



RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES

DATE: APRIL 9, 2018

ITEM NO: 10

SUBJECT: 4kV TO 12kV CONVERSION PROGRAM STATUS REPORT

ISSUE:

Receive and file this status report on the 4kV to 12kV Conversion Program.

RECOMMENDATION:

That the Board of Public Utilities receive and file the status report on the 4kV to 12kV Conversion Program, upgrading aging 4kV distribution facilities to a modern 12kV distribution system.

BACKGROUND:

The energy delivery system in Riverside was originally designed around a 33kV sub-transmission and 4kV distribution system. Over the years, this standard was revised to a modern 69kV sub-transmission and 12kV distribution system. Riverside Public Utilities (RPU) has gradually migrated to the new voltage standard of 69kV and 12kV over time. These voltage conversion projects are considered routine capital projects and discussion of these were included in the presentation made to the Board at the September 25, 2017 meeting.

The Electric System Master Plan recommends the conversion of all aging 4kV distribution facilities to a modern 12kV distribution system to improve circuit reliability, safety, and outage restoration time. 4kV distribution facilities are made up of components that are obsolete, inefficient, and difficult to procure - especially during equipment failures and unexpected outages. The average age of these facilities is 50 years old, and the equipment is at or beyond its useful life. A typical voltage conversion project includes the replacement of all the facilities that make up the distribution system including deteriorated wooden poles, transformers, pole switches, cables and related electrical distribution components.

DISCUSSION:

The purpose of the 4kV to 12kV Conversion Program is to upgrade existing 4kV aging facilities to a 12kV distribution system, which will include the implementation of advanced technology to monitor circuit loads and their impact on the distribution grid. Upgrading to a modern, standardized 12kV circuit will result in greater power capacity, reduced line losses, improved electric service and power quality, and improved system operations using standardized equipment.

This modernization effort will help keep up with technology advancements and the increased demand for electricity. 12kV distribution circuits have approximately three times as much power capacity as 4kV circuits. 12kV circuits improve overall system efficiency when compared to 4kV circuits. 12kV circuits also increase voltage stability, which is an important component for photovoltaic installations and large industrial

customers with sensitive equipment. Standardizing on 12kV equipment makes for faster outage restoration since nearby 12kV circuits can be utilized to reroute customer loads while working on equipment to restore power, and components are easier to locate and procure.

4kV to 12kV Conversion Summary

1. (5) Substations are associated with the 4-12kV conversion program (see Project Site Map).
2. (16) Substation transformers will be decommissioned after circuit conversions are completed.
3. (34) 4kV circuits will be upgraded to 12kV system.
4. (6) Circuits have been upgraded to date.
5. (28) Circuits are pending completion.

Substation	Number of substation transformers	Number of 4kV circuits	Number of customers	Total linear feet of wire to be evaluated	Number of circuits upgraded to date	Projected substation completion date
Magnolia Substation	5	5	700	165,000	5	March 31, 2018 (complete)
Plaza Substation	3	14	4,913	685,000	1	June 30, 2021
Hunter Substation	2	3	956	200,000		June 30, 2022
Riverside Substation	4	6	3,612	371,000		June 30, 2024
Mt. View Substation	2	6	3,005	442,000		June 30, 2026
Totals	16	34	13,186	1,863,000	6	

4kV to 12kV Conversion Program Status

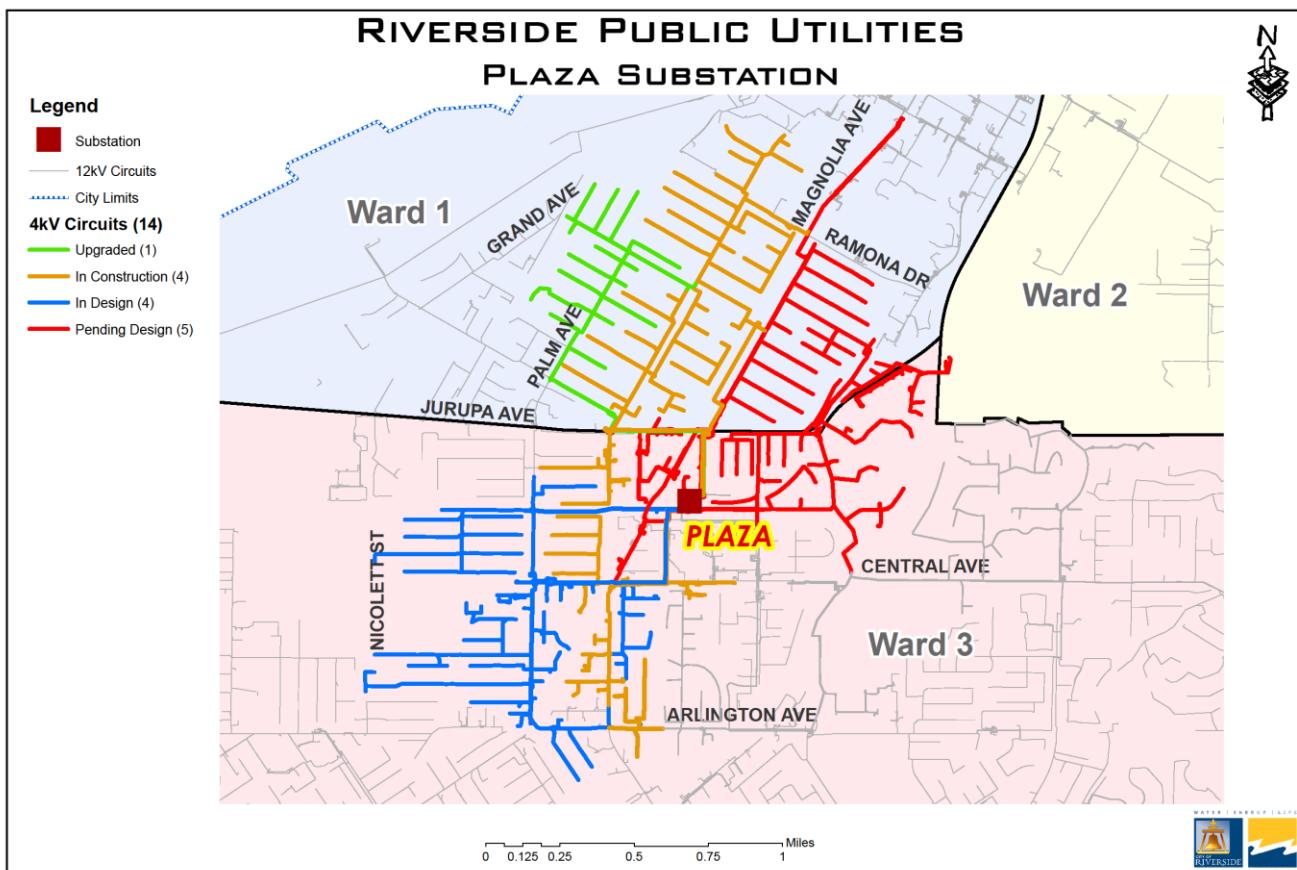
The next nine (9) circuits to be designed and issued to construction will originate from the Plaza Substation as outlined in the summary below.

4kV to 12kV Plaza Substation summary

1. (1) Circuit has been upgraded to date.
2. (4) Circuits are currently in construction.
3. (4) Circuits are currently in design.
4. (5) Circuits are pending design.

Circuit status	Number of 4kV circuits	Number of customers	Total linear feet of wire to be evaluated	Electrical design completion status	Projected construction completion date
Circuits upgraded	1	455	61,754	Complete	February 2017 (complete)
Circuits in construction	4	1,376	213,211	Issued to construction	June 2018
Circuits in design	4	667	104,995	October 2018	June 2019
Circuits pending design	5	2,415	305,040	June 2019	June 2021
Totals	14	4,913	685,000		

4kV to 12kV Plaza Substation Summary



The conversion of all 4kV circuits out of Plaza Substation is projected to be completed by June 30, 2021. The conversion of the balance of remaining circuits will be complete by 2026.

FISCAL IMPACT:

There is no fiscal impact related to Board action.

Prepared by: George R. Hanson, Utilities Assistant General Manager/Energy Delivery

Approved by: Todd L. Jorgenson, Interim Utilities General Manager

Approved by: John A. Russo, City Manager

Approved as to form: Gary G. Geuss, City Attorney

Certifies availability
of funds: Laura M. Nomura, Utilities Assistant General Manager/Finance & Administration

Attachment: Presentation

Project Site Map