

Submission of Supplemental Projects for Inclusion in the Local Plan

Dayton Transmission Zone M-3 Process Greenville 138/69 kV Transformer

Need Number: Dayton-2019-006

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 8/15/2019

Previously Presented:

Needs Presented: 2/20/19

Solution Presented: 3/25/19

Project Driver:

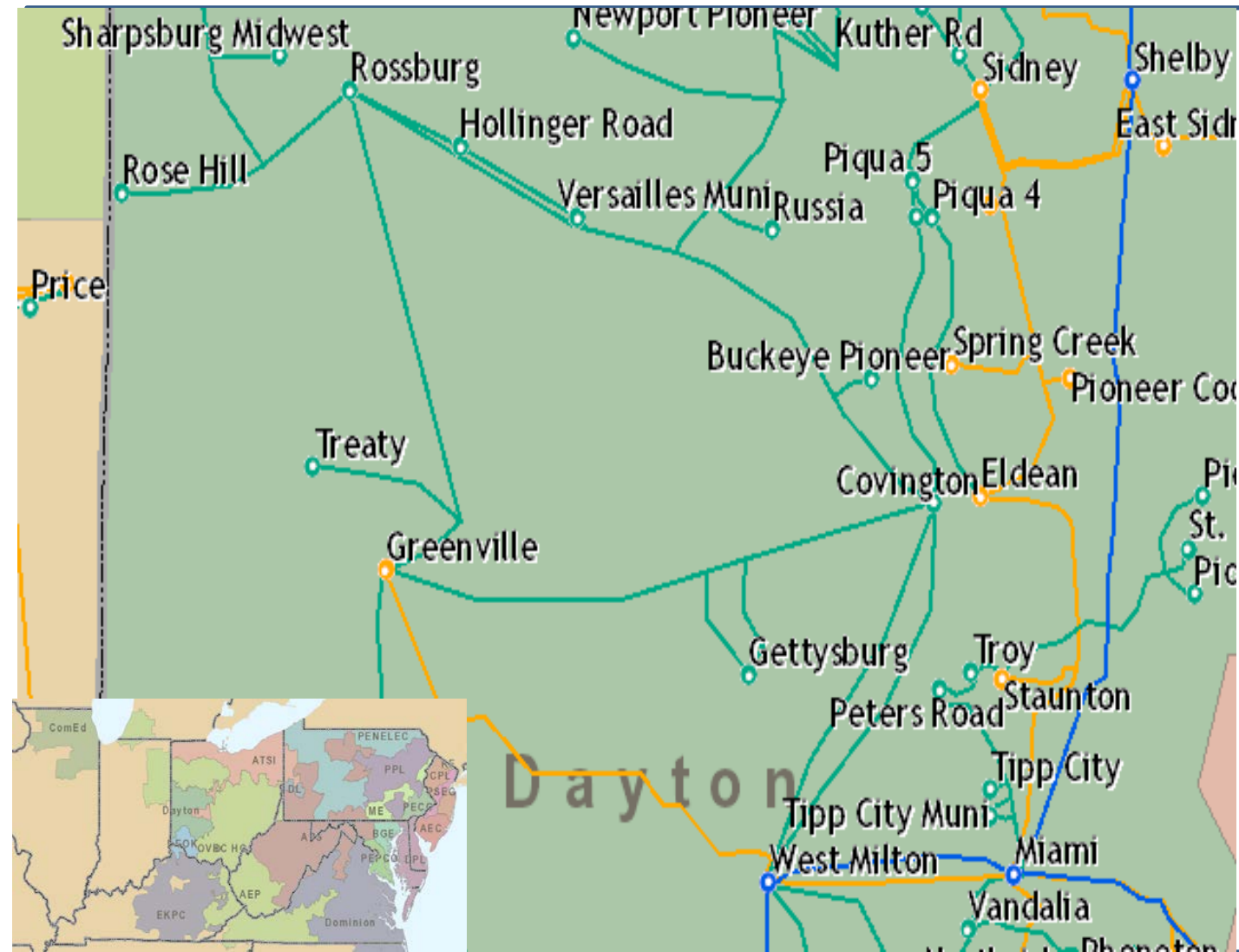
Operational Performance

Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- Greenville 138/69kV transformer was built in 1978
- Failed, repaired, and placed back in-service in 2009
- In the summer of 2018, this transformer experienced issues evidenced by rising transformer temperatures, generation had to be called on to relieve the loading constraint on several occasions.
- This transformer is undersized and routinely approaches its nameplate ratings as evidenced by frequent PCLLRW's issued on this facility. Due to the operational issues this past summer and regular loading near nameplate capacity, this transformer could fail or not be available during peak load conditions which potentially creates real-time issues. It is critical for real-time operations that this transformer issue be addressed in a planned manner to ensure reliability of the 138kV and 69kV system in this area.
- The existing Greenville 138/69 kV transformers is the only 150 MVA transformer on the Dayton system, the standard 138/69 kV transformer size is 200 MVA. The extra capacity provided by a 200 MVA transformer is needed in this area to account for the wide range of loading scenarios depending on the status of Greenville Generation.



Dayton Transmission Zone M-3 Process Greenville 138/69 kV Transformer

Need Number: Dayton-2019-006

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 8/15/2019

Selected Solution:

Replace the existing 150 MVA Greenville 138/69 kV transformer with a single 200 MVA 138/69 kV transformer. This will increase the rated capacity of the Greenville Transformer to perform with adequate capacity during shoulder peak times when Greenville Generation is offline and will address the equipment concerns associated with the existing transformer.

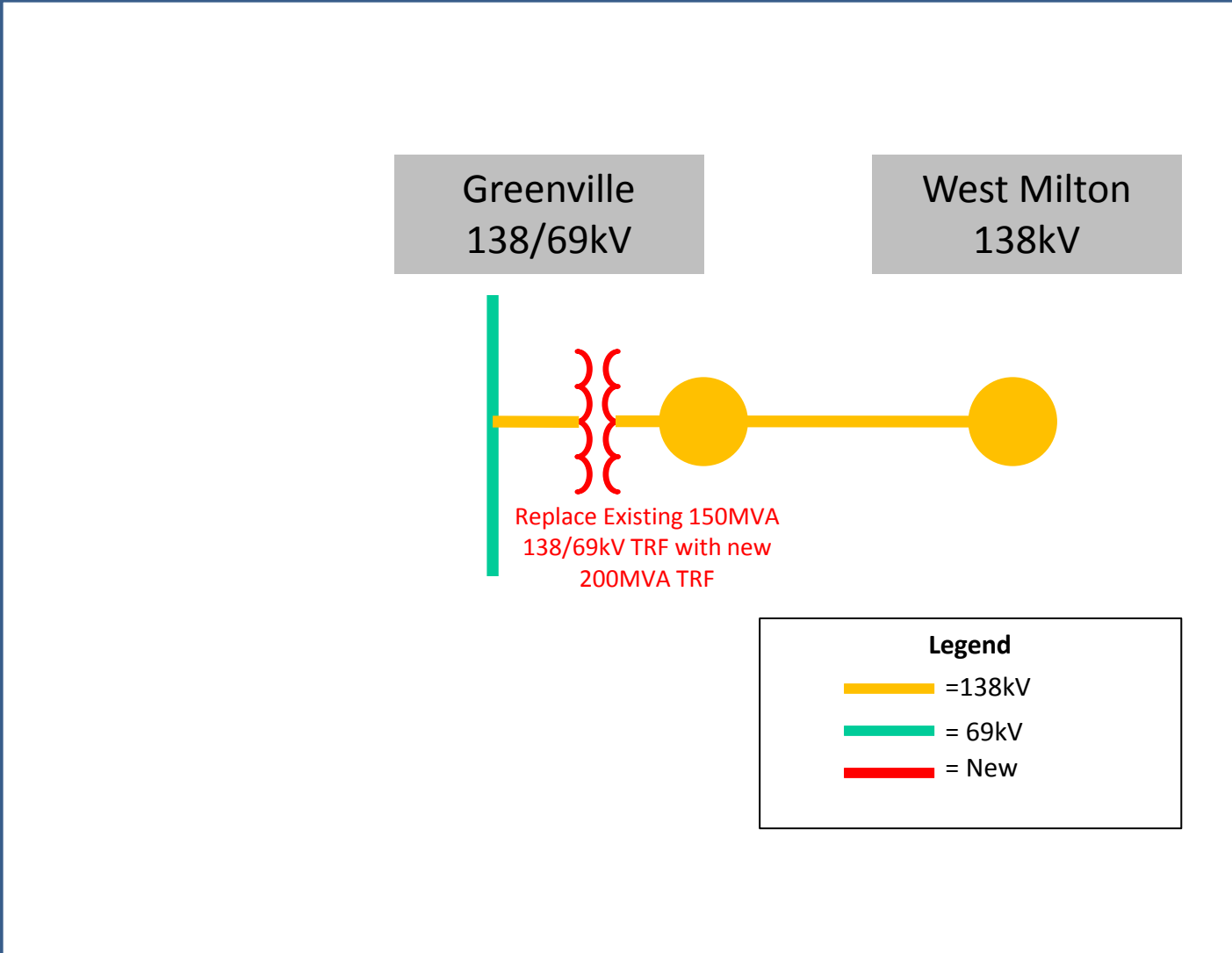
Estimated Cost: \$2,000,000

Projected In-Service: 12/31/2020

Supplemental Project ID: s1846

Project Status: Conceptual

Model: NA



Dayton Transmission Zone M-3 Process Bethel Township, Ohio

Need Number: Dayton-2019-007

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 8/15/2019

Previously Presented:

Needs Presented: 2/20/19

Solution Presented: 3/25/19

Project Driver:

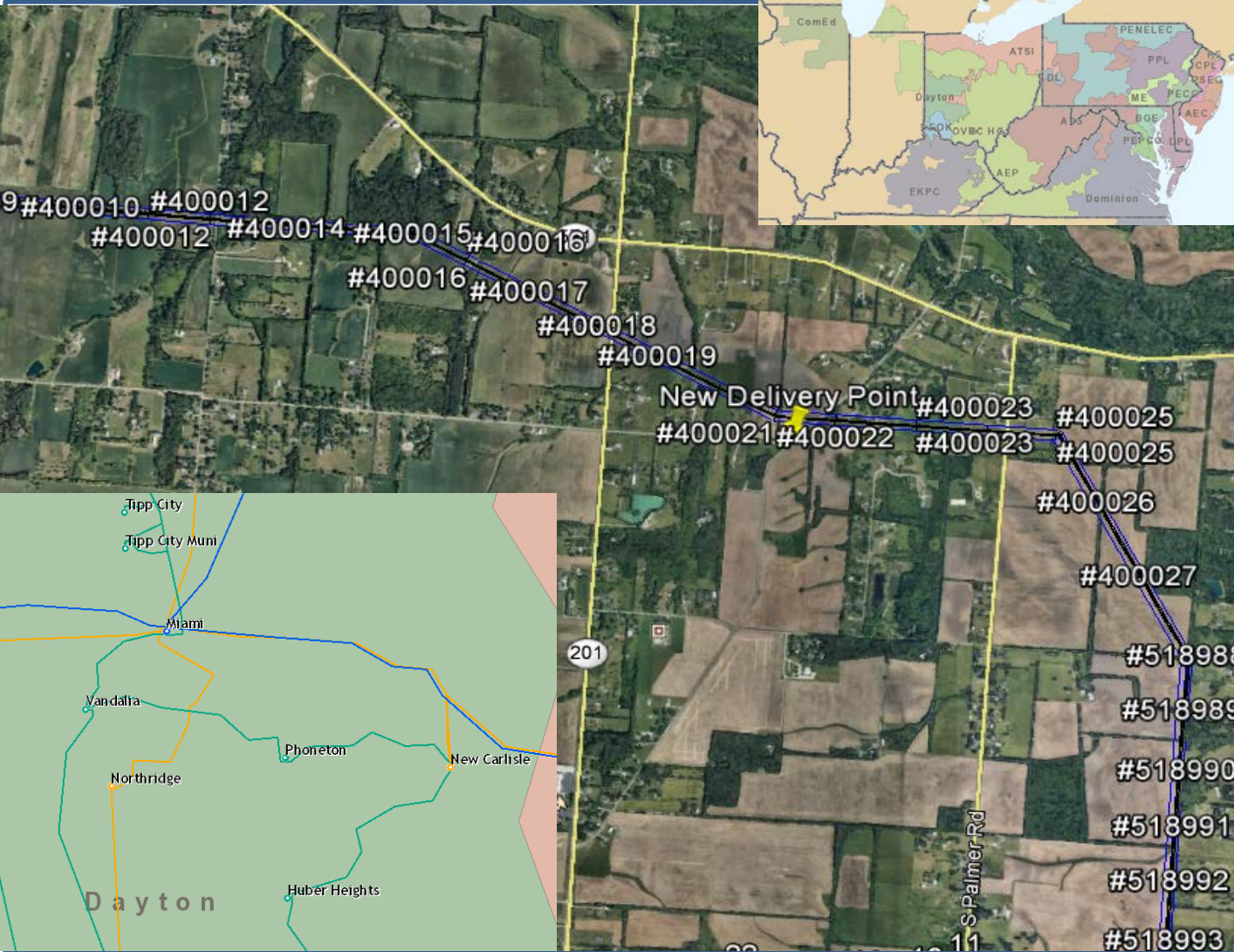
New customer delivery point

Specific Assumption Reference:

Dayton Local Plan Assumptions (Slide 5)

Problem Statement:

- Customer requested a new delivery point in Miami County, within Bethel Township.
- Initial loading projected at ~5-7 MW, with expected annual growth of 1.2%



Dayton Transmission Zone M-3 Process Bethel Township, Ohio

Need Number: Dayton-2019-007

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 8/15/2019

Selected Solution:

- This project will tap the Miami-New Carlisle 138 kV line with sectionalizing switches on each side of the delivery point and provide a short 138kV service to the proposed customer substation in near proximity to the existing transmission line.

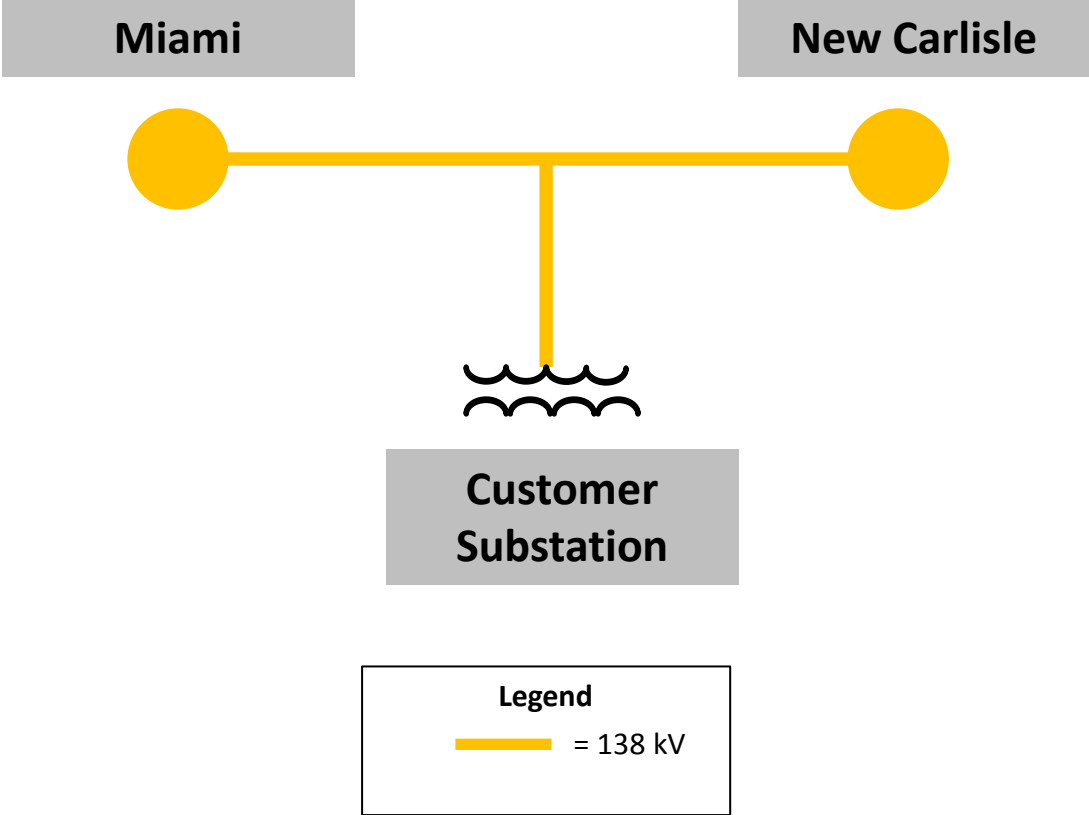
Estimated Cost: \$850,000

Projected In-Service: 12/31/2019

Supplemental Project ID: s1847

Project Status: Conceptual

Model: NA



Dayton Transmission Zone M-3 Process Gebhart Distribution Sub

Need Number: Dayton-2019-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Previously Presented:

Needs Presented: 2/20/19

Solution Presented: 4/23/19

Project Driver:

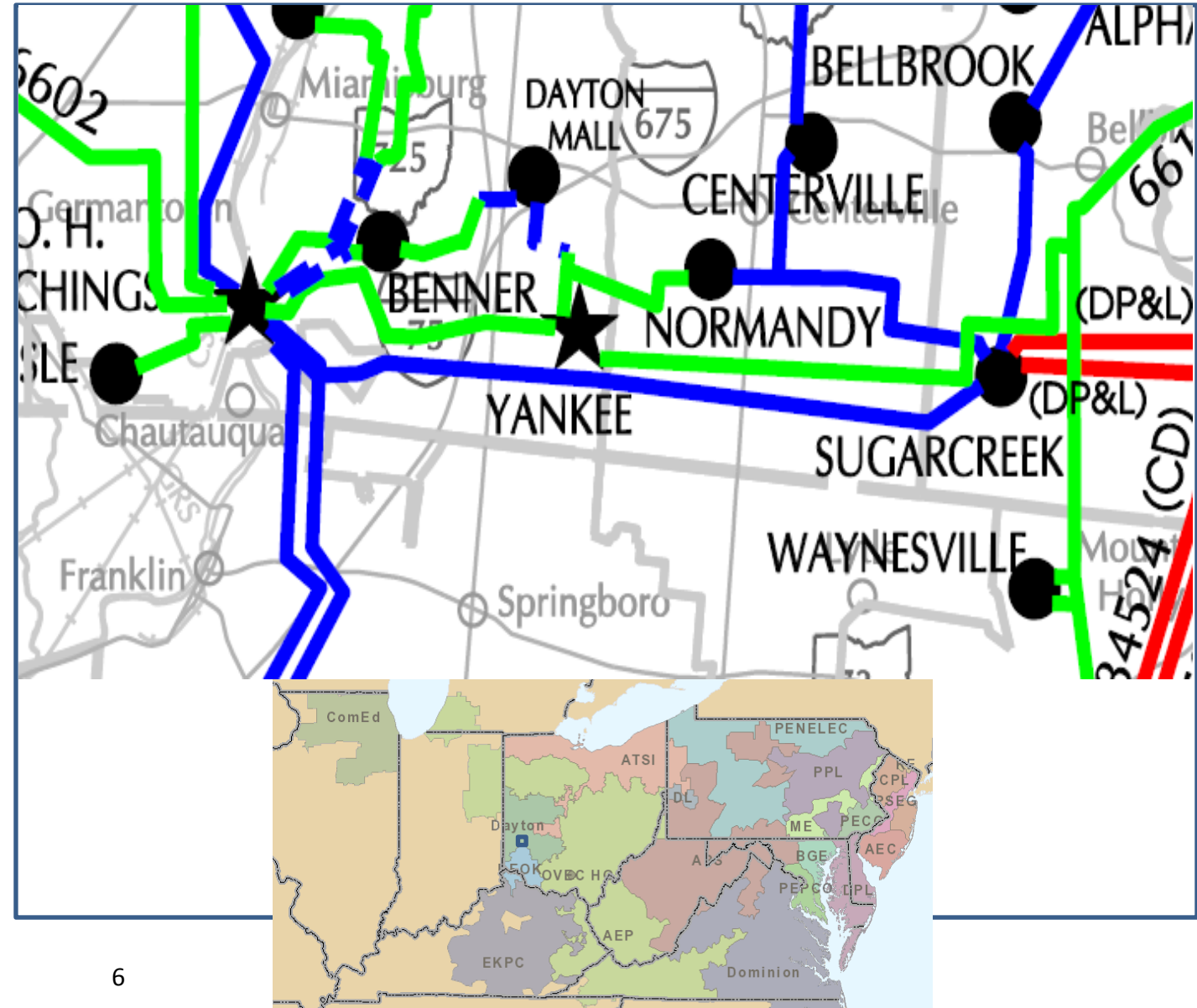
Source for Underlying Distribution

Specific Assumption Reference:

DPL Local Plan Assumptions (Slide 5)

Problem Statement:

- Significant load growth in the area east of I-75 and south of I-675
- Distribution Circuit RH1211 served from Yankee Substation exceeded its thermal rating this past summer and RH1204 from Yankee Substation is approaching its rated capacity. There are no ties in the vicinity of the load center with sufficient capacity to serve growing loads.
- DP&L must develop a solution immediately to have capacity to serve distribution load in this load center or risk overloading existing equipment and not having sufficient distribution capacity to serve growing load. There is a need for a new distribution source closer to the load center.
- DP&L must offload the Yankee and Normandy circuits to ensure sufficient capacity to serve growing load centers in Centerville and Waynesville.



Dayton Transmission Zone M-3 Process Gebhart Distribution Sub

Need Number: Dayton-2019-002

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Selected Solution:

- The project will tap the existing Hutchings-Sugarcreek 138kV line and loop the 138 kV in and out of the substation which is in close proximity to the existing 138 kV line. There will be a single 138/12 kV 30 MVA distribution transformer installed at the new substation and three new 138 kV breakers arranged in a ring bus configuration. The location of this substation will allow Dayton to offload distribution circuits served from Yankee and Normandy while also serving as a centrally located source for growth in the Centerville and Waynesville areas.

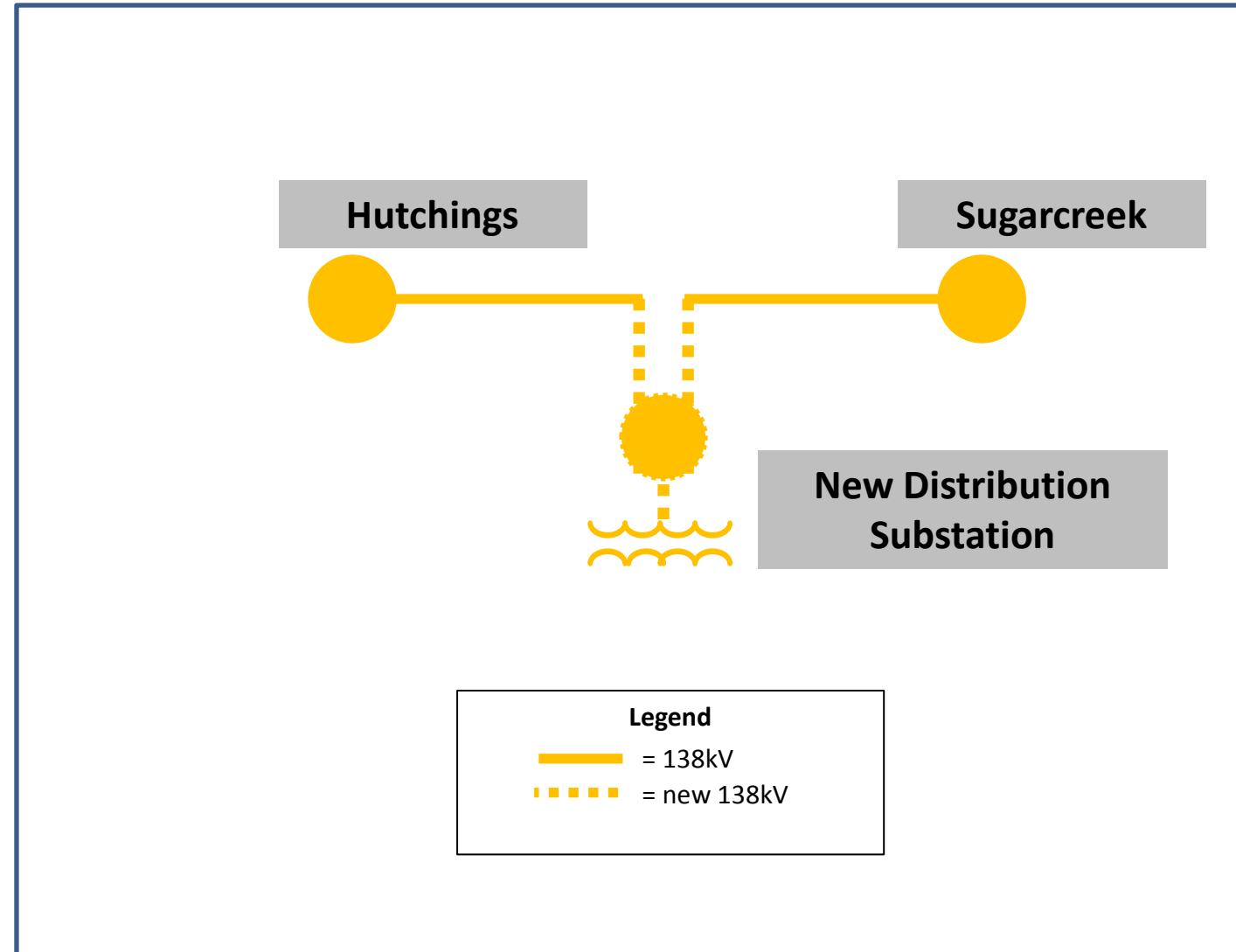
Estimated Cost: \$2.5 M

Projected In-Service: 12/31/2020

Supplemental Project ID: S1874

Project Status: Conceptual

Model: NA



Dayton Transmission Zone M-3 Process Urbana, Ohio

Need Number: Dayton-2019-003

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Previously Presented:

Needs Presented: 2/20/19

Solution Presented: 4/23/19

Project Driver:

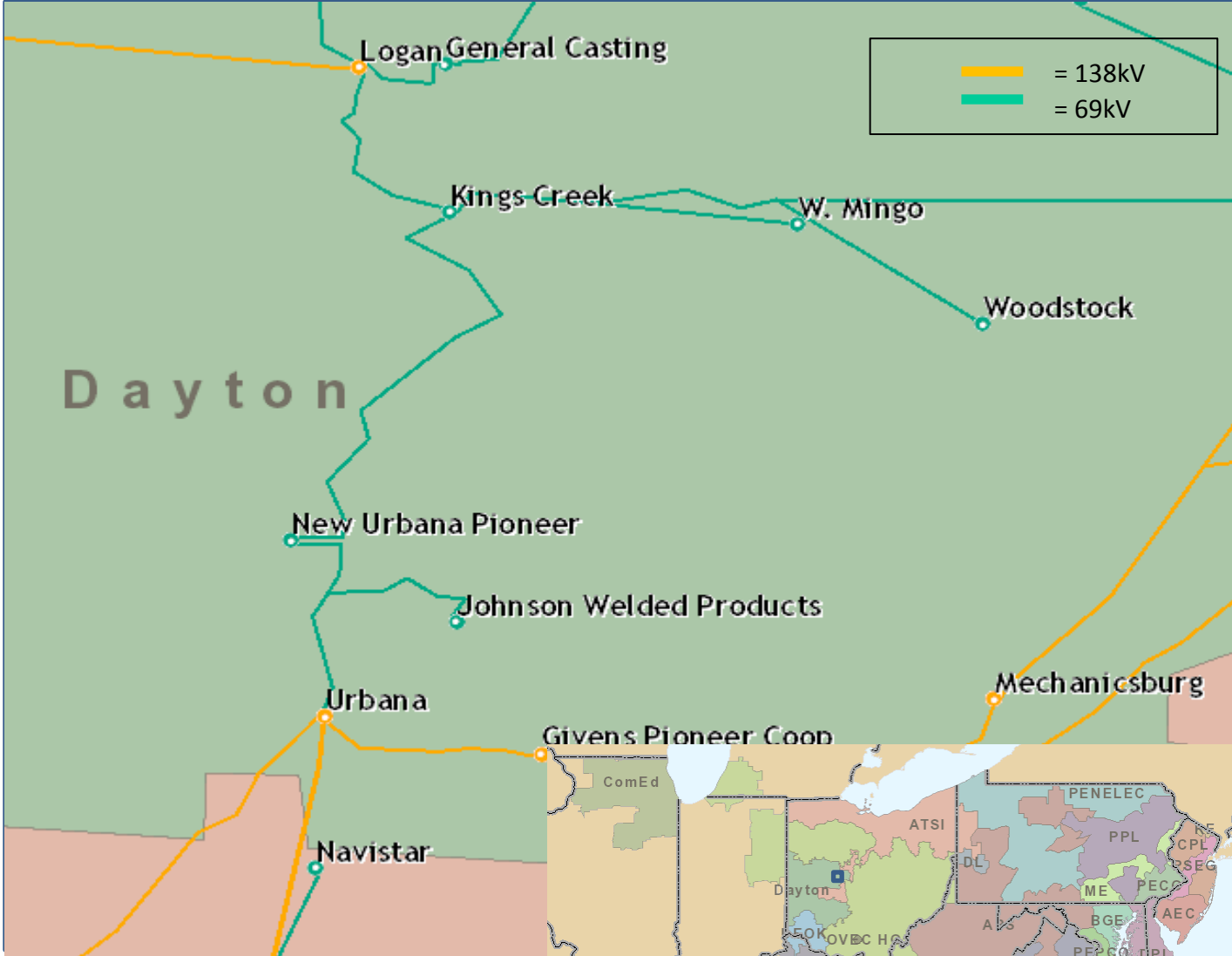
Source for Underlying Distribution

Specific Assumption Reference:

DP&L Local Plan Assumptions (Slide 5)

Problem Statement:

- The loads at the existing Urbana Substation have grown beyond the capacity of the existing distribution transformers and DP&L has utilized a mobile transformer at the Urbana substation to take load off of the distribution banks that would otherwise be pushed beyond their thermal limits.
- The existing Urbana and Kings Creek substations are not centrally located to the growing load center which makes load transfers to and from either sub nearly impossible.
- Distribution circuits DB1205 and DB1206 from Urbana Substation both reached their peak circuit capacities this past summer.
- There is a need for a new distribution source closer to the load center to provide loading relief on the Urbana Substation transformers and circuits.



Dayton Transmission Zone M-3 Process Urbana, Ohio

Need Number: Dayton-2019-003

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Selected Solution:

- The project will tap the existing Urbana-Kings Creek 69kV line and build a new 1 mile 69 kV extension to the new substation. There will be a single 69/12 kV 30 MVA distribution transformer installed at the new substation and two new 69kV breakers. This substation will be located in close proximity to the load center on the southwest side of Urbana where many of the large commercial and industrial loads are located. This location will ensure that DP&L has sufficient capacity to serve the load center and offload the transformers at Urbana Substation. The solution will also enhance the ability to switch distribution circuits and facilitate load transfers between the new substation, Urbana, and Kings Creek Substations.

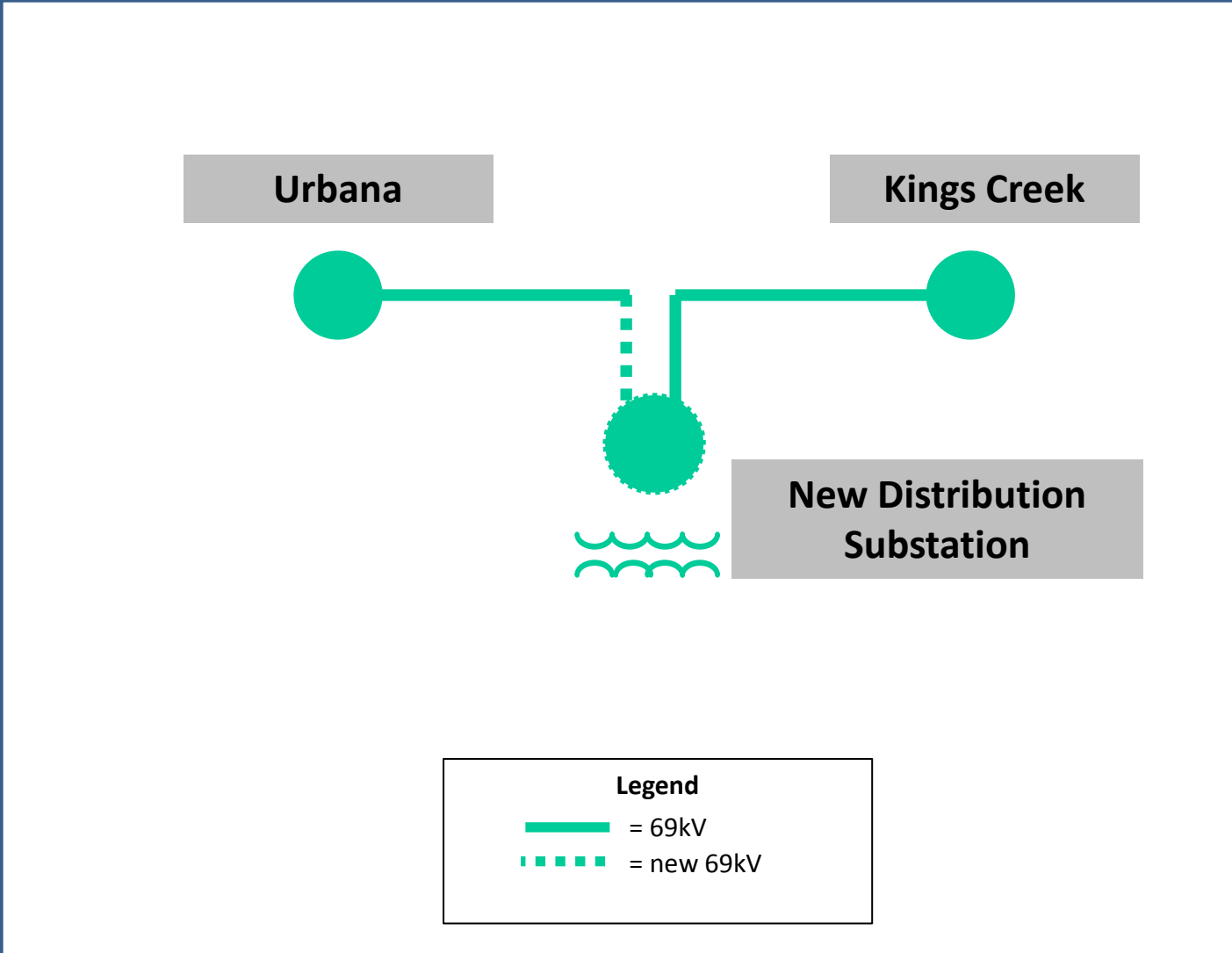
Estimated Cost: \$2.5 M

Projected In-Service: 06/01/2020

Supplemental Project ID: S1875

Project Status: Conceptual

Model: NA



Dayton Transmission Zone M-3 Process South Dayton Metro

Need Number: Dayton-2019-004

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Previously Presented:

Needs Presented: 2/20/19

Solution Presented: 4/23/19

Project Driver:

Operational Performance

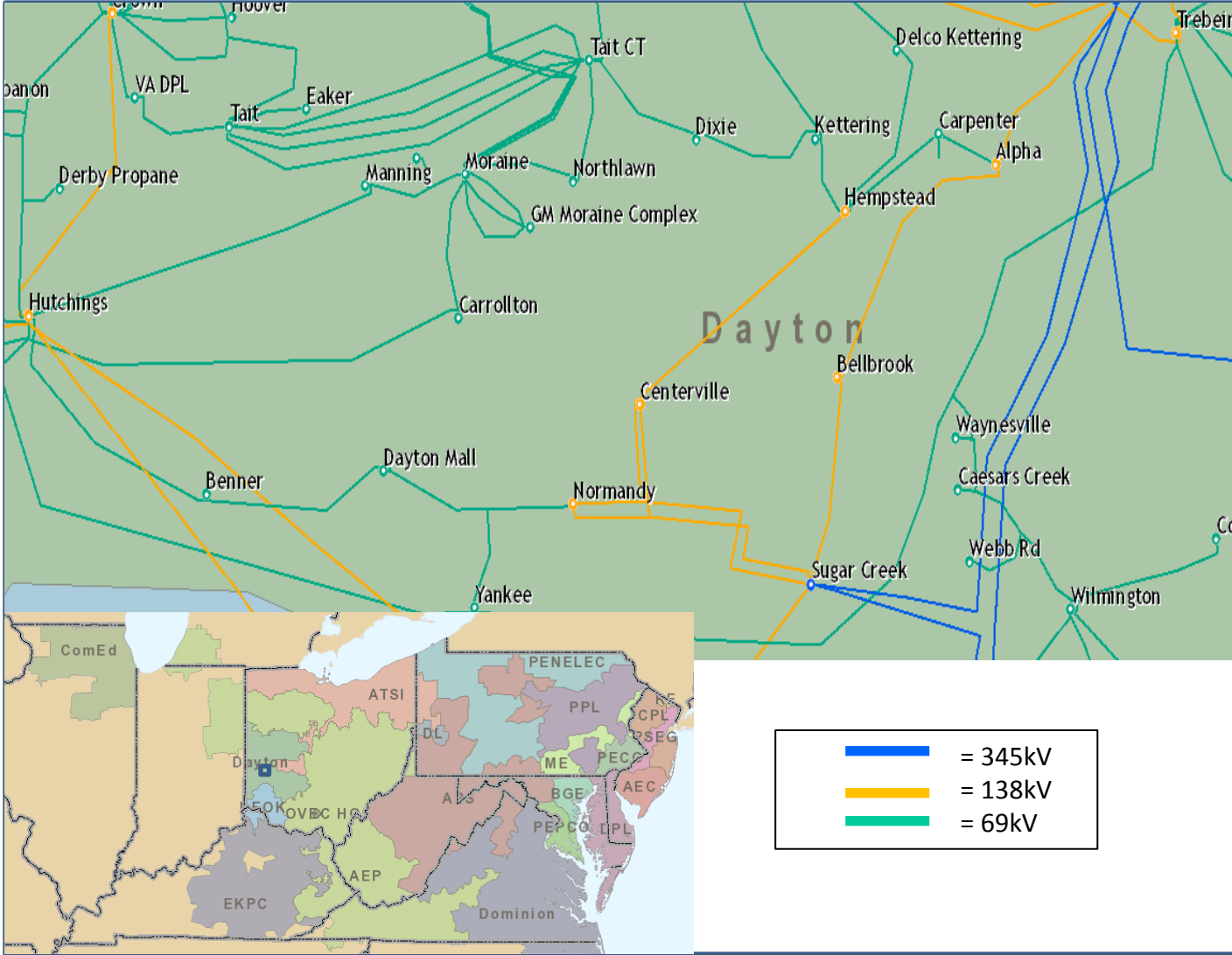
Specific Assumption Reference:

DPL Local Plan Assumptions (Slide 5)

Problem Statement:

-The Dayton 138kV system regularly experiences real-time loading issues on the Hutchings-Sugarcreek 138kV 13805 line during peak and shoulder peak times. Dayton System Operations works with PJM and frequently switches the Crown 138/69kV transformer out of service to avoid a PCLLRW but in some instances, this is not a possibility. Also, this switching and segmentation of the system is not a good practice for the equipment and reliability of the system. Dayton has a plan to help solve this issue by installing a 138/69kV transformer at Normandy Substation but we have concerns this could shift the operational loading issues from the Sugarcreek-Hutchings 138kV line to the Sugarcreek to Normandy 138kV line with the growth in this area. Also, Normandy Substation has space limitations for a 138kV transformer. If this issue is not addressed immediately, it could lead to more real-time issues and further degradation to the equipment that is switched out in this quickly growing load center.

-In addition to the 138kV loading issues in this area, this growing load center is served by three 69kV sources with limited capacity and a performance issue. These factors make performing regular maintenance more difficult and puts the reliability of the system at risk. In the event of a single outage (planned for maintenance or unplanned due to system events) to one of the three sources, a subsequent 69kV outage would lead to severe reliability implications including loadings in excess of the emergency line ratings. The 6610 Yankee-Caesars-Trebein 69kV line is one of the three 69kV lines supplying the load center and it is a 31 mile line, three terminal line constructed in 1950 with wood poles that has experienced 7 permanent and 16 momentary outages the past 5 years.



Dayton Transmission Zone M-3 Process South Dayton Metro

Need Number: Dayton-2019-004

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/5/19

Selected Solution:

- This project will expand the Sugarcreek Substation by installing a 138/69kV 200MVA transformer, forming a new 69kV ring bus, and building a new 69kV line from Sugarcreek to Normandy Substation that will connect directly into the load center. These upgrades will provide a critical fourth source into the load center which will address shoulder peak loading concerns and will improve reliability of the three terminal 6610 Yankee-Caesars-Trebein 69kV line that has historically been a poor performing circuit. Estimated Cost: \$ 8.251M (**\$1876.1**)
- Normandy Substation has an existing distribution transformer that will need to be changed from 138/12kV to 69/12kV. This will provide operations greater flexibility for switching loads through parallel distribution bank operation at Normandy. Estimated Cost: \$5.114M (**\$1876.2**)
- The Dayton Mall-Yankee-Normandy 6671 line will be looped in and out of Yankee Substation to eliminate a three terminal arrangement. A single 69kV breaker will be needed at Normandy to separate the 69kV bus and a single 69kV breaker will be installed at Yankee to eliminate the three terminal line configuration. Estimated Cost: \$2.535M (**\$1876.3**)

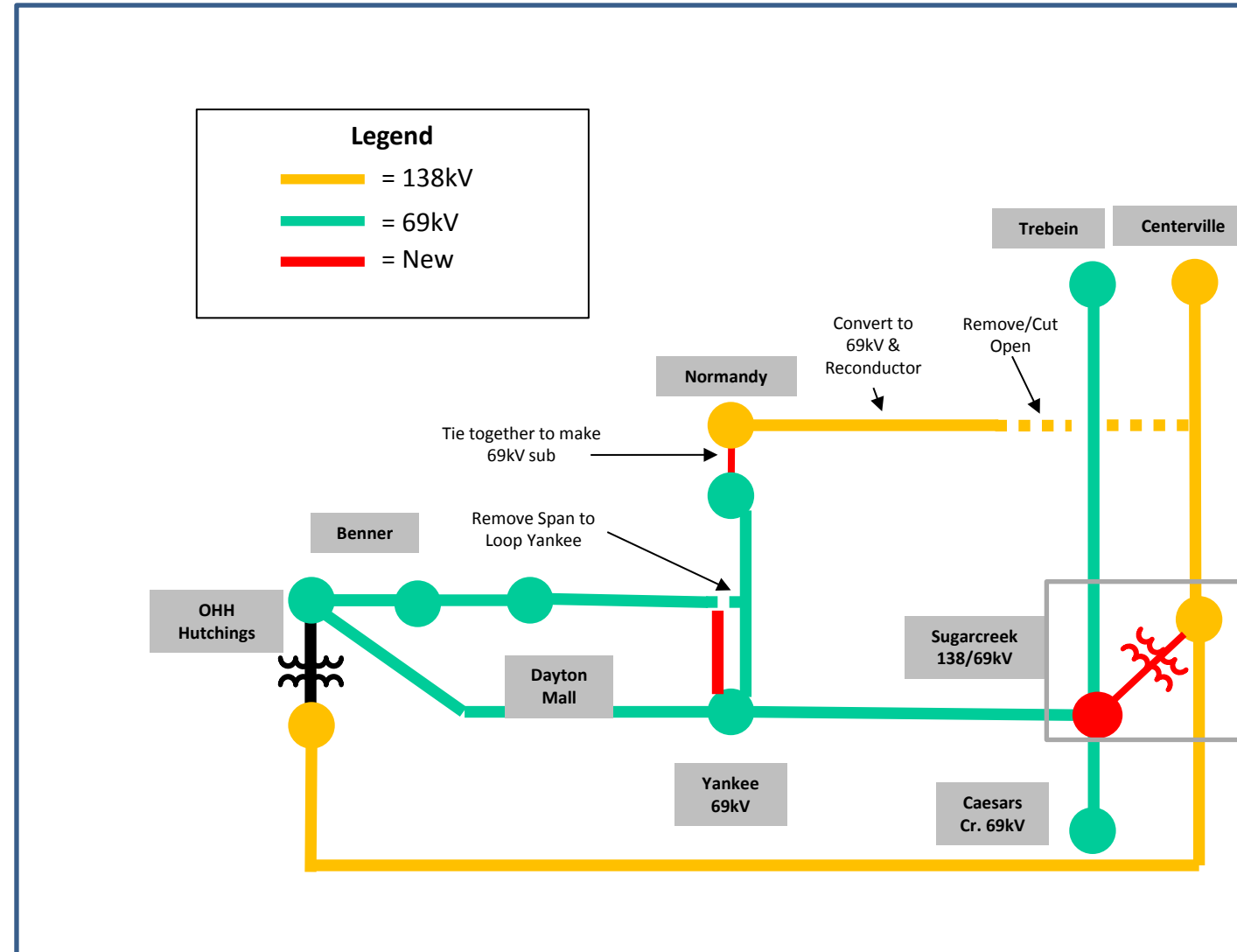
Estimated Cost: \$15.9M

Projected In-Service: 12/31/2021

Supplemental Project ID: S1876.1 – S1876.3

Project Status: Conceptual

Model: 2023 RTEP



Dayton Transmission Zone M-3 Process Killen Substation

Need Number: Dayton-2019-008

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/4/2019

Previously Presented:

Needs Presented: 4/11/19

Solution Presented: 6/13/19

Project Driver:

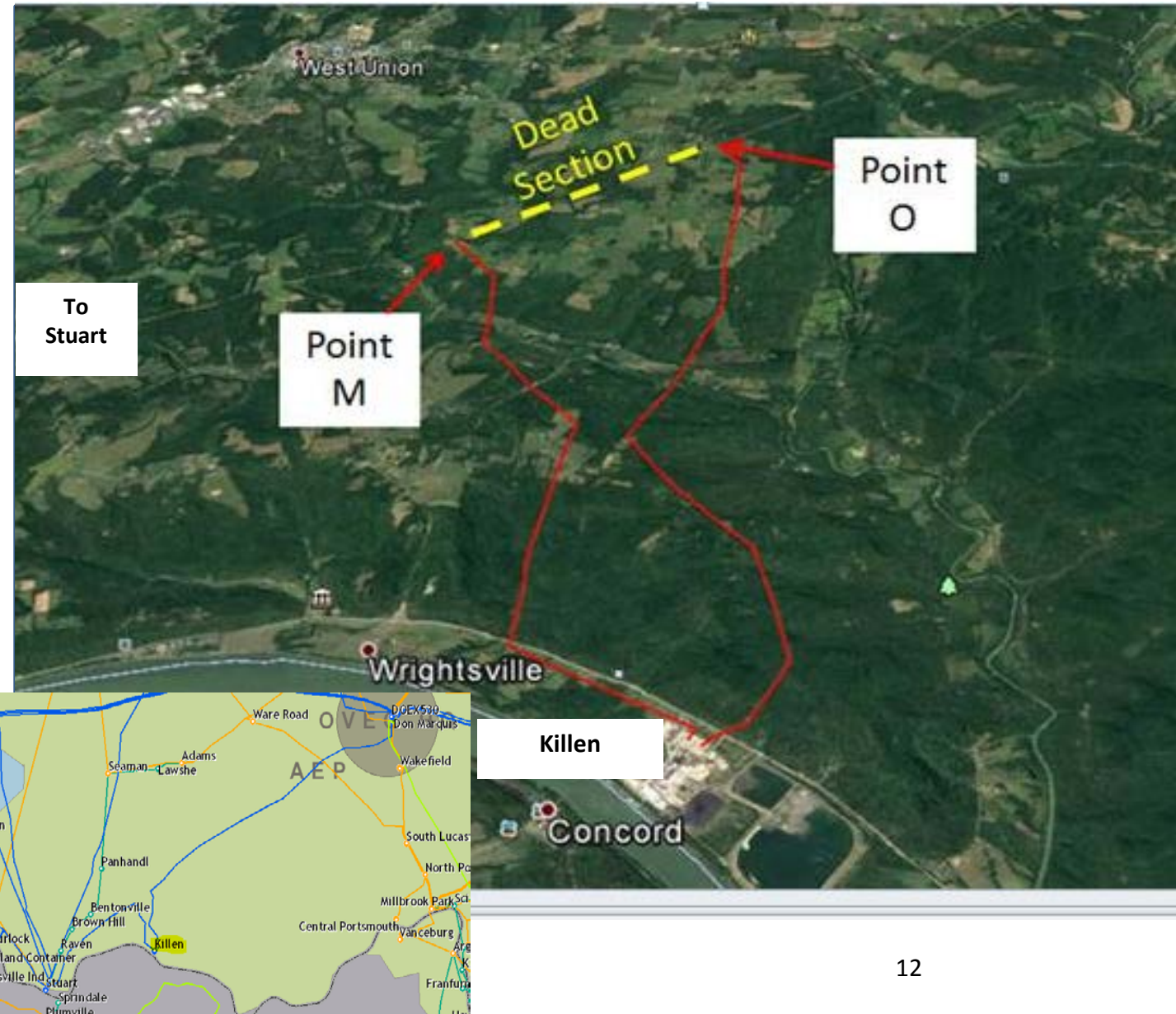
- Operational performance

Specific Assumption Reference:

- DPL Local Plan Assumptions (Slide 5)

Problem Statement:

- Killen generators retired 6/1/18 and the capacity injection rights expired 6/1/19.
- After CIRs expire, Killen Substation will serve no purpose since there will be no generation or load serving facilities located at the substation. There is a dead-section of 345 kV line that could be utilized to bypass the Killen Substation.
- Point M and Point O serve as demarcation points between AEP and Dayton on the line and points where the Killen 345 kV loop could be opened.
- The 345 kV line that loops in and out of the substation, along with the substation equipment will add exposure to the system that could decrease the reliability of the 345 kV path between Stuart and Marquis Substations.



Dayton Transmission Zone M-3 Process Killen Substation

Need Number: Dayton-2019-008

Process Stage: Submission of Supplemental Project for inclusion in the Local Plan 9/4/2019

Selected Solution:

1. (AEP will re-energize a dead section of the Stuart-Marquis 345 kV line to bypass Killen Substation.) Dayton's scope of work will include opening the Killen 345 kV loop at Points O and M shown on previous slide. Dayton will need to install guy stub poles for tension at the open points. **(S1877.1)**

Cost = \$200,000

2. Dayton will de-energize Killen substation, update relay settings on the Stuart end of the line, install new tie-line meter at Stuart, and work with AEP to complete end-to-end relay testing on the Stuart-Marquis 345 kV path. **(S1877.2)**

Cost = \$100,000

Ancillary Benefits:

1. Because the Killen generating units retired on 6/1/18 and there is no load served from the sub, the Killen Substation is now just a pass through. Therefore, retiring it and the 345 kV transmission loop will reduce system exposure and increase operational efficiency to improve overall system reliability. Killen is located ~2 hours from Dayton so this will eliminate the burden of required inspections and testing there, as well as reducing O&M.

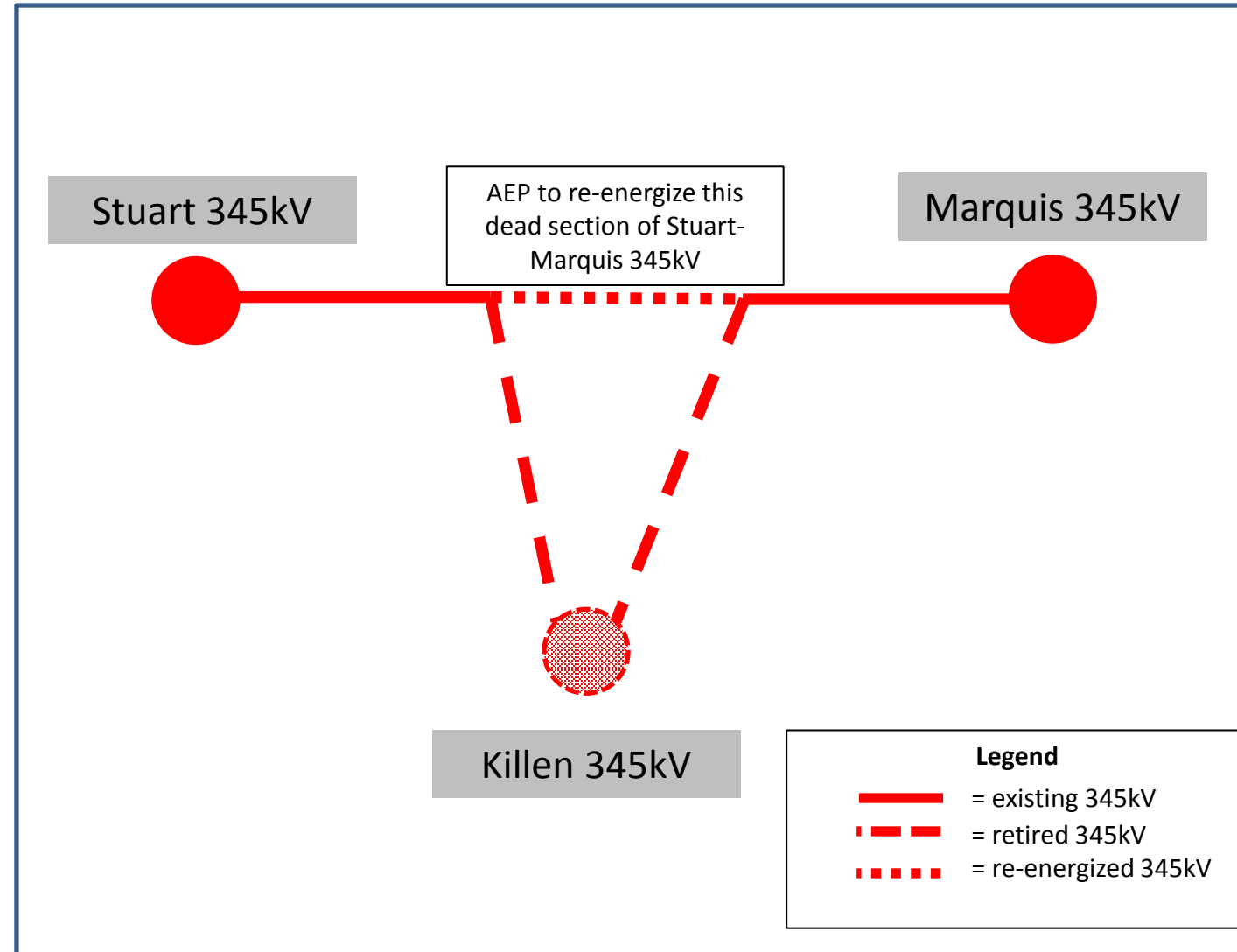
Estimated Cost: \$300,000

Projected In-Service: 11/25/2019

Supplemental Project ID: S1877.1 and S1877.2

Project Status: Conceptual

Model: 2018 MMWG Series – 2020 Summer, 2023 Summer RTEP



Revision History

- 8/15/2019 – V1 – Local Plan posted to pjm.com for S1846 – S1847
- 9/5/2019 – V2 – Local Plan posted to pjm.com for S1874 – S1877
- 9/12/2019 – V3 – Remove the duplicate slides (#6-13)