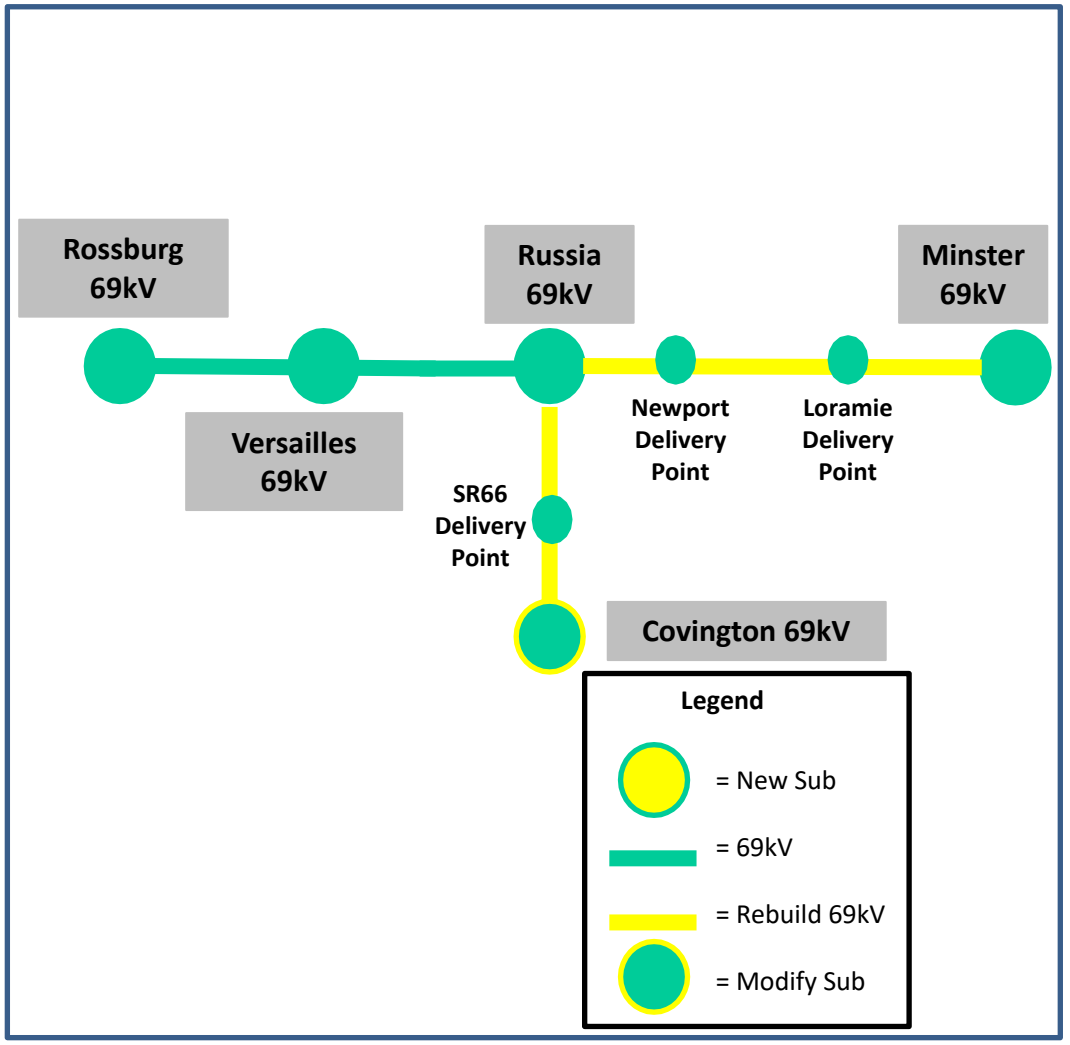
Covington Substation: Replace 5 - 1940's era oil breakers, relaying, and establish another 69kV bus tie for operational flexibility. These breakers have experienced operational issues and should also be replaced at the time of the rebuild to ensure modern relaying is in place which will also help improve area reliability**. (S2809.3)**

Estimated Transmission Cost: $3M, ISD 6/1/2027

Total Estimated Transmission Cost: $40.8M

Project Status: Conceptual

Supplemental Project ID: S2809.1-.3



Model: 2022 RTEP Series, 2027 Summer Case

Need Number: Dayton-2022-007

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 4/21/2023

Previously Presented: Need Meeting 10/14/2022

Solution Meeting 11/18/2022

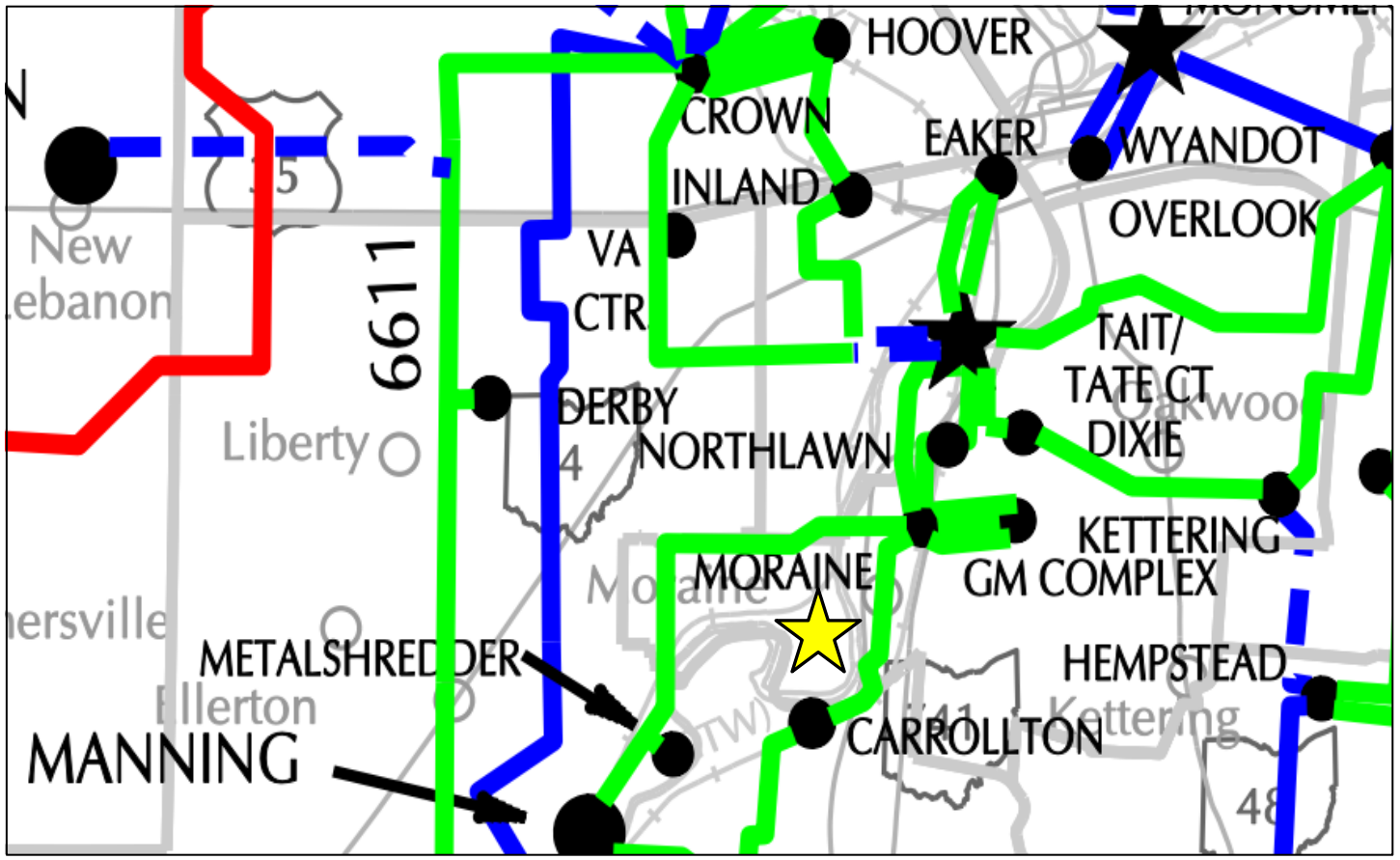
Project Driver: Customer Request

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- An industrial customer served from the Moraine Substation intends to add 40 MW of load in 2024.

Model: 2022 RTEP Series, 2027 Summer Case



Dayton Transmission Zone M-3 Process

Need Number: Dayton-2022-007

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 4/21/2023

Previously Presented: Need Presented, 8/19/2022
Solution Meeting 12/6/2022

Project Driver: Customer Request

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Proposed Solution:

- Southtown Substation: Install an additional 69kV breaker at Southtown Sub to facilitate the installation of a third 69/12kV transformer.

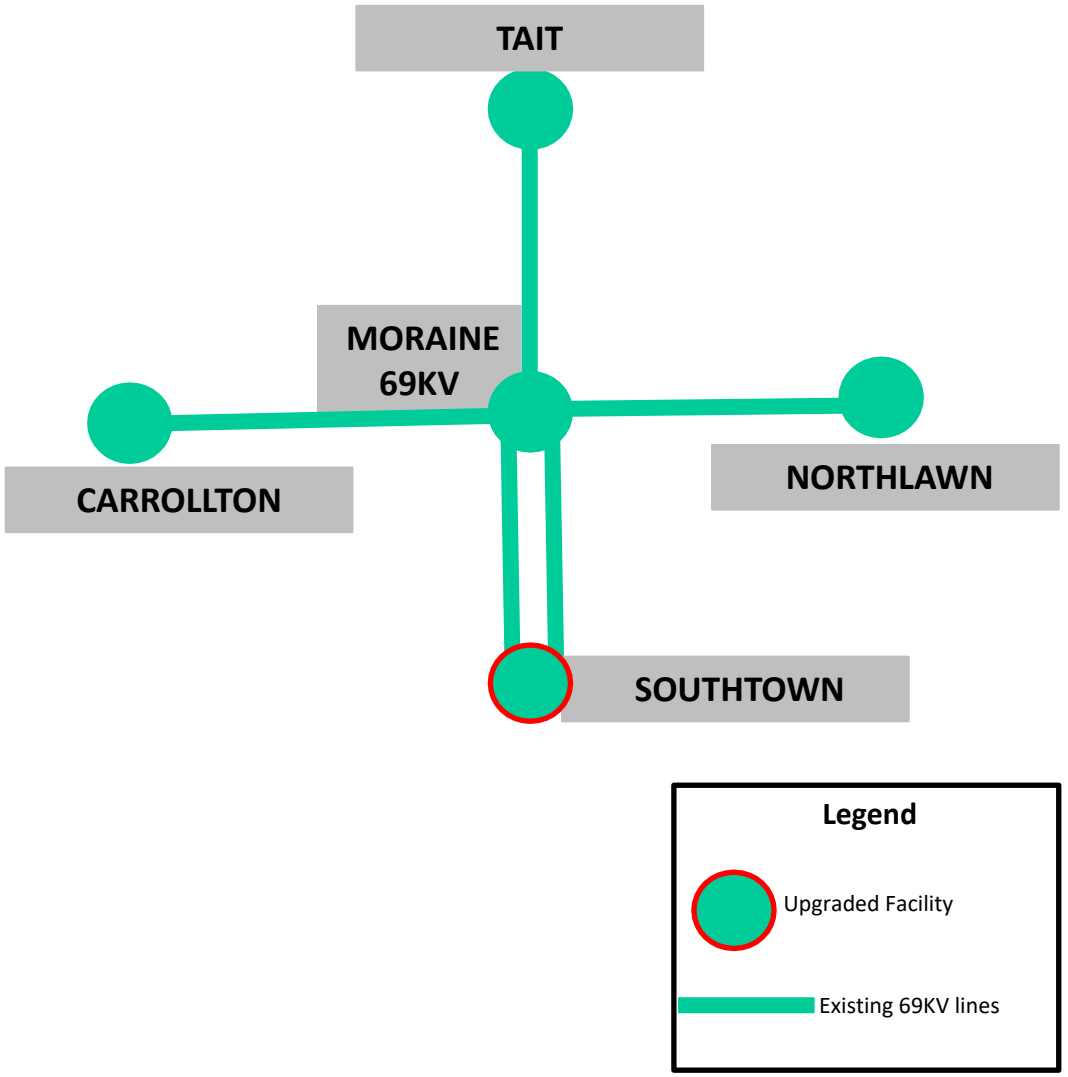
Estimated Transmission Cost: $0.1M, ISD 1/1/2024

Total Estimated Transmission Cost : $0.1 M

Project Status: Conceptual

Supplemental Project ID: s2847

Model: 2022 RTEP Series, 2027 Summer Case



Dayton Transmission Zone M-3 Process

Need Number: Dayton-2022-004

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 4/21/2023

Previously Presented: Need Meeting 8/19/2022

Solution Meeting 12/6/2022

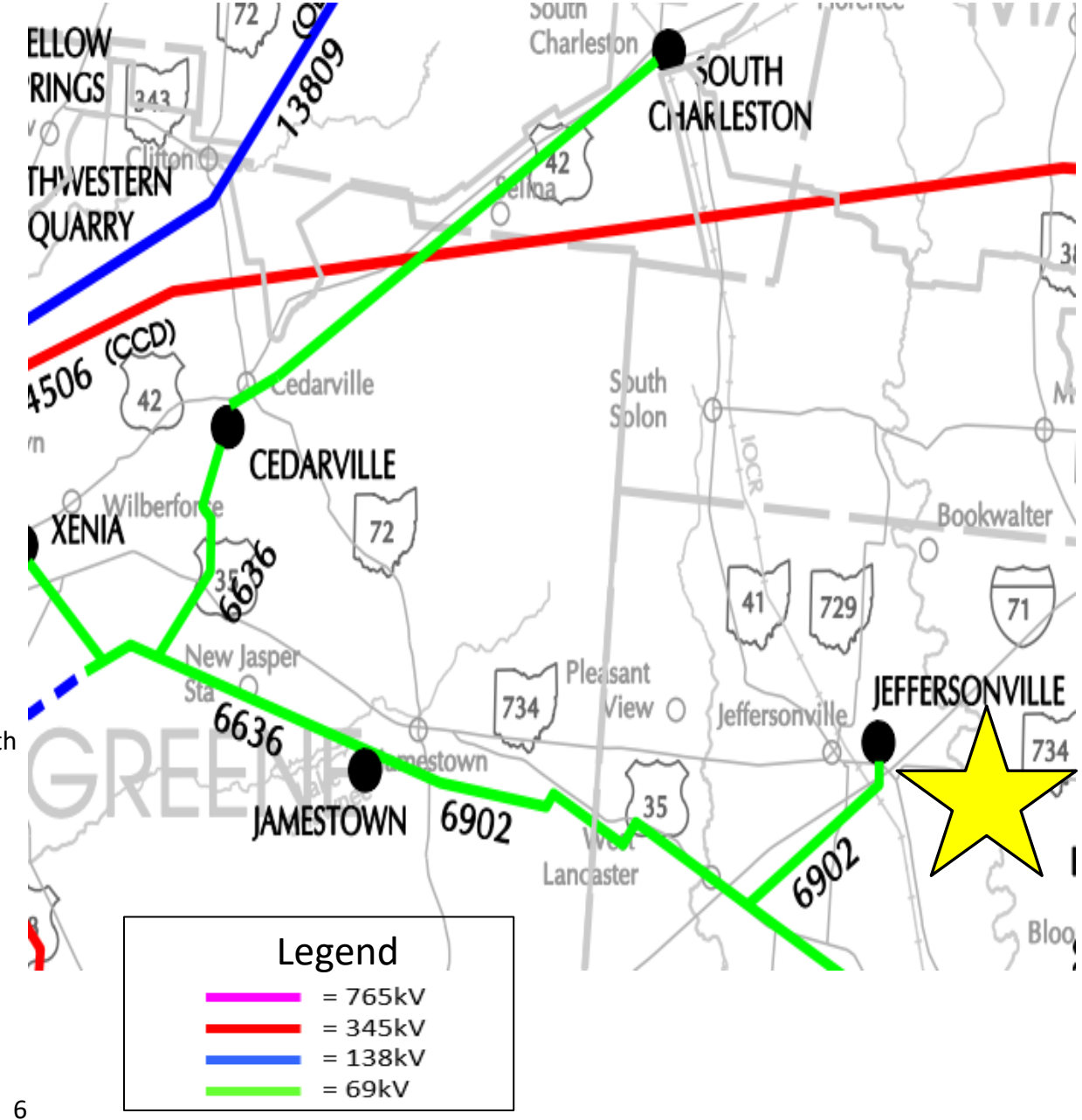
Project Driver: Customer Request

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- AES has received multiple large industrial customer requests for service in the Jeffersonville area.
- Total load requests have ranged from 100MW to several hundred megawatts
- Presently, Jeffersonville has certified 2,000-acres for industrial development with over 250 acres currently under option by customers.
- AES projects the site will be capable of supporting over 1,000 MWs of new manufacturing related load based upon the total number and size of customer requests.
- AES currently has a supplemental project, S0323, that proposes to build a 69kV line from South Charleston – Jeffersonville. AES believes that the magnitude of the load requests in the area exceed the capabilities of the existing project.

Model: 2021 RTEP Series, 2026 Summer Case



Dayton Transmission Zone M-3 Process

Need Number: Dayton-2022-004
Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 4/21/2023
Previously Presented: Need Presented, 8/19/2022
Solution Meeting 12/6/2022
Project Driver: Customer Request
Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Proposed Solution:

- **Fayette Substation:**
  - The newly established Fayette Substation will serve as the primary source for the Jeffersonville area and will step service down from 345kV to 138kV and 69kV. This substation is located central to the largest developing load center in the AES Ohio area supporting the electric vehicle manufacturing industry developing in the area. The new substation called Fayette will have a breaker and half 345kV design, two 345/138kV 450MVA transformers, a breaker and half 138kV design, a 138/69kV 200MVA transformer, 138kV capacitor, and 69kV feed to a new Panther Substation. A 0.25-mile 138kV extension will span from AES's Fayette Substation to a 138kV delivery point to serve the first 140MW development**. Estimated Transmission Cost: $33.9M, ISD 8/1/2024 (s2853.1)**
- **Madison-Fayette 1 & 2 345kV Lines*:**
  - AES will construct a 13-mile double circuit 345kV line from Madison to Fayette Substation utilizing bundled 1024.5 ACAR 30x7 conductor. The new 345kV transmission lines will provide the primary feed into the new Fayette Substation and Jeffersonville, Ohio region which will be the primary load center between Dayton, Cincinnati, and Columbus, Ohio.
  Estimated Transmission Cost: $51.2M, ISD 8/1/2024 (s2853.2)
- **Madison Substation*:**
  - AES will establish a new 3-bay breaker and half 345kV substation at Madison. Madison plays a critical role in sourcing the emerging load center while also improving reliability by looping present day radial loads at Cedarville, Jeffersonville, and South Charleston. The Madison Substation will have a single 345/69kV transformer and will have 4-345kV line exits**. Estimated Transmission Cost: $27M, ISD 8/1/2024 (s2853.3)**
- **Jeffersonville 69kV Substation Relocation & Retirement:**
  - Retire the existing radial Jeffersonville Substation that is located in floodplain and not conducive to further expansion for an additional 69kV source. The retired substation will be replaced with a new 69kV looped substation called Panther. The new Panther Substation will have three 69/12kV 30MVA distribution transformers. The new Panther sub will be designed as a 69kV breaker and a half station. **Estimated Transmission Cost: $15.5M, ISD 12/31/2025 (s2853.4)**
- **6946 69kV Reroute & Extension*:**
  - Establish a new ~1.5-mile 69kV transmission line from Fayette Substation to Panther Substation using 1351 AAC conductor. Reroute and upgrade to 1351 AAC conductor approximately 5.5 miles of line from Panther Substation to Octa Substation.
  Estimated Transmission Cost: $17.5M, ISD 12/31/2025 (s2853.5)

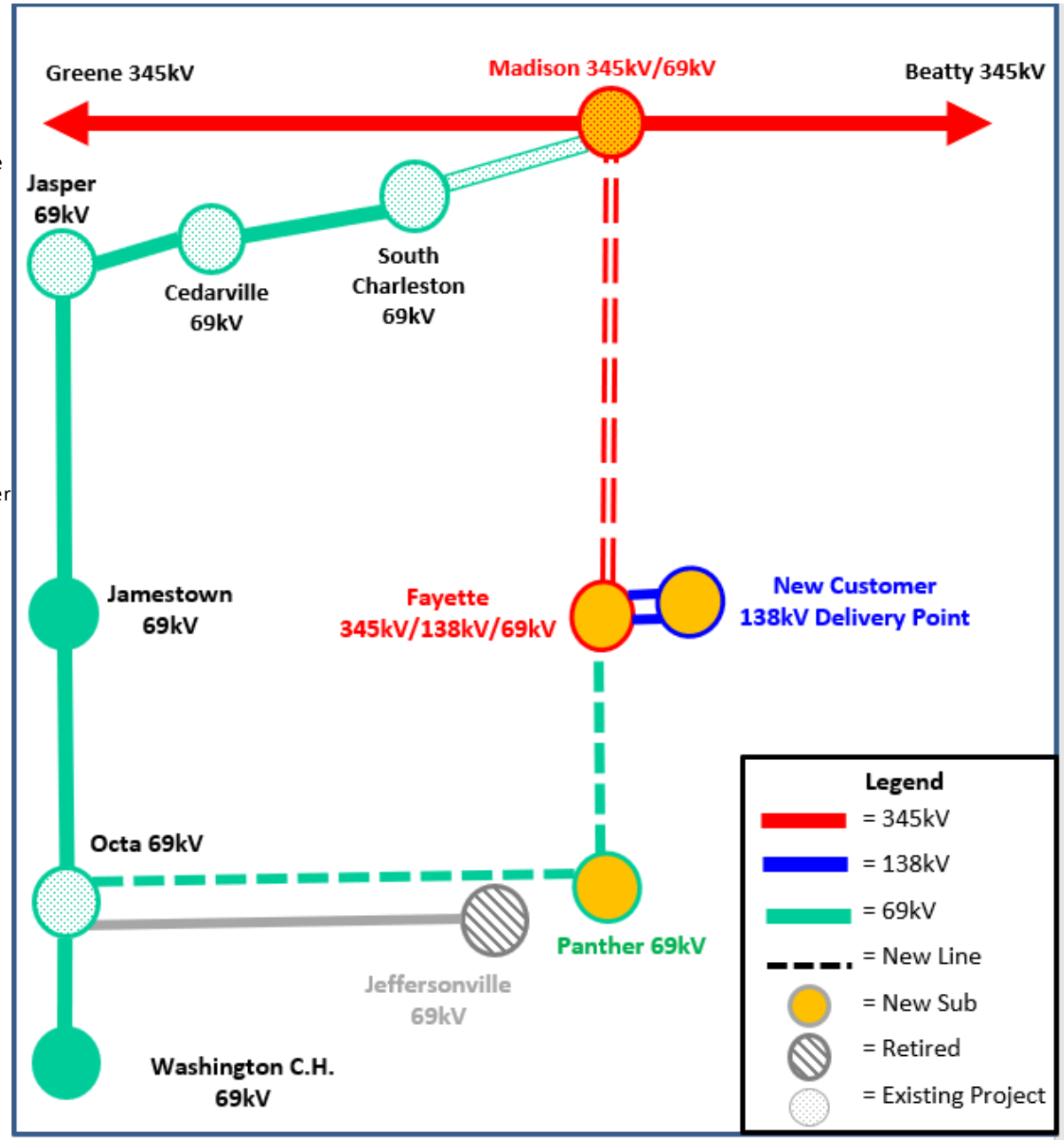
Total Cost : $145.10M

*Approximately $10M of this Solution will take the place of Supplemental Projects s0322 and s0323. The previous projects were scoped primarily to loop radial load and not serve major development.

Alternatives Considered:

- Madison 345/138kV Transformer & Madison-Fayette 1&2 138kV Lines
  Estimated Total Transmission Cost: $120.9M, ISD 8/1/2024
  Not selected due to putting primary transformation 12 miles from load center.
- Madison-Fayette 345kV Line & N. Wilmington 345kV line:
  Estimated Total Transmission Cost: $196.4M, ISD 8/1/2024
  Not selected due to higher cost.

Project Status: Conceptual
Supplemental Project ID:s2853.1-.5



Model: 2022 RTEP Series, 2027 Summer Case

Need Number: Dayton-2023-001

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Meeting 2/17/2023

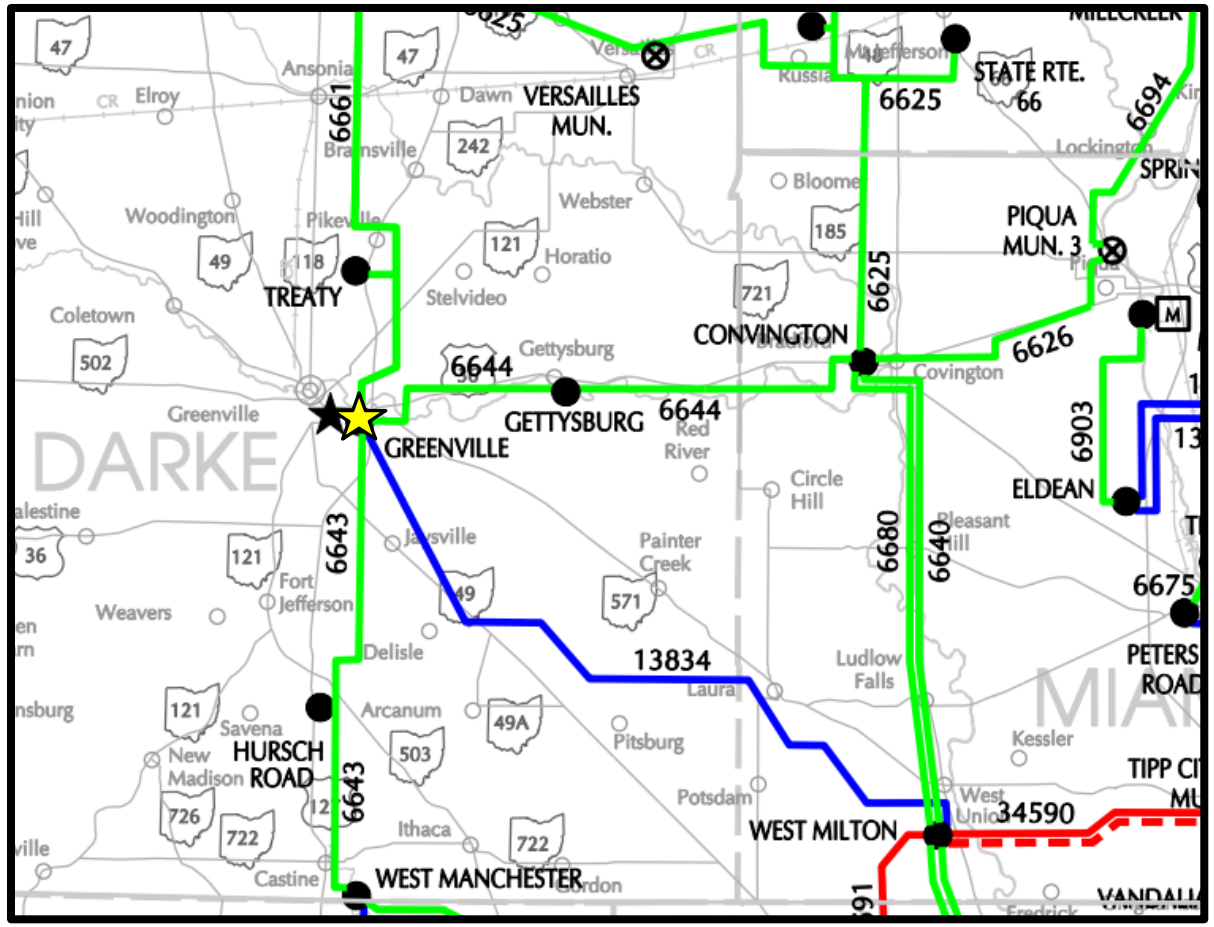
Solution Meeting 4/21/2023

Project Driver: Operational Flexibility and Efficiency

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- Dayton and PJM planning have worked on local stability studies and identified an issue with the clearing time associated with certain Greenville 69kV circuit breakers.
- Critical clearing times for faults at Greenville 69kV resulting in additional loss of Greenville-West Milton 138kV and Greenville 69/12kV Bk-3 is approximately 6.5 cycles.
- The current breakers at Greenville are older oil breakers with a 7-cycle clearing time, Dayton's standard breaker is able to clear faults in 5 cycles.



Need Number: Dayton-2023-001

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Presented, 2/17/2023
Solution Meeting, 04/21/2023

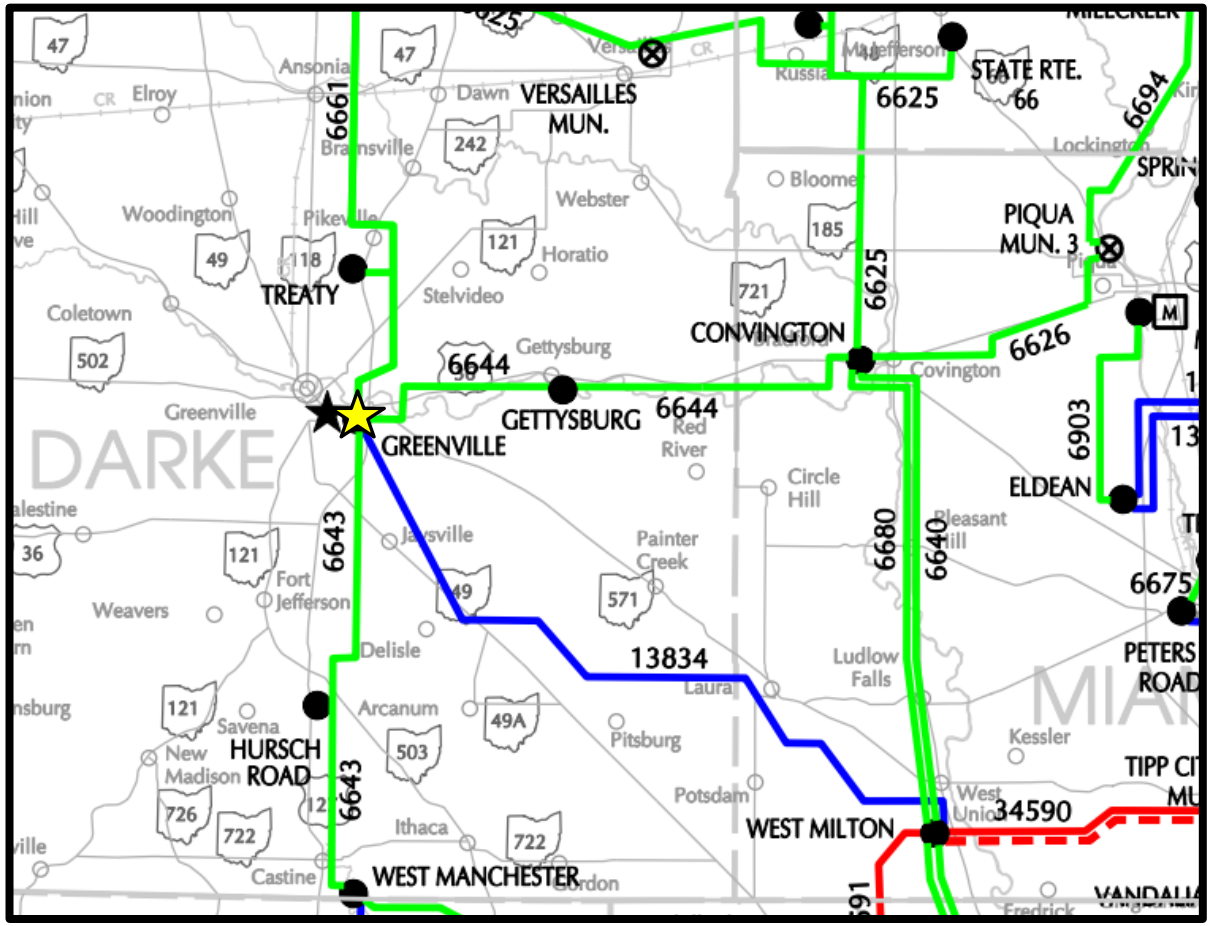
Project Driver: Operational Flexibility and Efficiency

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Selected Solution:

- **Breaker Replacement:**
  - Replace Greenville 69/12kV Bk-3 Breaker
- **Total Estimated cost :** $350k
- **Projected In-Service:** 12/31/2025
- **Project Status:** Conceptual
- **Supplemental Project ID**: s2940

- **Alternatives Considered:** No alternatives considered due minimal scope and cost of selected solution.



Model: 2022 RTEP – 2027 Summer Case

Need Number: Dayton-2022-006

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Presented, 9/16/2022
Solution Meeting, 03/17/2023

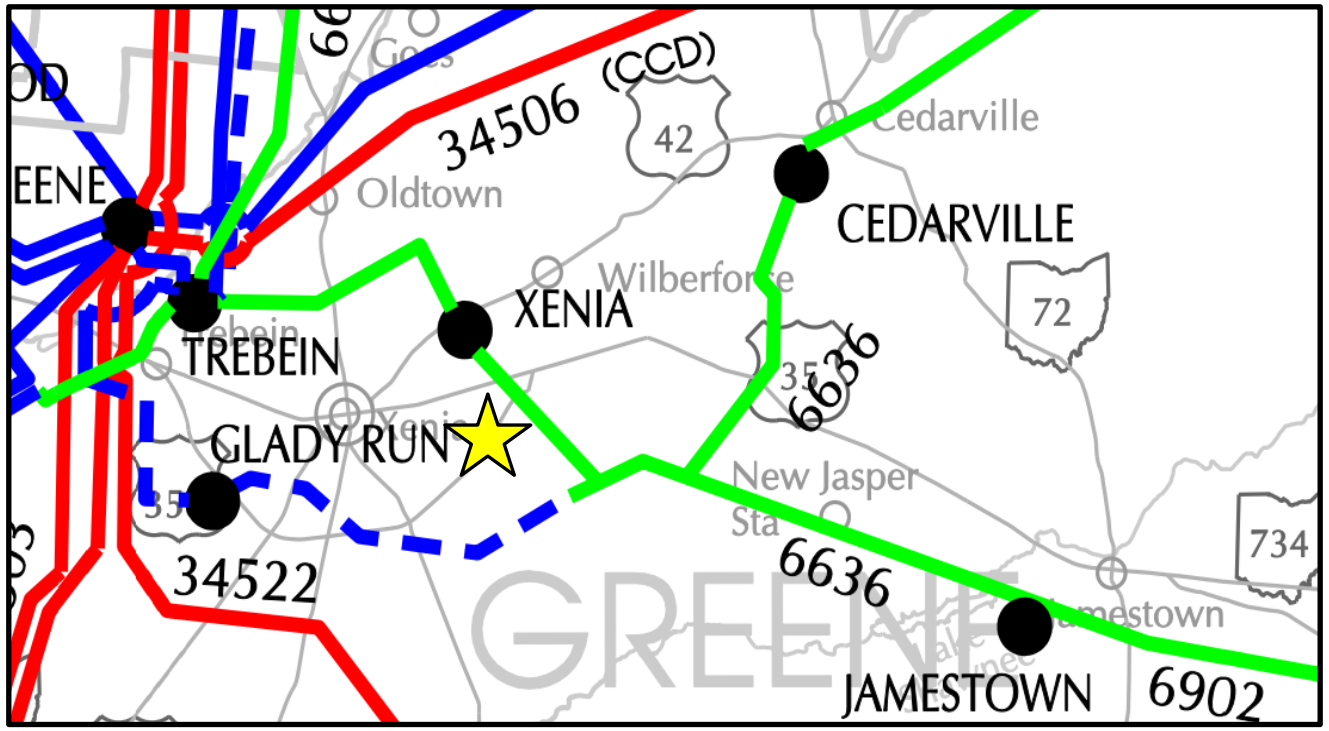
Project Driver: Customer Service

Specific Assumption Reference:
Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- AES has received a customer request to establish a new interconnect in the vicinity of Xenia substation
- Total MW load request, associated timelines & load totals

In-Service Date	Total New Connected Load
2022	1
2023	5.5
2026	11



Model: 2022 RTEP Series, 2027 Summer Case

= 345kV
= 138kV
= 69kV

Need Number: Dayton-2022-006

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Presented, 9/16/2022
Solution Meeting, 03/17/2023

Project Driver: Customer Service

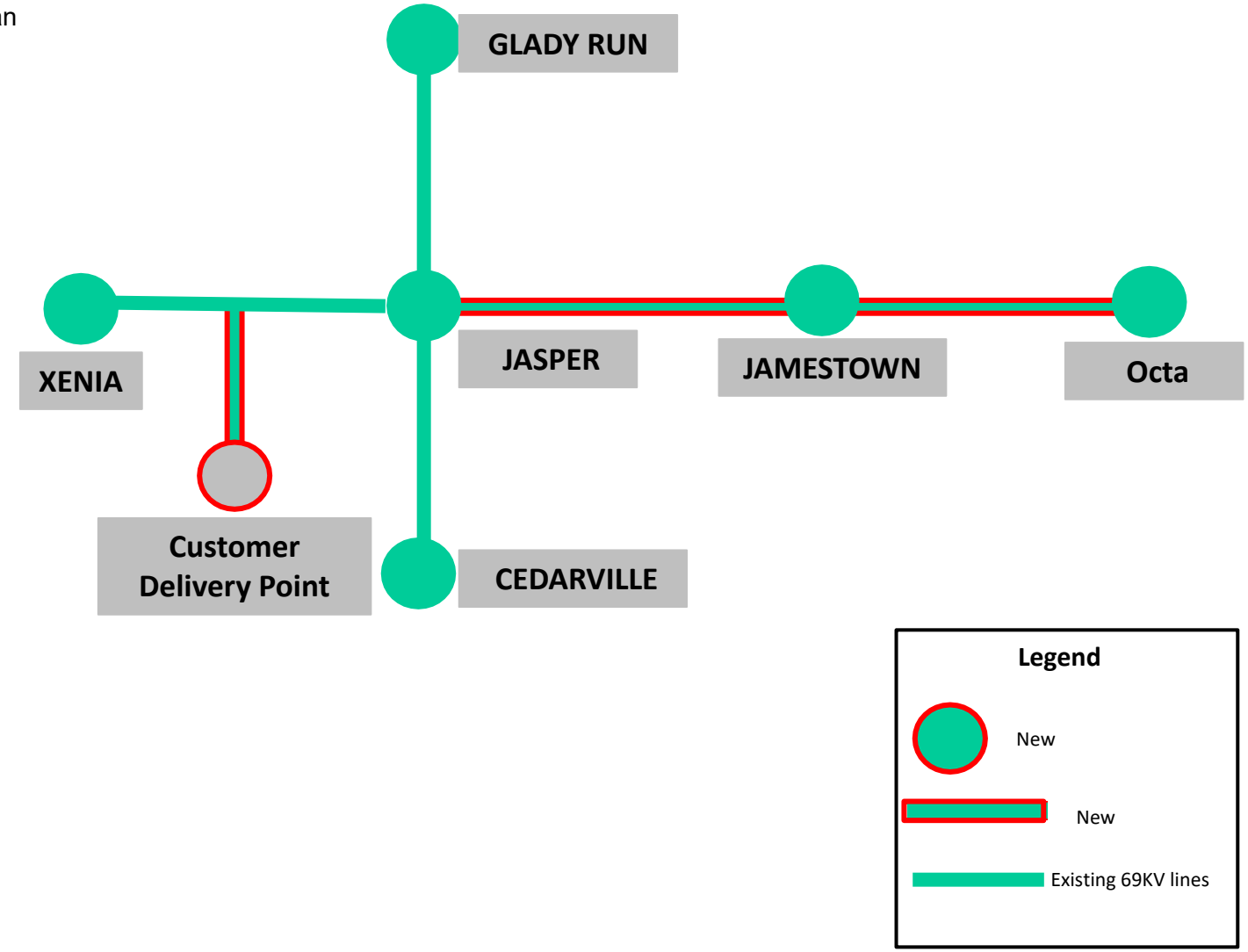
Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Selected Solution:

- **Customer Delivery Point Extension:**
  - Establish a new 69kV delivery point with auto sectionalizing motor operated air brake switches, extend a 0.4-mile 69kV single circuit extension off the Xenia – Jasper 69kV transmission line.

  Estimated Cost : $1.1 M, ISD 12/31/2023 (s2939.1)
- **Jasper-Octa Reconductor:**
  - Reconductor the 15.8-mile section of 2/0 conductor with 795 ACSR to improve capacity in the area.

  Estimated Cost : $6.0 M, ISD 12/31/2026 (s2939.2)
- **Total Estimated Transmission Cost :** $7.1 M
- **Projected In-Service:** 12/31/2026
- **Project Status:** Conceptual
- **Supplemental Project IDs**: s2939.1, s2931.2
- **Alternatives Considered:**
  - Direct Feed from new breaker position at Xenia Substation - $22.1M



Model: 2022 RTEP – 2027 Summer Case

Need Number: Dayton-2023-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Presented, 2/17/2023

Solution Meeting, 05/19/2023

Project Driver: Equipment Material Condition, Performance and Risk; Operational Flexibility and Efficiency

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- Greenfield sub is currently a two-breaker substation that services two transmission lines (6662 and 6649) and two distribution delivery points
  - The existing breakers at Greenfield are legacy oil breakers from the 1950's that have a history of poor reliability
  - Currently a single breaker failure at Greenfield sub can result in the loss of one transmission line and service to both distribution delivery points
- AES Ohio's 6649 transmission line is 13.43-mile 69kV line built in 1967 with wood poles.
  - This line has a history of poor reliability
  - There have been a total of 10 permanent outages over the last 5 years
- AES Ohio's 6662 transmission line is 4.56-mile 69kV line built in 1967 with wood poles.

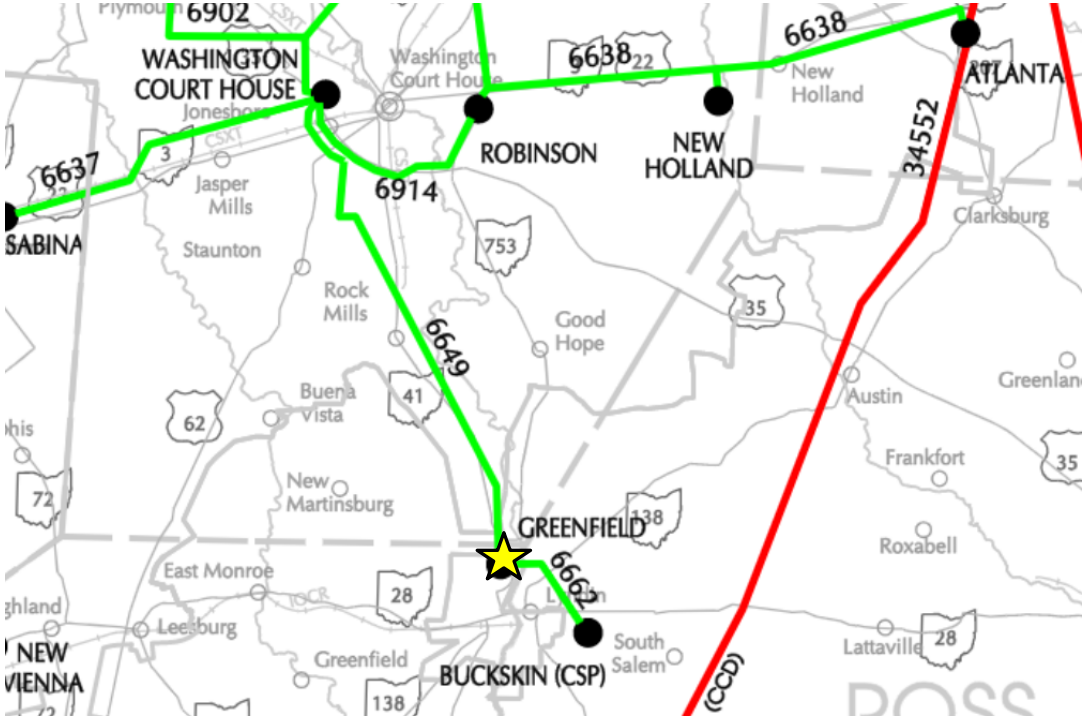


Figure 1 : Area Map

Model: 2022 RTEP – 2027 Summer Case

Need Number: Dayton-2023-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan

Previously Presented: Need Presented, 2/17/2023
Solution Meeting, 05/19/2023

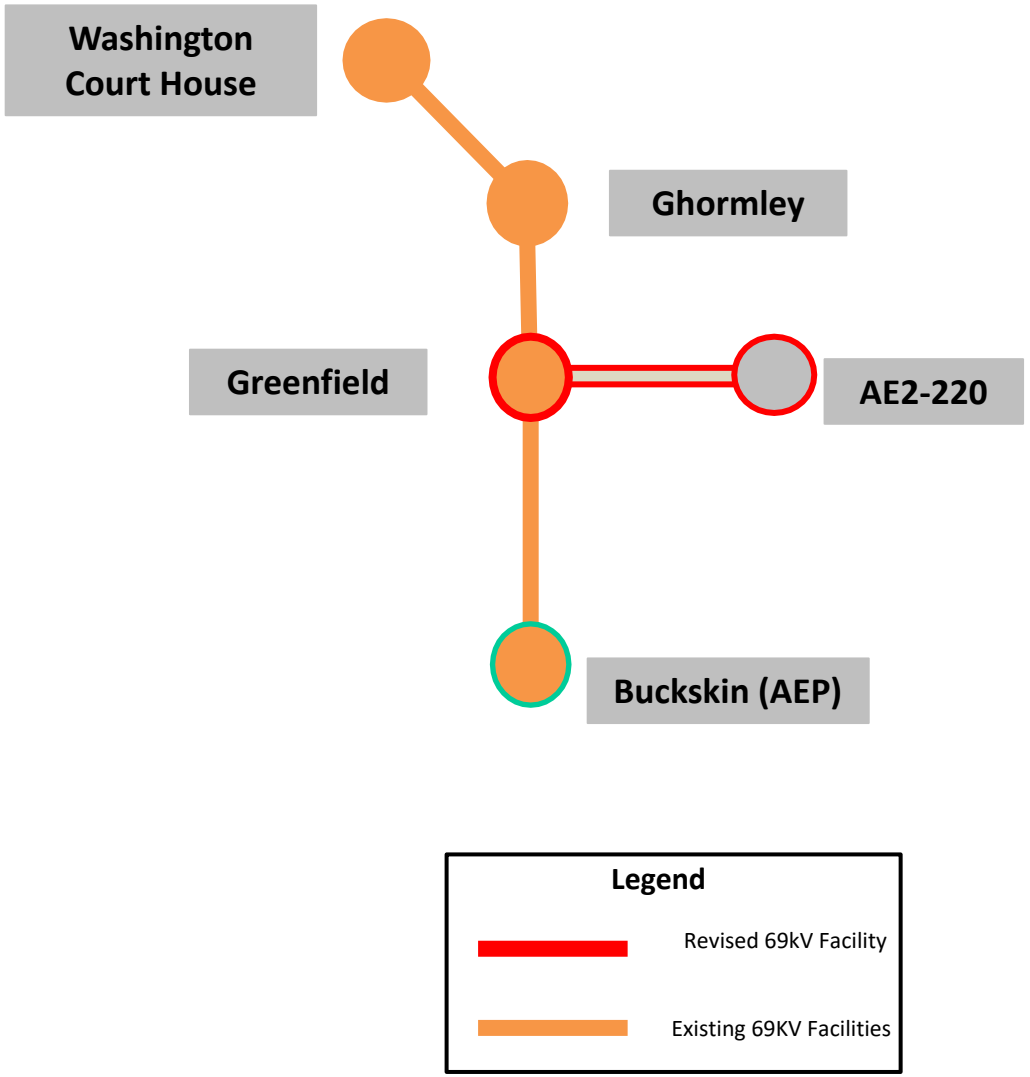
Project Driver: Equipment Material Condition, Performance and Risk; Operational Flexibility and Efficiency

Specific Assumption Reference: Dayton Local Plan Assumptions (Slide 5)

Selected Solution:

- **Greenfield Substation Expansion:**
  - AES will replace two (2) oil 69 kV breakers with gas breakers. AES will convert the sub from a single bus to a double bus with redundant ties, requiring the addition of 2 new 69kV breakers and reconfiguration of the bus.
  - This will be completed along side work required to interconnect AE2-220.
- **Total Estimated Transmission Cost :** $2.4 M
- **Projected In-Service:** 12/31/2026
- **Project Status:** Engineering
- **Supplemental Project ID**: s2972
- **Alternatives Considered:**
  - AE2-220 Scope only : Single Breaker connection to the substation would not address existing configuration and equipment needs which need addressed.

Model: 2022 RTEP – 2027 Summer Case

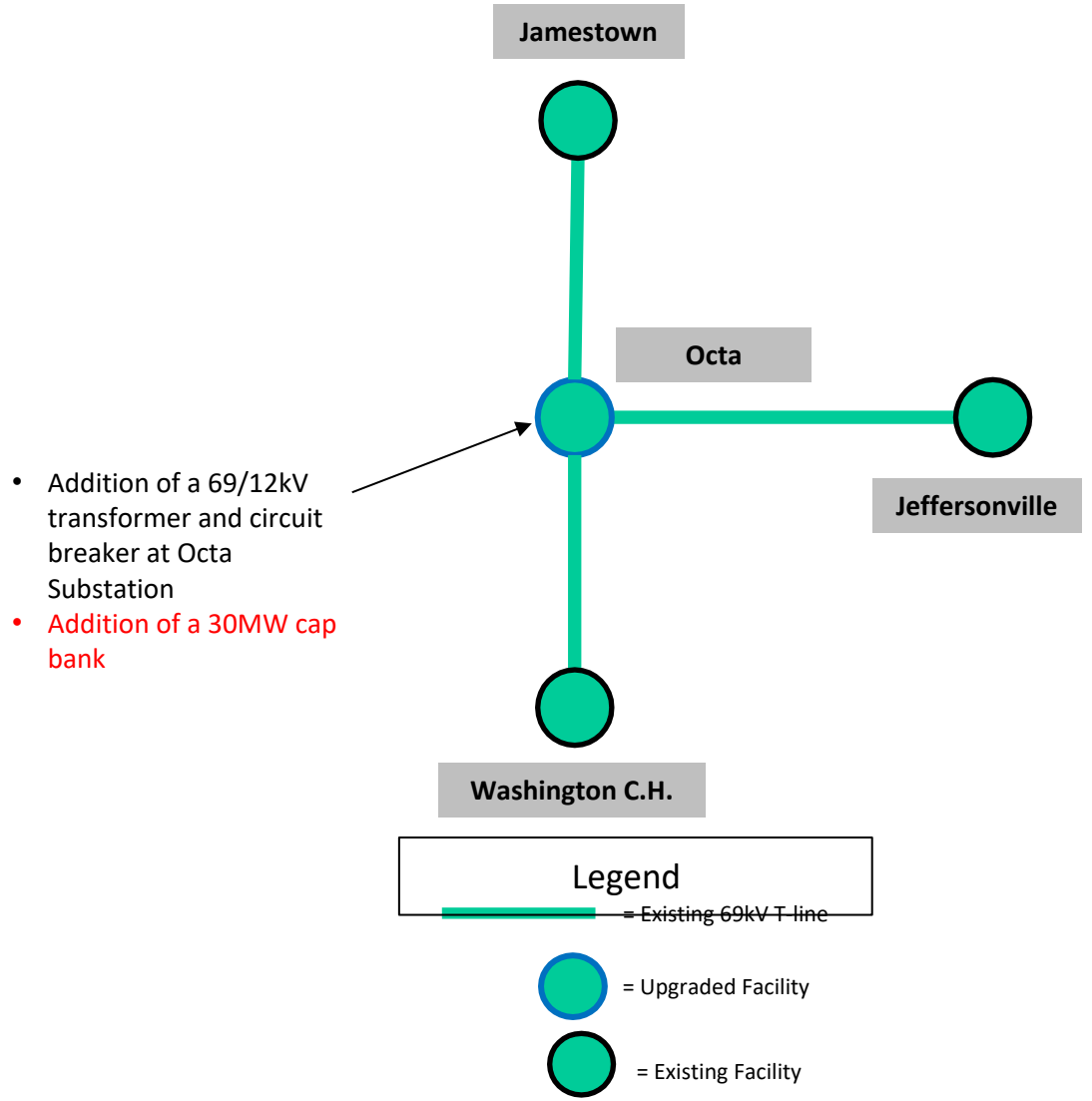


S2695 : Need Number: Dayton-2021-011 - Needs Meeting 12/17/2021, Solutions Meeting 2/18/2022, posted to 2022 Dayton Local Plan

Scope change and reasons:

- **Octa Substation**
  - A new 69/12kV transformer will be installed at Octa Substation and terminated into a new 69kV breaker position. This will expand Octa Substation from a three breaker 69kV ring bus to a four breaker 69kV ring bus. This transformer will create a new delivery point for AES Ohio distribution. This delivery point will provide capacity and switching flexibility, particularly at the Washington Courthouse and Jeffersonville substations, ensuring load can be restored under contingency conditions.
  - Install a 30MW cap bank to support the voltage profile and improve operational flexibility due to area development and the large load addition in Jeffersonville

- **Estimated cost** ~~: $310K~~ $0.71M
- **Projected In-Service:** ~~12/31/2023~~ 06/30/2026
- **Project Status:** Engineering



S2585 (.1-.10) is posted in 2022 Dayton local plan to address Dayton supplemental Needs: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008

Current scope :

Part #1: Project Description:

- **New Westville Substation Replacement:**
  - Establish a new 138kV three breaker ring bus substation that will tie into AEP's Hodgin, connect back to AES Ohio's West Manchester Substation, and serve AES Ohio distribution in the New Westville area. Once the new substation is online, the existin New Westville 33kV Substation will be retired. This will help improve reliability to customers served via New Westville and elimina vintage 33kV system. The new substation will upgrade the obsolete and non-standard equipment at New Westville
  - **Estimated Cost: $6.0M, In-service Date: 12/31/2025 (s2585.1)**

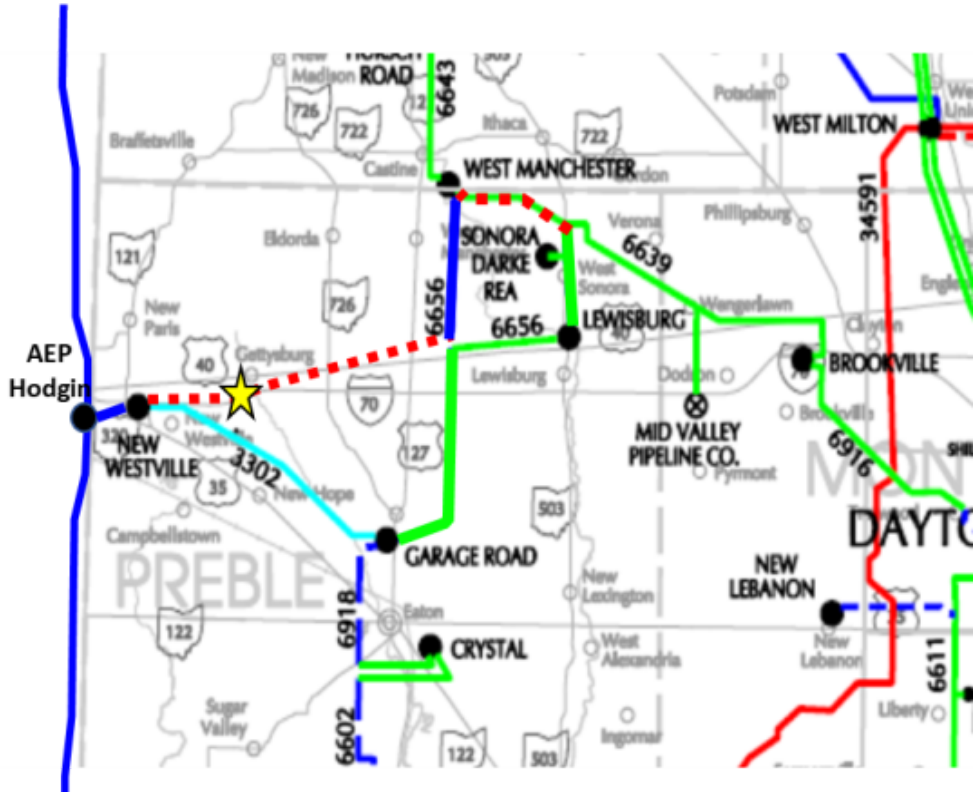
- **New Westville – AEP Hodgin 138kV Line:**
  - Construct a 138kV 1.86-mile single circuit transmission line. This transmission line will help loop the radial load served at New Westville as part of the overall effort to improve reliability in this area. Also, it provides a source to feed New Westville load while t 138kV tie built back into the AES Ohio system.
  - **Estimated Cost: $3.7M , In-service Date: 12/31/2025 (s2585.2)**

- **New Westville – West Manchester 138kV Line:**
  - Construct a new approximate 11-mile single circuit 138kV line from New Westville to the Lewisburg tap off 6656. Convert a portio of 6656 West Manchester – Garage Rd 69kV line between West Manchester - Lewisburg to 138kV operation (circuit is built to 138kV). This will utilize part of the line already built to 138kV and will take place of the 3302 that currently feeds New Westville. T 3302 line will be retired as part of this project.
  - **Estimated Cost: $16.0M, In-service Date: 12/31/2026 (s2585.3)**

- **West Manchester Substation:**
  - The West Manchester Substation will be expanded to a double bus double breaker design where AES Ohio will install one 138kV circuit breaker, a 138/69kV transformer, and eight new 69kV circuit breakers. These improvements will improve help improve a nc standard bus arrangement where there is only one bus tie today and will improve the switching arrangement for the West Sonora Delivery Point.
  - **Estimated Cost: $9.9M , In-service Date: 12/31/2026 (s2585.4)**

- **New Orphan Rd POI (Darke REA):**
  - Install a new three-way phase over phase MOAB to serve a new 138kV delivery point for the Darke REA Electric Co-operative.
  - **Estimated Cost: $0.5M , In-service Date: 12/31/2026 (s2585.5)**

Total Part 1 Cost: $36.1M



Part #2: Project Description:

- **West Manchester – West Senora Tap Double Circuit Rebuild**
  - Retire the existing single circuit section of the 6639 line tap to Sonora up to West Manchester and rebuild as a 4-mile double circuit 69kV line. One circuit will connect West Manchester to Lewisburg and the other circuit will connect back to West Manchester to Wolfcreek.
  - **Estimated Cost: $8.0M, In-service Date: 12/1/2026 (s2585.6)**

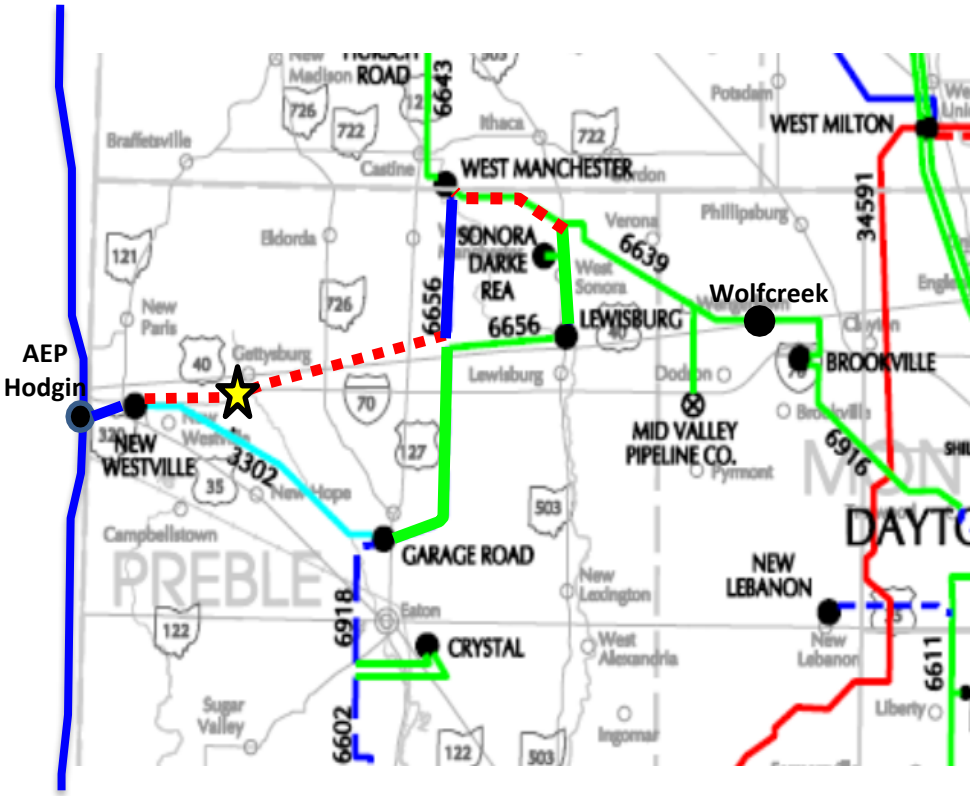
- **Lewisburg Substation**
  - The Lewisburg 69kV Substation will be converted to a new four breaker 69kV ring station and will serve the 7MVA additional customer load that is being added in Lewisburg. Also, this conversion will allow AES Ohio to close in the normally open feed at Lewisburg when complete.
  - **Estimated Cost: $4.5M, In-service Date: 12/1/2025 (s2585.7)**

- **West Sonora (Darke REA)**
  - Install a new three-way phase over phase MOAB to serve the Sonora Darke REA delivery point that is currently served via a one-way switch. Retire the existing switch.
  - **Estimated Cost: $0.5M, In-service Date: 12/1/2025 (s2585.8)**

- **Mid-Valley Pipeline Tap**
  - Replace the existing two-way switch with a new three-way phase over phase MOAB switch. This will provide greater flexibility to switch during outages on the portion of the tap down to the customer.
  - **Estimated Cost: $0.5M, In-service Date: 12/1/2026 (s2585.9)**

- **Brookville Substation:**
  - Modify the bus arrangement at Brookville Substation to install two new 69kV line circuit breakers. This will improve reliability at Brookville Substation by removing tapped transformers from the transmission lines.
  - **Estimated Cost: $2.9M, In-service Date: 12/1/2026 (s2585.10)**

Total Part 2 Cost: $16.4M



Additional Scope to Previous Solution:

➢ **AEP Hayes Substation & AEP Hayes- New Westville Interconnection**

- Hayes – New Westville 138 kV line: Build ~0.19 miles of 138 kV line to the Indiana/ Ohio State line to connect to AES's line portion of the Hayes – New Westville 138 kV line with the conductor size 795 ACSR26/7 Drake. The following cost includes the line construction and ROW. **(s2585.11)**
- **Cost: $0.38 M (AEP)**
- Hayes – Hodgin 138 kV line: Build ~0.05 miles of 138 kV line with the conductor size 795 ACSR26/7 Drake. The following cost includes the line construction, ROW, and fiber. **(s2585.12)**
- **Cost: $ 1.22 M (AEP)**
- Hayes 138 kV: Build a new 4-138 kV circuit breaker ring bus. The following cost includes the new station construction, property purchase, metering, station fiber and the College Corner –Randolph 138 kV line connection. **(s2585.13)**
- **Cost: $ 7.44 M (AEP)**

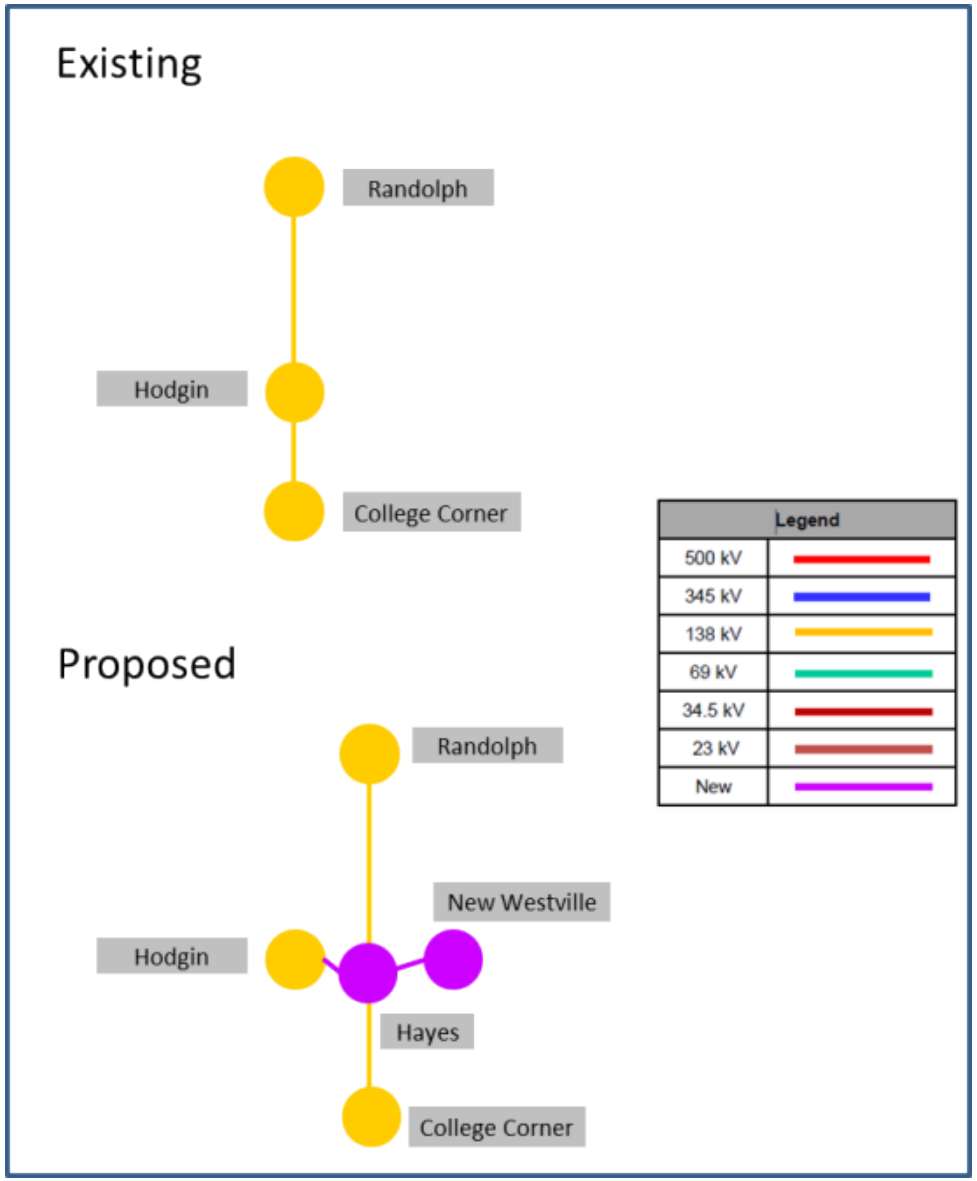
Total Cost: $9 M (AEP)

Alternative considered:

Connecting to Hodgin station is not an option as it is not owned by AEP.

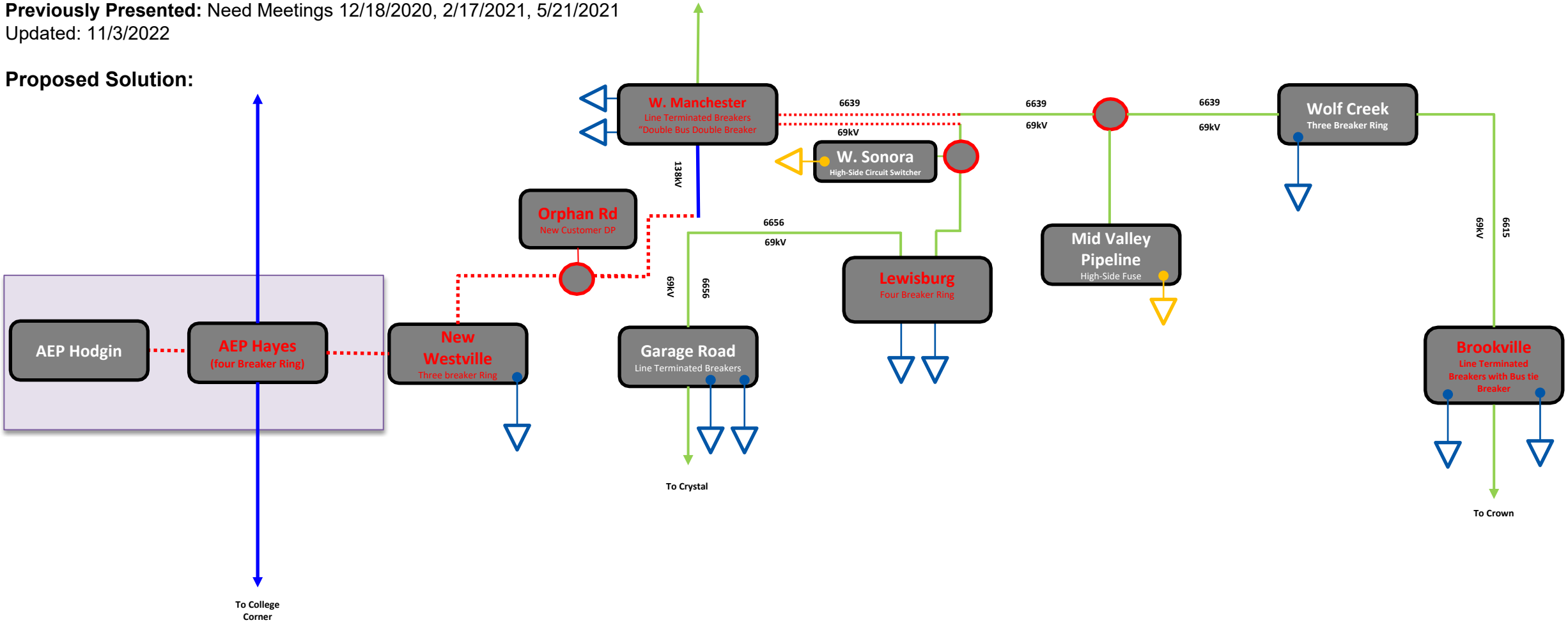
Projected In-Service: 12/31/2025

Project Status: Scoping



Need Number: Dayton-2020-011, Dayton-2021-001, Dayton-2021-008
Process Stage: Solutions Meeting 8/16/2021
Previously Presented: Need Meetings 12/18/2020, 2/17/2021, 5/21/2021
Updated: 11/3/2022

Proposed Solution:



-Updated 11/18/2022

Revision History

1/20/2023 – V1 –Added Slides #2-3, S2809.1-.3

4/11/2023 – V2 –Added Slides #4-7, S2847 and S2853.1-.5

4/16/2023 – V3 –Slides #7, updated bubble diagram

10/4/2023 – V4 –Add Slides #8 -13, S2939.1-.2, S2940 and S2972

10/17/2023 – V5 –Add Slides #14 -18, S2695 scope change and S2585 scope change