Agenda – Day 2
Preliminary Reliability Assessment Results

Tom Cuccia
Senior Stakeholder Engagement and Policy Specialist

2013/2014 Transmission Planning Process Stakeholder Meeting
September 25-26, 2013

2013/2014 Transmission Planning Process Stakeholder Meeting - Today's Agenda

Topic	Presenter
Introduction	Tom Cuccia - ISO
SDG&E Proposed Reliability Solutions	John Jontry, Huang Lin & Denis Katacha – SDG&E
SCE Proposed Reliability Solutions	Jonathan Yuen & Yan Zou - SCE
VEA Proposed Reliability Solutions	Chris Tomchuk - VEA
PG&E Proposed Reliability Solutions	Meng Zhang, Greg Ligon & Isaac Read – PG&E
Next Steps	Tom Cuccia - ISO

2013 Grid Assessment Results

CAISO Stakeholder Meeting

September 25-26, 2013

Agenda

- Introduction
  - San Diego Area Summary
  - Objectives
- SDG&E Grid Assessment Study
  - 2013 Study Scope
- Expansion Plan Summary
  - Study Results & Expansion Plan
    - Major Projects
    - Small Projects
- Project Summaries
  - Projects requiring CAISO approval

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Introduction

San Diego Area - Summary

- The assessment identified:
  - Category B and Category C overloads
  - Low voltages and voltage deviations on 69 kV substations driven by Category B contingencies
- Comparing to last year results:
  - All Category B overloads until years 2018 and 2023 mitigated by projects and/or SPS

Introduction

Objectives

- SDG&E Project Proposals
  - Mitigate overloaded facilities
    - Category B contingencies
  - Mitigate voltage deviations
    - Category B contingencies
  - Operating procedures, SPS
    - Category C contingencies

2013 Study Assumptions

- Study years
  - Five-Year Studies (2014-2018)
  - Ten-Year Study (2023)
- Major assumptions
  - CEC Load Forecast for San Diego
  - SONGS retired in all study years
  - Cabrillo II peakers retired in study years 2015 and later
  - Encina retired in study years 2018 and later
  - Pio Pico online in study year 2015
  - CAISO-approved reactive power projects
  - SX-PQ 230 kV line in study years 2017 and later

Expansion Plan Summary- Major Projects

- HVDC /AC Alternatives
- 3rd 230 kV Circuit Suncrest & Los Coches 230 kV Substation Expansion
- Poway Load Pocket Comprehensive Plans:
  - Artesian 230 kV Expansion
    - Potential postponement or cancellation of TL6961(Sycamore-Bernardo)
    - Battery storage as interim mitigation
  - Chicarita 69 kV Conversion
  - 3rd Sycamore to Pomerado (UG) 69 kV Line
- 230 kV Imperial Valley flow control project
- 230 kV Reactive Support Projects - Mission and Sycamore

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HV AC/DC Alternatives

Proposed New HV Transmission Lines

- **Need Justification**
  - Meet G-1/N-1 and N-1-1 planning criteria
  - Retirement of SONGS
  - Retirement of Once Through Cooling (OTC) units in Southern California
  - In Service Date = June, 2022
- **Evaluation Criteria**
  - Viable and Feasible Alternatives (Multi-Disciplinary)
  - Reduce the Need for In-Basin Generation
  - Transfer Capacity
- **Potential Technologies**
  - AC – 500 kV and/or 230 kV
  - HVDC – Voltage TBD (±320-500 kV)
    - Line Commutated Converter (LCC)
    - Voltage Source Converter (VSC)
  - Overhead, Underground and Underwater

Proposed New HV Transmission Lines

Proposed 4 Alternatives

Alternative[1]	Technology	Approximate Length	Approximate Reduced Generation	Approximate Project Cost
1A *Imperial Valley Substation to a new north inland substation*	500 kV AC *Overhead*	145 miles	1401 MW	*$3.1B - $3.8B*
1B *Imperial Valley Substation to a new north inland substation*	HVDC[2] *Overhead and Underground*	145 miles	1401 MW	*$4.7B - $5.7B*
2A *Valley Substation to a new north inland substation*	500 kV AC *Overhead*	35 miles	1450 MW	*$1.6B - $1.9B*
2B *Valley Substation to a new north inland substation*	HVDC[2] *Underground*	35 miles	1450 MW	*$3.3B - $4.0B*

[1] Other included work within each alternative is the reconductoring of TL 23030 (ES-TA) to a minimum rating of 1175/1175 MVA normal/emergency and loop-in to a new north inland substation. Construct a new 230 kV transmission line on the vacant side of the existing tower line supporting TL 23030 between Escondido and Talega substations and loop-in to the new north inland substation.

[2] Further analysis is required to determine final voltage level for proposed HVDC alternatives

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3rd 230 kV Suncrest Circuit/Los Coches 230 kV Expansion

Project Title:	***District:***	***Need-Date:***	***Project:***
3rd SCR 230 kV Circuit/LC 230 kV Expansion	**Bulk Power**	**June 2018**	**P13XXX**

Driving Factor:

- NERC Violations: 500 kV N-1
- Congestion
- Need for additional Sunrise outlet

Scope:

- Construct new 230 kV line:
  Suncrest to Los Coches
- Expand Los Coches to 230 kV

Cost Range: $210M to $262M

Advantages:

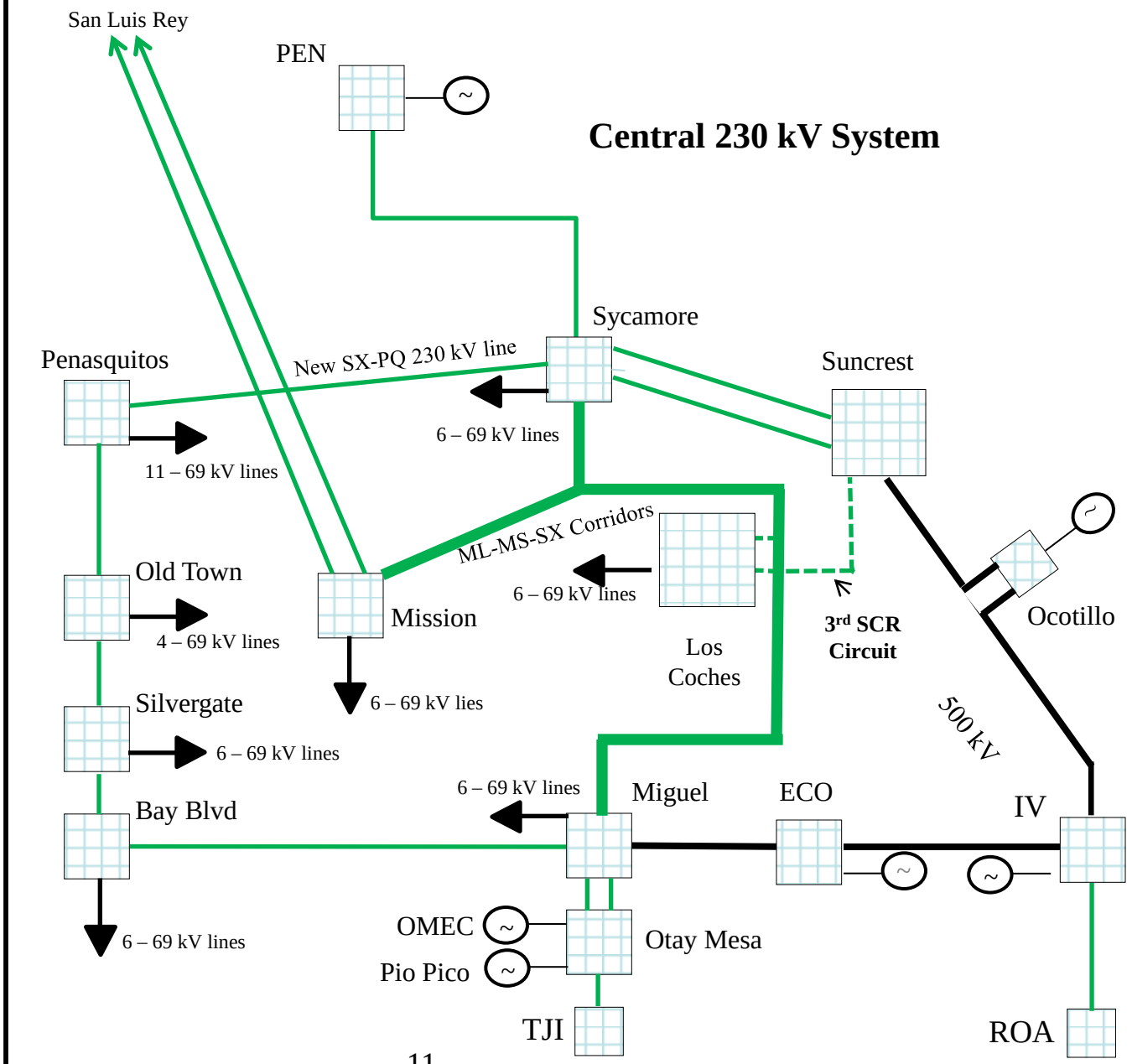
- Deliver in-basin generation closer to load,
- Improves Sunrise flowability,
- Adds strength to the core transmission network, and
- Import Capability? (studies in progress).

Issues:

- Routing / Environmental
- Cost / Benefit
- Licensing

Status:

CAISO – Approval Pending



Project Title:	***District:***	***Need date:***	***Project:***
3rd SCR 230 kV Circuit/LC 230 kV Expansion	**Bulk Power**	**June 2018**	**P13XXX**

Driving Factors:

- Operating flexibility,
- North of Miguel corridor,
- Deliver generation closer to load,
- Post contingency loading on TL6916 [Sycamore-Scripps] , and
- Need for a 2nd outlet from Sunrise.

Scope:

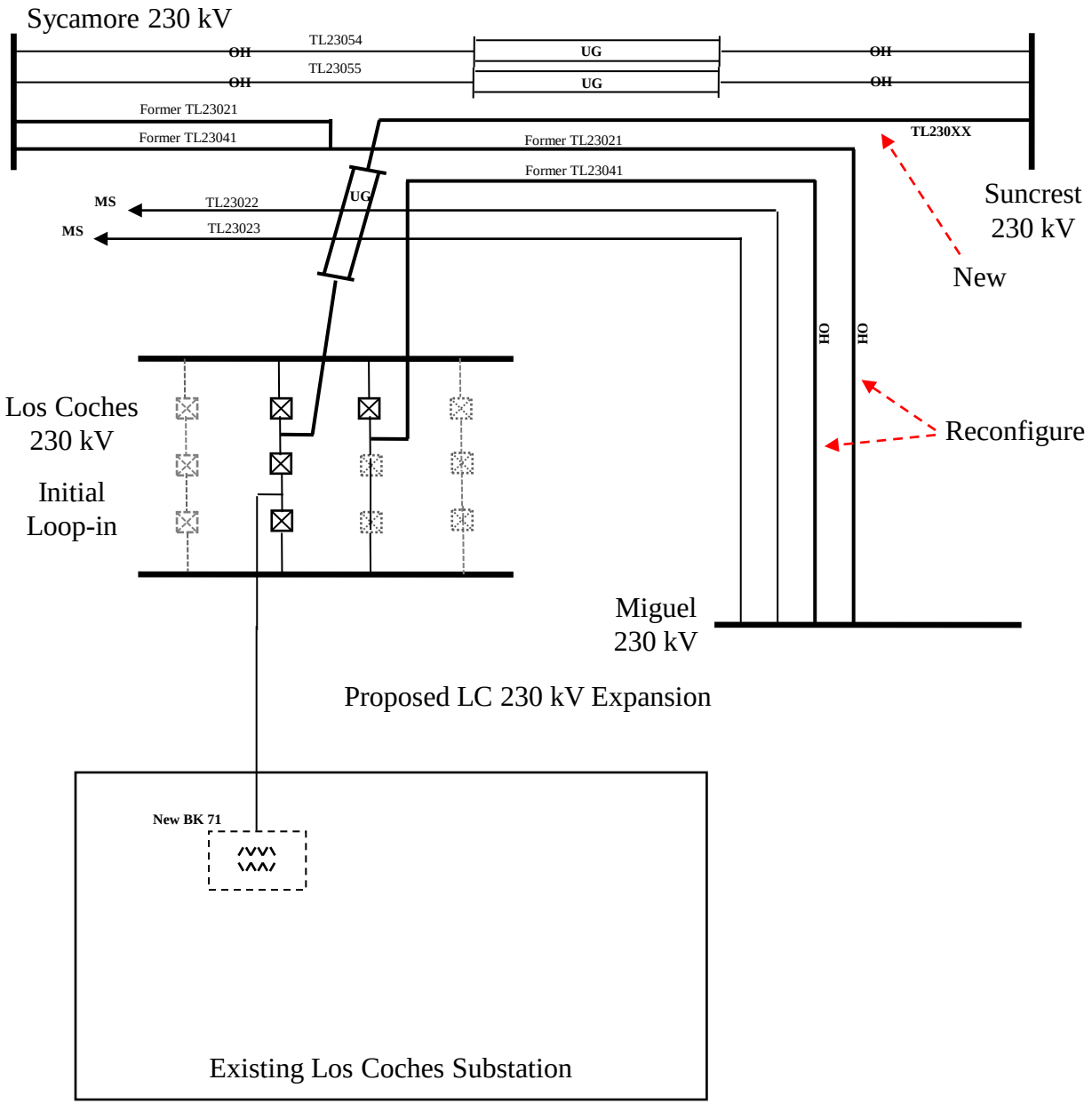
- 230 kV: construct 4 bay 1-1/2 breaker bus, loop-in TL23041 from ML and new TL230XX from Suncrest.
- Reconfigure TL23021 & 41 from Sycamore to form single SX-ML line.
- Install 1 – 230/69 kV 224 MVA Xfmr.

Issues:

- Licensing
- Environmental
- Topography
- Grading

Alternative:

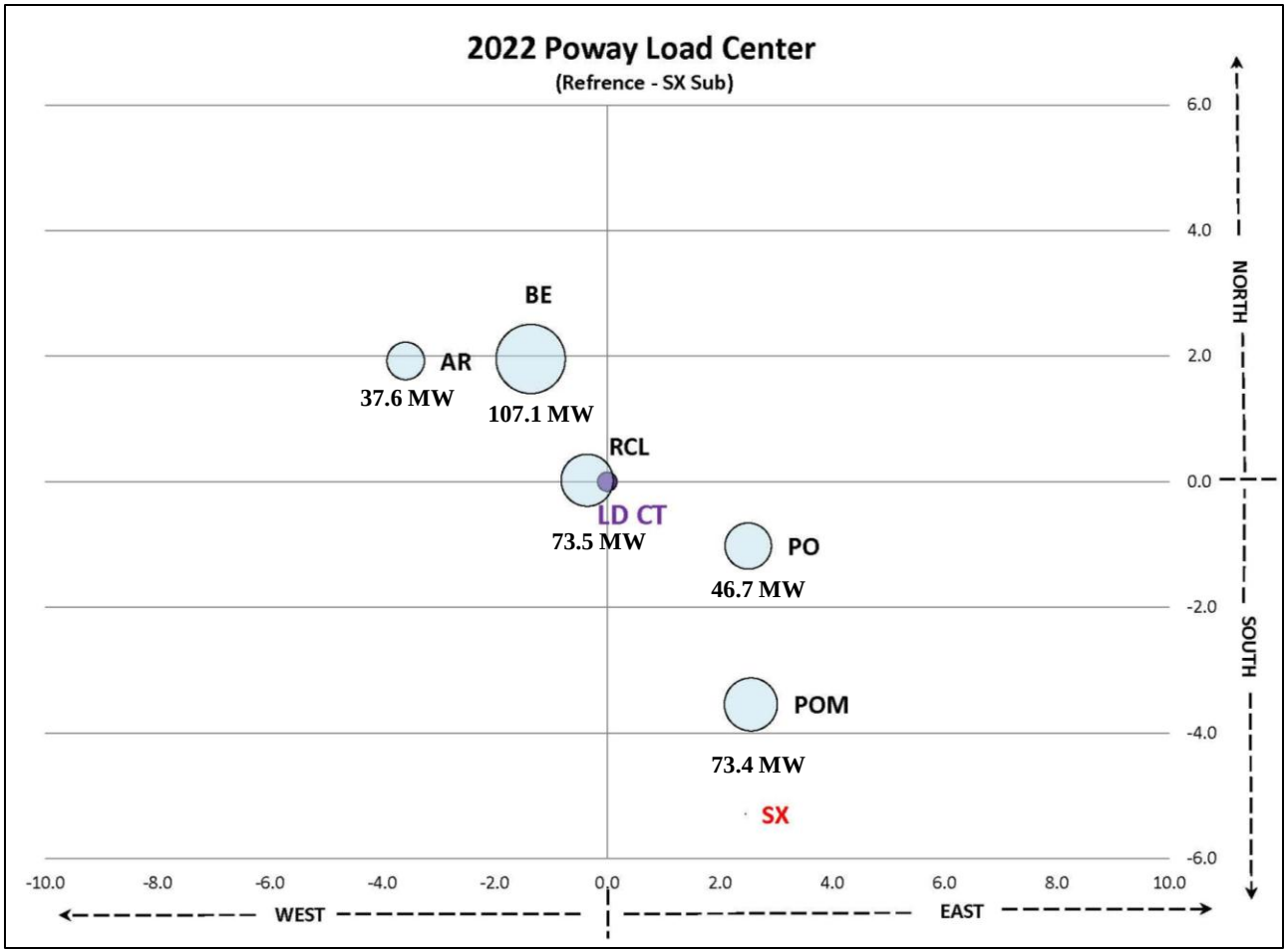
- Continue to upgrade 138 kV & 69 kV facilities in the Sycamore area



Poway Load Pocket Comprehensive Plans

Poway Load Center

Near Rancho Carmel Substation
(4 mile radius)



Poway Load Pocket Overview

District: **Northeast**

Project: **P13XX**

Driving Factor:

•Cat B Criteria Violations
Outage of TL6915 or 6924
[Peak & Sensitivity cases]
•Loading on the PLP continues to grow.
- •304 MW in 2014
- •341 MW in 2023
- (12% load increase)

•Mitigate existing 69 kV congestion at Sycamore

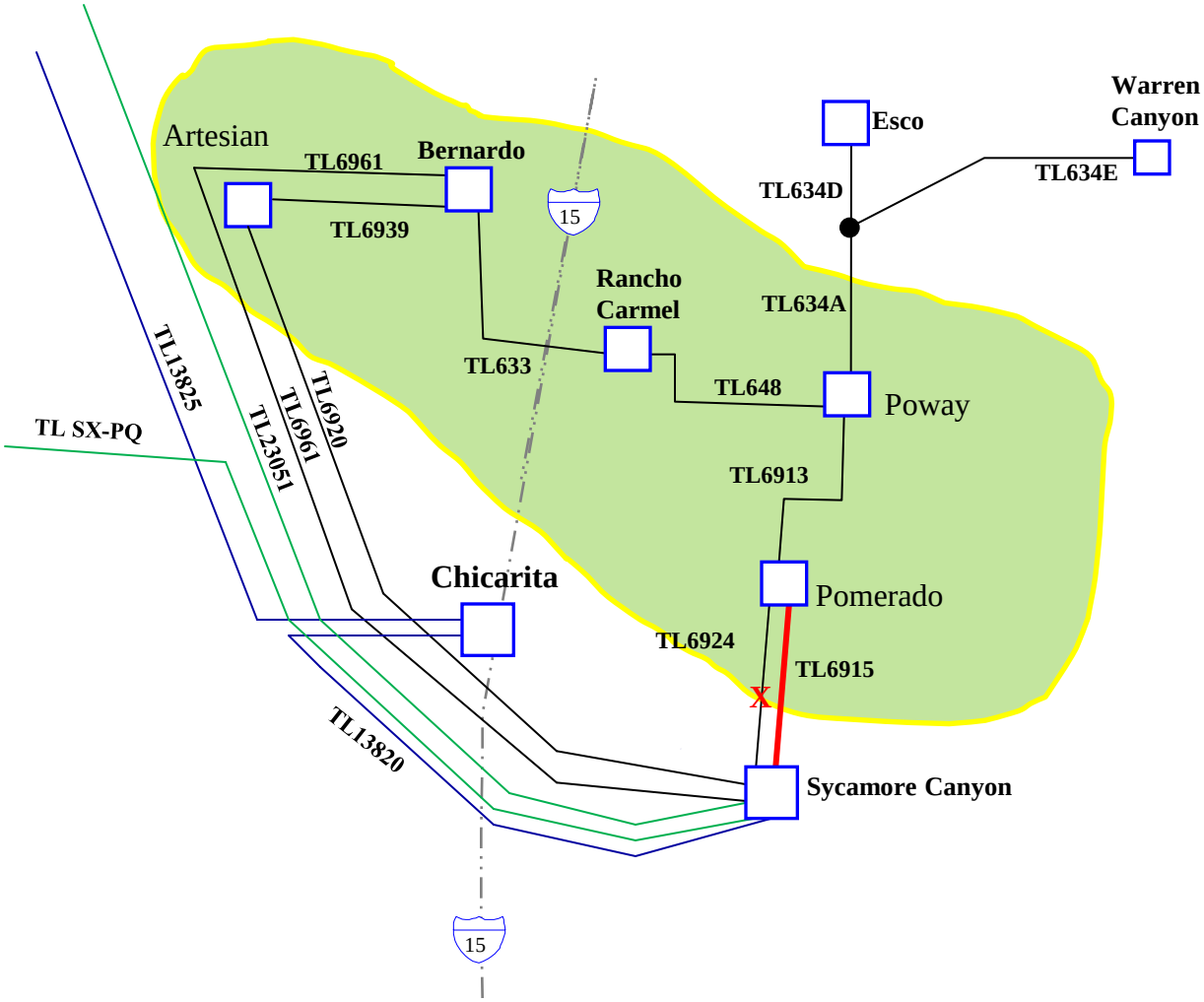
Issues:

•N-1 of either TL6915 or TL6924 overloads the remaining line above the 174 MVA Emergency Rating
- With TL6961:
  - SDG&E Case – 96.4% in 2023
  - CAISO Case – 101.0% in 2023
- Without TL6961:
  - SDG&E Case – 101.6% in 2016
  - – 108.0% in 2017

Scope:

Three Alternatives Studied:
1. Artesian 230 kV Expansion
2. Chicarita Conversion to 69 kV
3. Add a 3rd SX-POM Line

One Interim solution:
- Battery Storage at Poway



Contingency – TL6915 or TL6924 X

Overloaded Conductor

69 kV Line

138 kV Line

230 kV Line

Project Title: Artesian 230 kV Expansion
(Recommended Alternative)

District: **Northeast**

Need-Date: **June 2016**

Project: **P13XX**

Scope:

•Make Artesian Substation a primary source for the Poway Load Pocket
•Expand AR to a 230/69 kV Substation, split in two Phases:

Phase 1: In 2014
Purchase available Real Estate ~ 3.5 acres

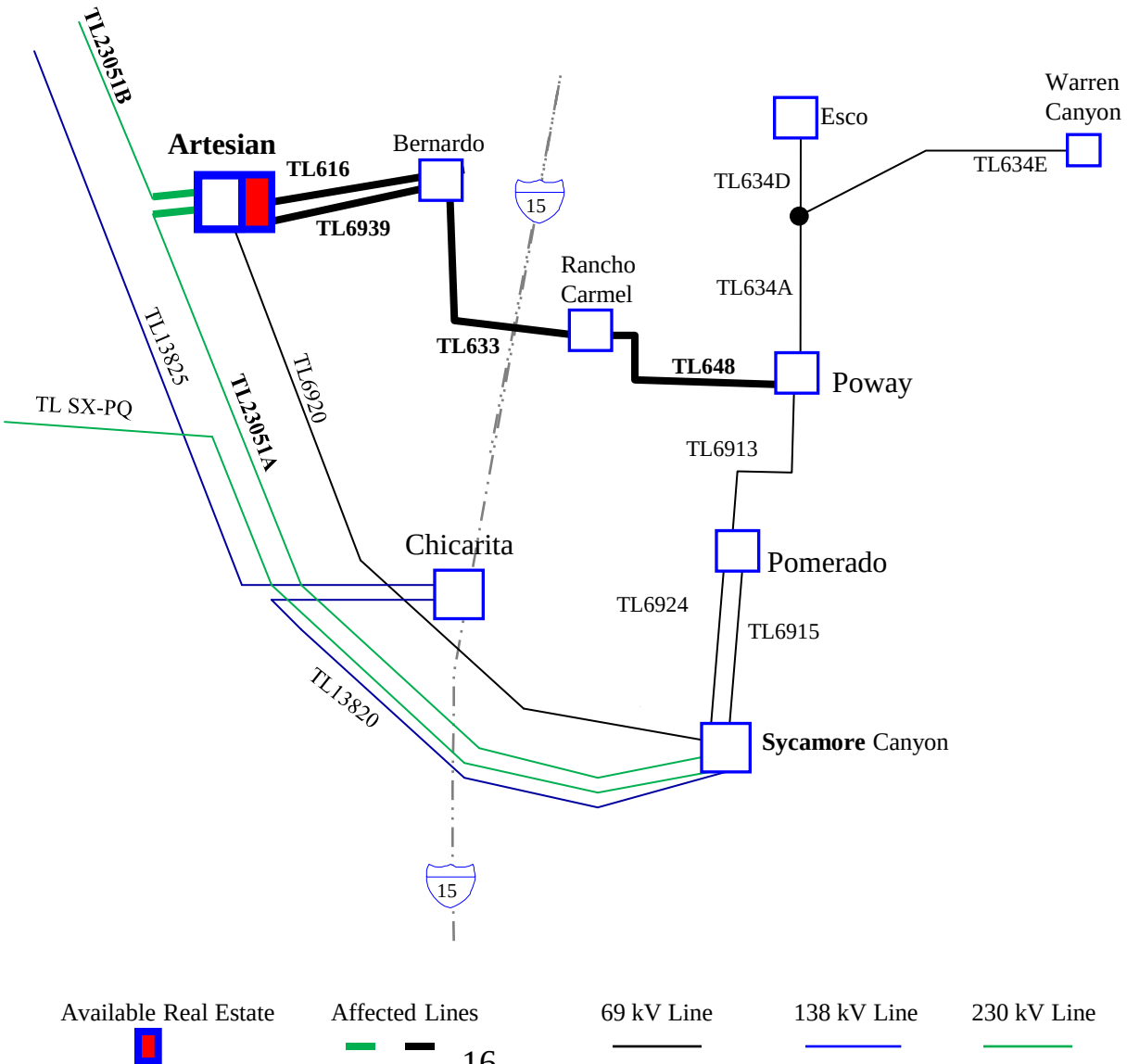
Phase 2: In 2016
•Expand AR69 to 230/69 kV & Loop in TL23051
•Reconductor both AR-BE lines to achieve a 137 MVA rating (original part of TL6961)
•Reconductor TL633 to achieve 145/179 MVA rating
•Reconductor TL648 to achieve 137 MVA rating

Cost Range: $72M-$92M

Benefits:

•Cancel TL6961 Project ~ 11miles (cost saving of ~$43M)
•Provide a second 230 kV source to the Poway load pocket.

Topology for 2016



Project Title : Poway Battery Storage *(Interim Solution)*	***District:*** **Northeast**	***Need-Date:*** **June 2014**	***Project:*** **P13XXX**

Driving Factor:

Alleviate existing 69 kV congestion at Sycamore

Issues:

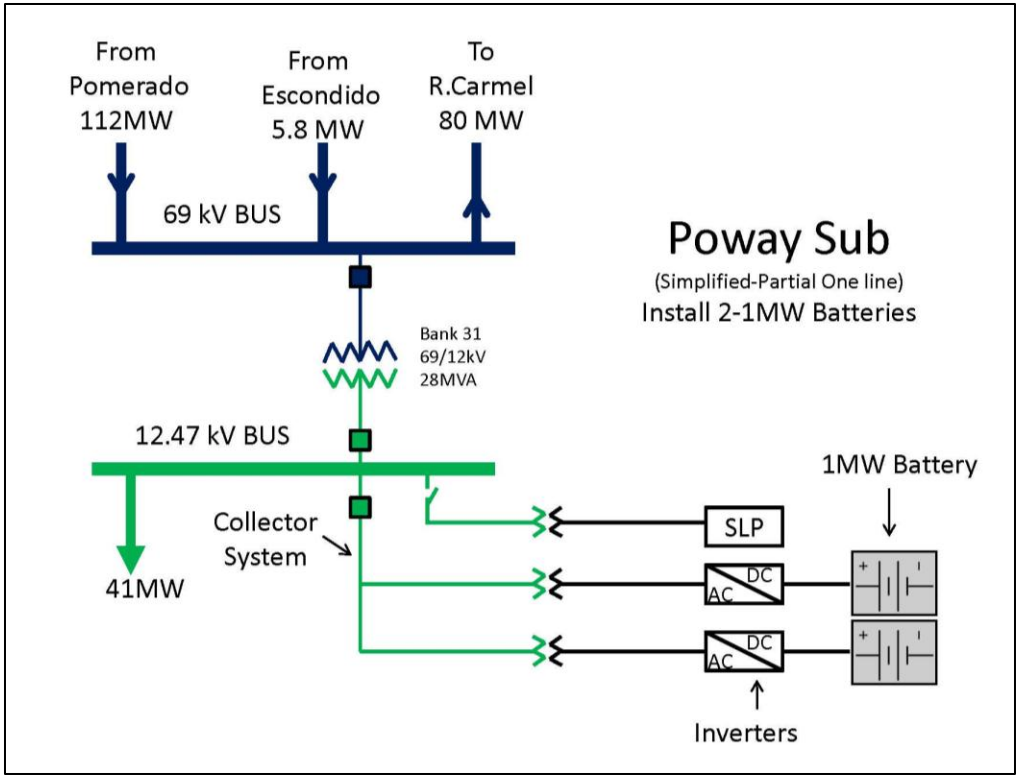
- TL6915 & TL6924 are the primary source to the Poway Area Load Pocket
- For Cat B contingencies loading on TL6915 or TL6924 is greater than 90%, respectively
- Loading in the Poway Load Pocket continues to grow.

Scope:

- Install 2-1 MW battery units at Poway Substation for peak load reduction during extreme heat waves
- Poway has available real state to accommodate batteries

Benefits:

- Reduces loading in Poway Load pocket by as much as 1%.
- Possibly defer transmission upgrades to 2017 without TL6961



Project Title: Chicarita 69 kV Conversion *(Alternative 1)*

District: Northeast

Need-Date: In 2022

Project: P13XX

Scope:

•Convert Chicarita 138 kV to 69 kV
- 6 Transmission Circuits
- 3-69/12 kV Transformers

•Loop-in TL6920 & TL6961 into Chicarita. Reconductor both SX-CC segments to achieve 145/174 MVA ratings

.

•Build two new lines from Chicarita to Camino Del Norte and Intercept TL648.
- TL69XX – CC-R.Carmel
- TL69YY – CC-Poway

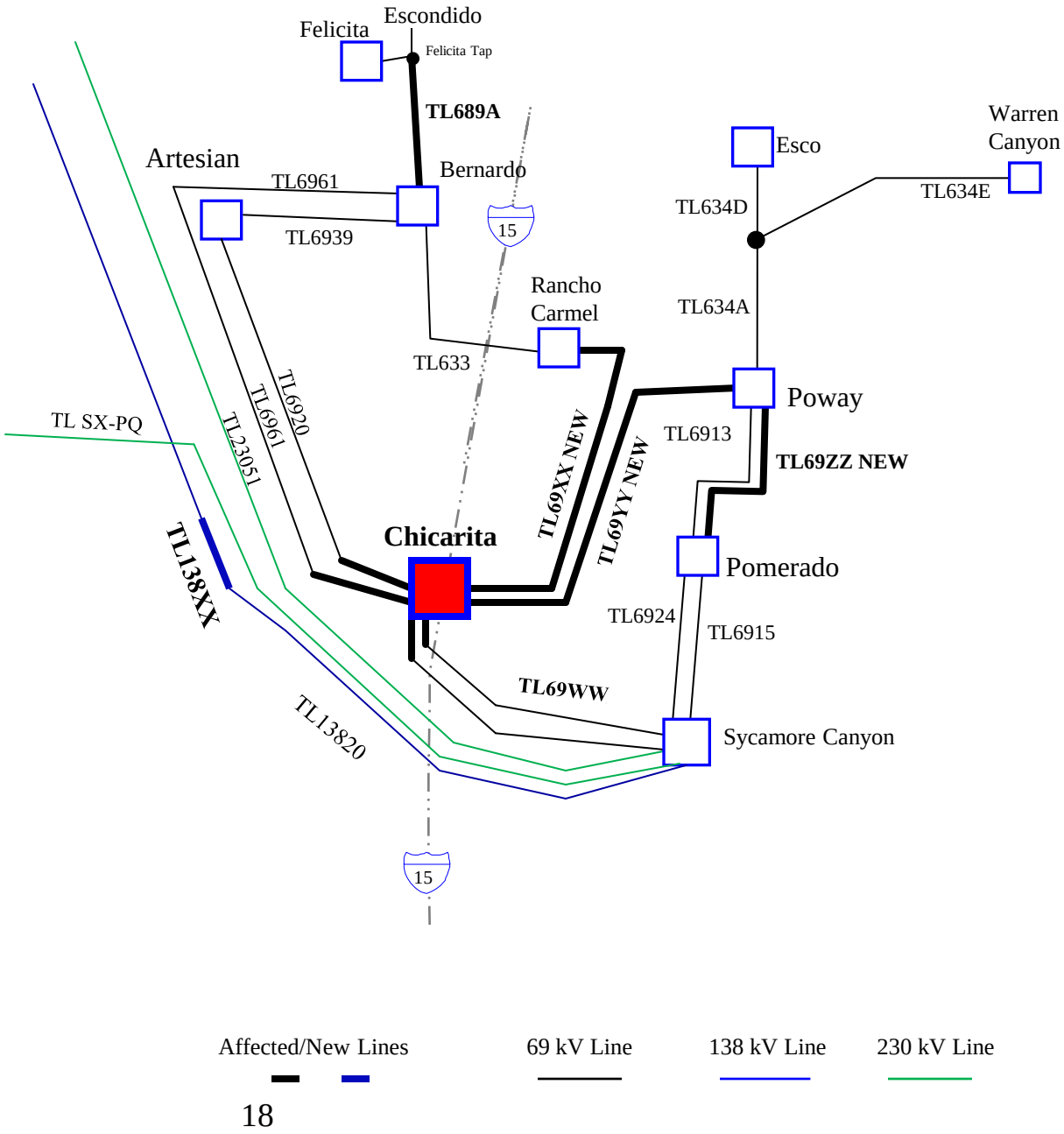
Both lines to achieve a 145/179 MVA rating

•Add 2nd Pomerado – Poway 69 kV Line TL69ZZ

• Reconductor TL689A (Bernardo – Felicita Tap) to achieve a 174 MVA.

•Add 69 kV capacitor at R.Carmel, BE or PO

Cost Range: Pending



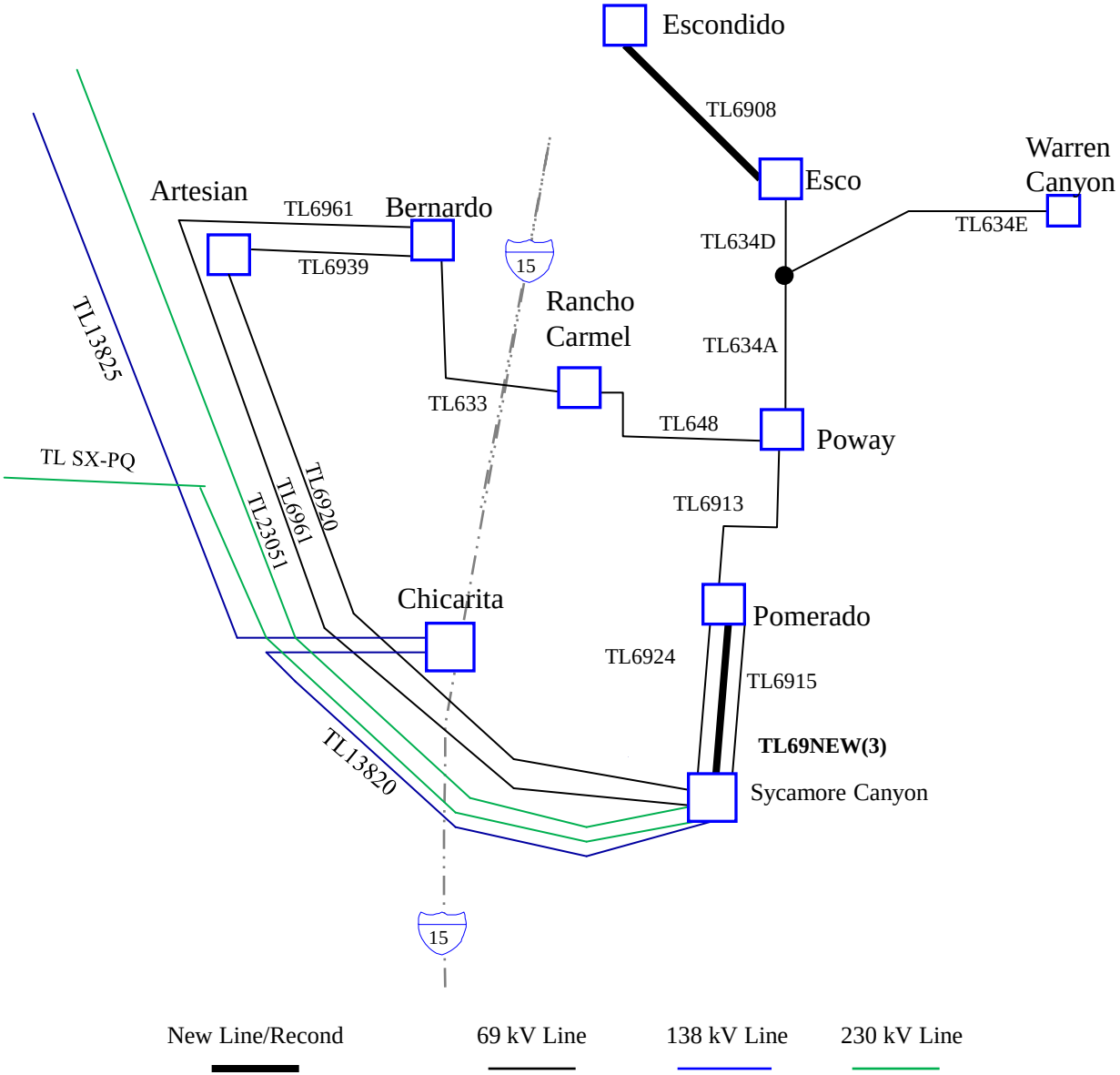
Project Title: 3rd Sycamore – Pomerado Line ***(Alternative 2)***

District:	***Need-Date:***	***Project:***
Northeast	**In 2022**	**P13XX**

Scope:

- Install 3rd SX-POM line to achieve a 145/174 MVA
- Reconductor TL6908 (Esco-Escondido) to achieve a 137 MVA rating
- SPS to trip 3rd SX-POM line in the event exceeds 174 MVA

Cost Range: $24.8M-31M (In addition to installing TL6961 as approved)



230 kV Imperial Valley Flow Control

Project Title:	***District:***	***Need-Date:***	***Project:***
Imperial Valley Flow Control	**Bulk Power**	**2016**	**P13XXX**

Driving Factor:
Renewable generation interconnections, CFE loop flow impact.

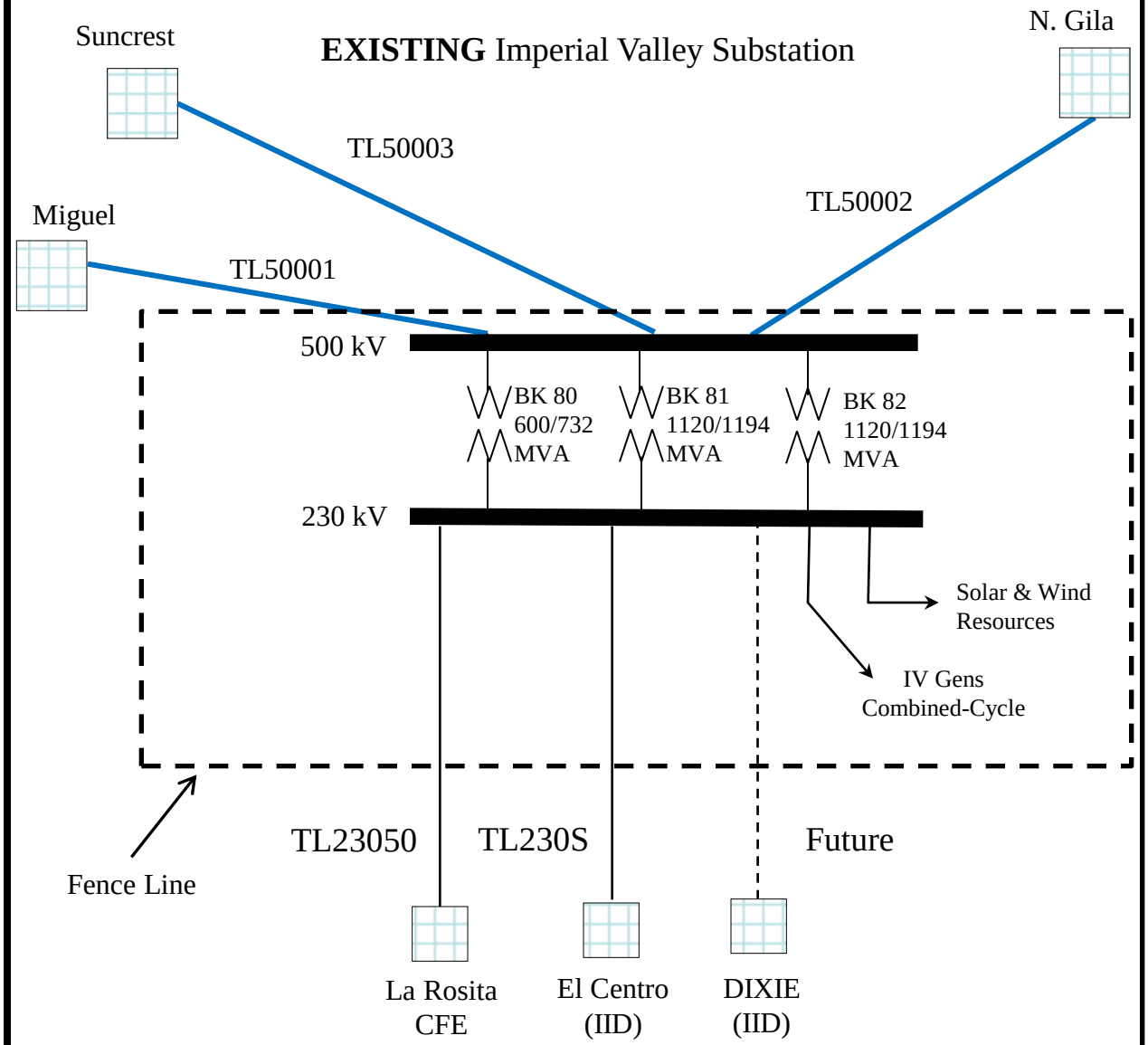
Scope:
Add Flow Control Device at IV
Add 230 kV bus: IV to CFE and IID

Cost Range: $55M to $68M

Issues:
-Post contingency flows through CFE
-Prevent tripping IV Gens
-Preserve existing interconnects

Alternatives:
a) Do nothing
b) Special Protection Systems
c) Phase Shifting Transformer(s)
d) Variable Frequency Transformers
e) Back to Back DC link

Status:
CAISO – Approval Pending



Project Title:	***District:***	***Need-Date:***	***Project:***
Imperial Valley Flow Control	**Bulk Power**	**2016**	**P13XXX**

Driving Factor:

RPS/renewable generation, and

Impact to SDGE, CFE & IID loop flow.

Scope:

Add 1000 MVA flow control device and 230 kV import/export bus at existing Imperial Valley substation to control loop flow on SDGE/IID/CFE Facilities.

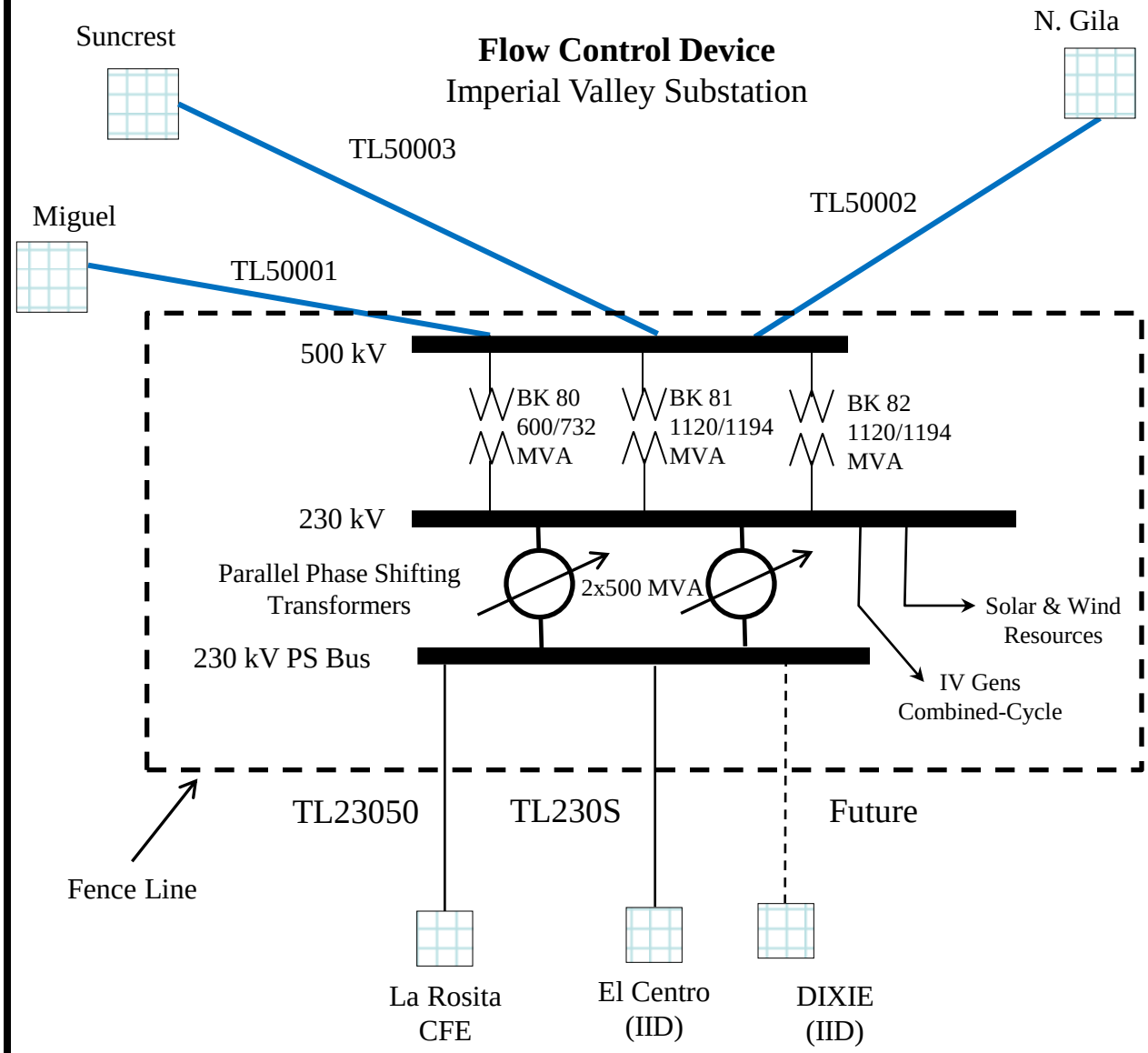
Cost Range: $55M to $68M.

Issues:

- Regional/regulatory coordination,
- Post contingency flows through CFE,
- Prevent tripping IV Gens,
- Preserve existing interconnects,
- Mitigate congestion, and
- Technology

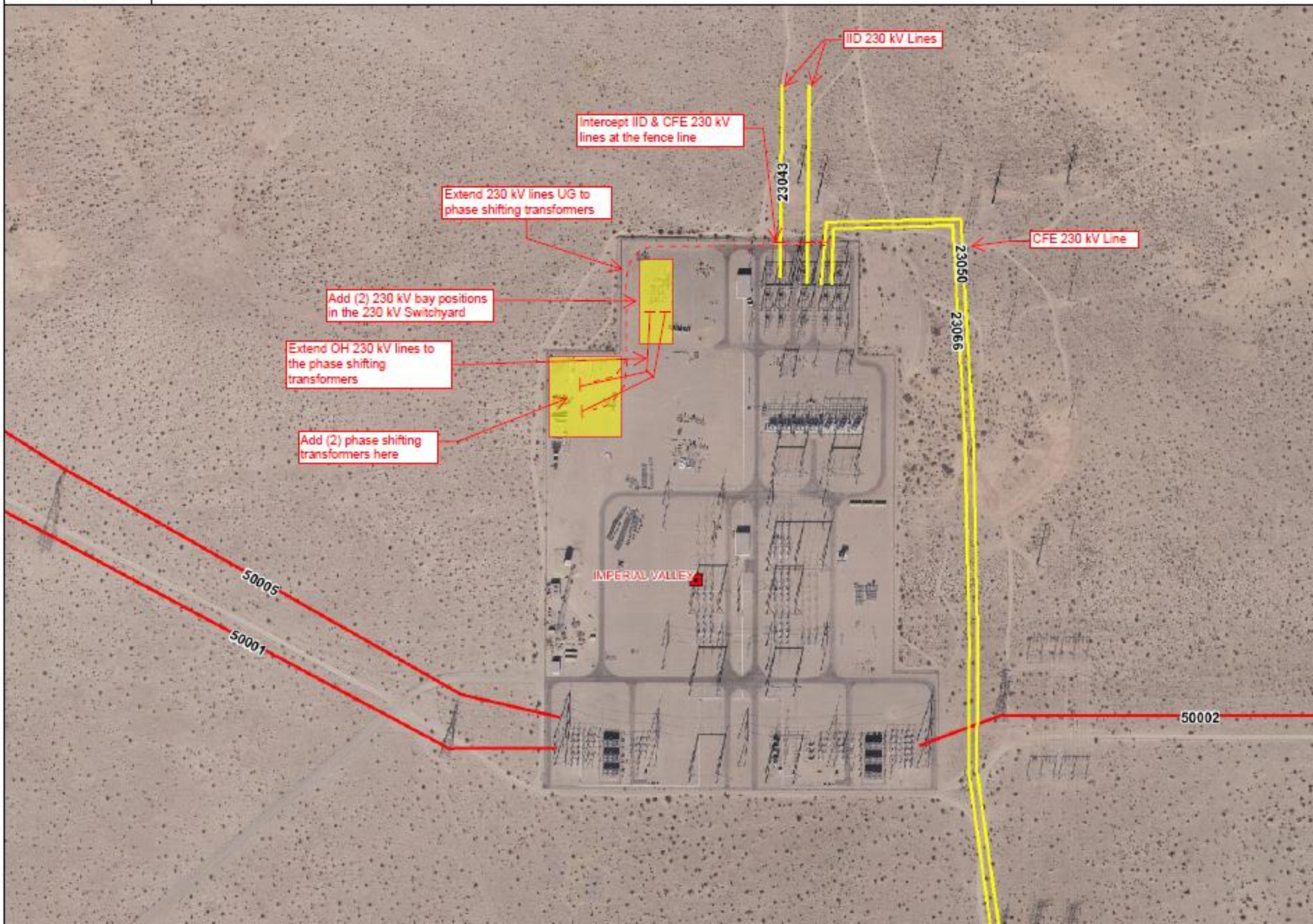
Alternatives:

a) Special Protection Systems
b) Variable Frequency Transformers
c) Back-to-Back DC link



LAND SERVICES GIS
http://gis.sempra.com

Imperial Valley Substation



230 kV Reactive Support Projects: Sycamore & Mission

Project Title:	District:	Need-Date:	Project:
Add 230 kV Reactive Power Support	Bulk Power	2018	P13xyz

Project Objective:

Add +240/-120 MVAR reactive power source at SDG&E's Sycamore and/or Mission Substation 230 kV Bus

Project Description:

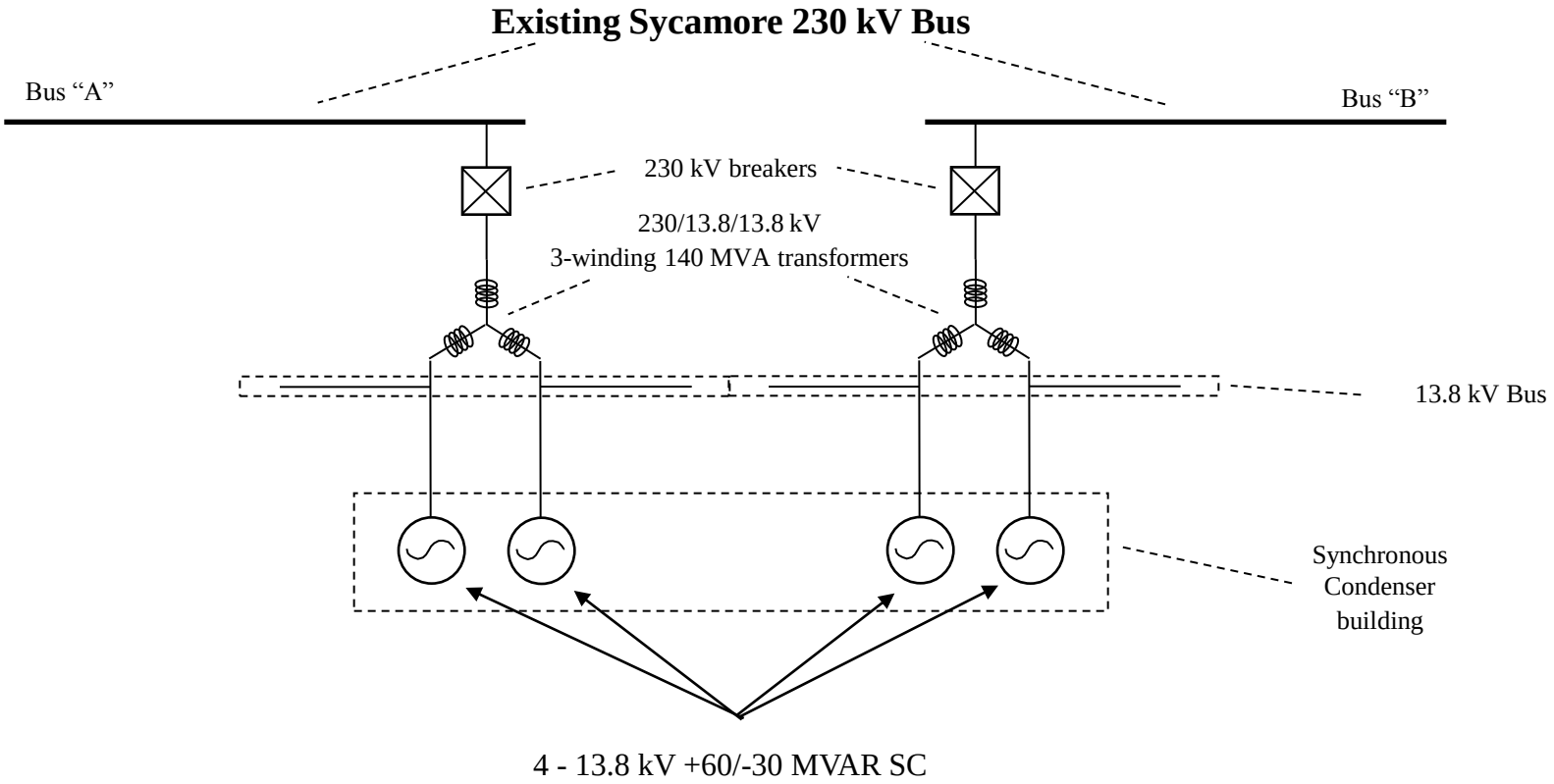
Install the following equipment at each site:

- 4 - +60/-30 MVAR 13.8 kV Synchronous Condensers
- 2 - 140 MVA, 230/13.8/13.8 kV, 3-winding transformers
- 2 - 230 kV breakers, disconnects, & UG cable to interconnect to each of the 230 kV bus sections
- Relaying, controls, RTU points for control/monitoring
- Enclosed 15 kV metal-clad switchgear
- Building to house Synchronous Condensers

25

Project Title:	***District:***	***Need-Date:***	***Project:***
Add 230 kV Reactive Power Support	**Bulk Power**	**2018**	**P13XXX**

Typical One-Line Diagram



Estimated Cost:

- Range of $60 to $75 million dollars for SX site
- Range of $66 to $83 million dollars for MS site

Summary of Justification

- Necessary to meet WECC 2.5% and 5% reactive margin requirements by 2018
- Partially replace inertia and dynamic reactive capability of retiring OTC generation
  - South Bay (2010 retirement)
  - SONGS (2013 retirement)
  - Encina (2017 OTC compliance date)
- Renewable Integration
  - Provides dynamic reactive capabilities that typical wind and photovoltaic/solar cannot provide
- Import Capability
  - Reduces the risk of voltage collapse during high import scenarios
- Operational Flexibility
  - Improves 230 kV voltage control
  - Increases secure operating range

27

Expansion Plan Summary- Small Projects (< 230 kV)

- 2nd San Marcos – Escondido 69 kV Circuit
- New San Luis Rey-Monserate 69 kV line
  - TL698A Reconductor (Avocado-Monserate Tap)
  - 30 MVAR Shunt Capacitor at Pendleton/Avocado
- TL690E Reconductor (Las Pulgas-Stuart Tap)
- TL605 Reconductor (Silvergate-Urban)
- TL617C Rose Canyon Tap Removal
- TL649D & TL623C Reconductor (Otay-San Ysidro)

Project Title:

2nd San Marcos – Escondido 69 kV Circuit

District: **Northeast**

Need-Date: **June 2015**

Project: **P13XXX**

Driving Factors:

- Real Time Operation congestion
- Planning Cases Cat B Criteria Violations beginning 2022

Issues:

- Post Contingency overloads in real time operations requires pre-contingency opening of TL684, radializing San Marcos load (80-100 MW)
- 69 kV congestion in Escondido to San Marcos corridor.
- 1% overload on TL680C in 2022

Scope:

Install 2nd TL from San Marcos to Escondido

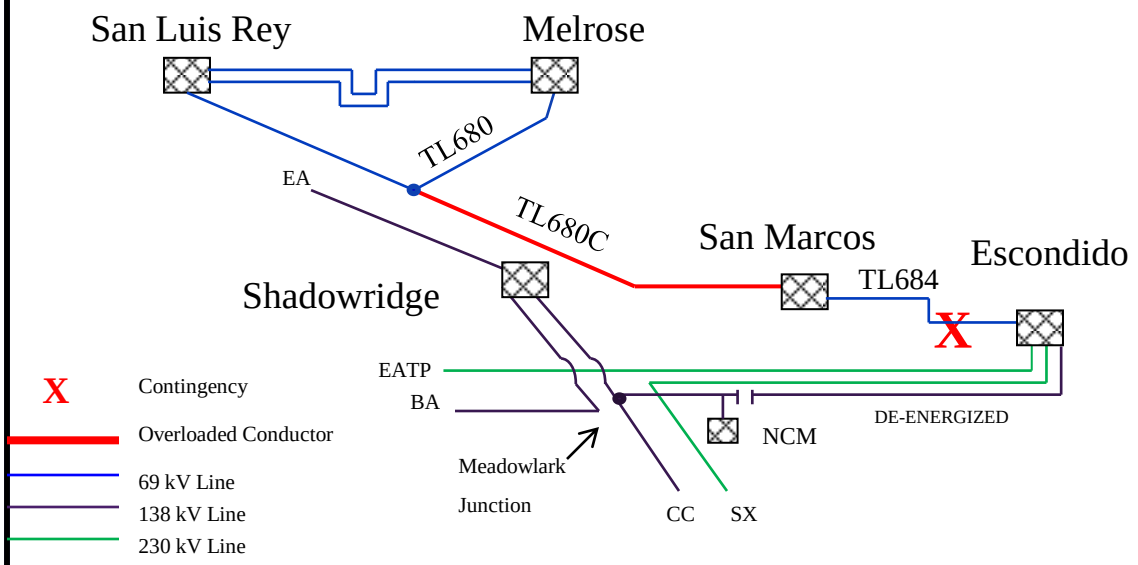
- Reconductor and energize existing 138 kV 'de-energized' line and convert to 69 kV
- Build new 69 kV circuit from Meadowlark Junction to San Marcos Blvd.
- At SM Blvd intercept TL680C pole line and double circuit to San Marcos Sub

Cost Range: $18M-$22M

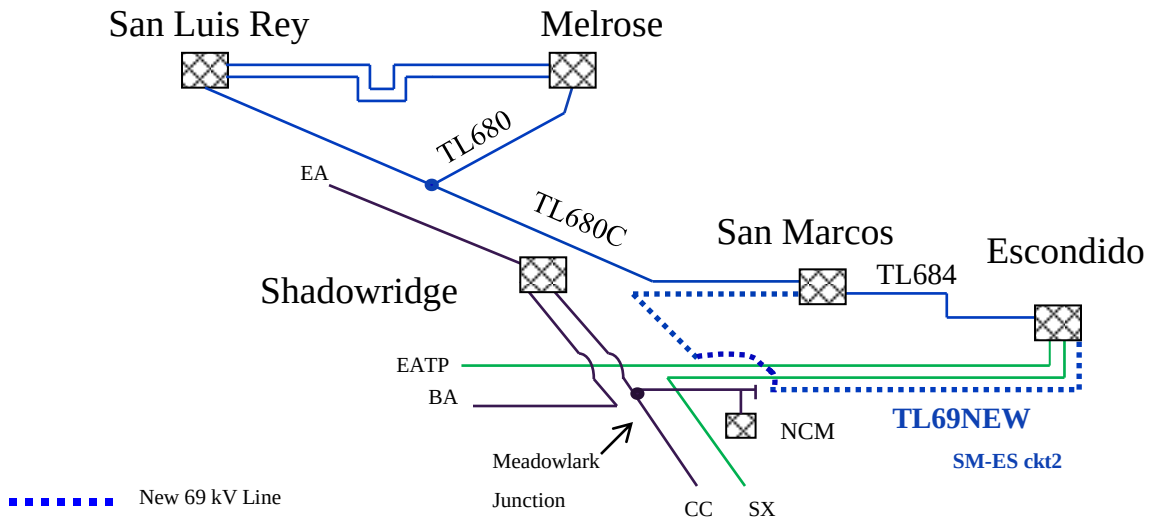
Alternatives /Cost Range:

- Reconductor TL680C (SM-ME Tap) ~ $18M-$23M
- 2nd SM-ES UG circuit ~$48M-59M

Existing



Proposed



Project Title:	***District:***	***Need-Date:***	***Project:***
New TL 69XX San Luis Rey - Monserate 69 kV line	**North Coast**	**June 2017**	**P12XX**

Driving Factor:

Cat B violations
[Peak & 4 Sensitivity Cases]

Scope:

New San Luis Rey to Monserate 69 kV line.

- RFS TL691B (Avocado Tap – Monserate)
- Use existing pole line and terminate new line at Monserate old TL691B breaker.

Cost Range: $35-$40M

Issues:

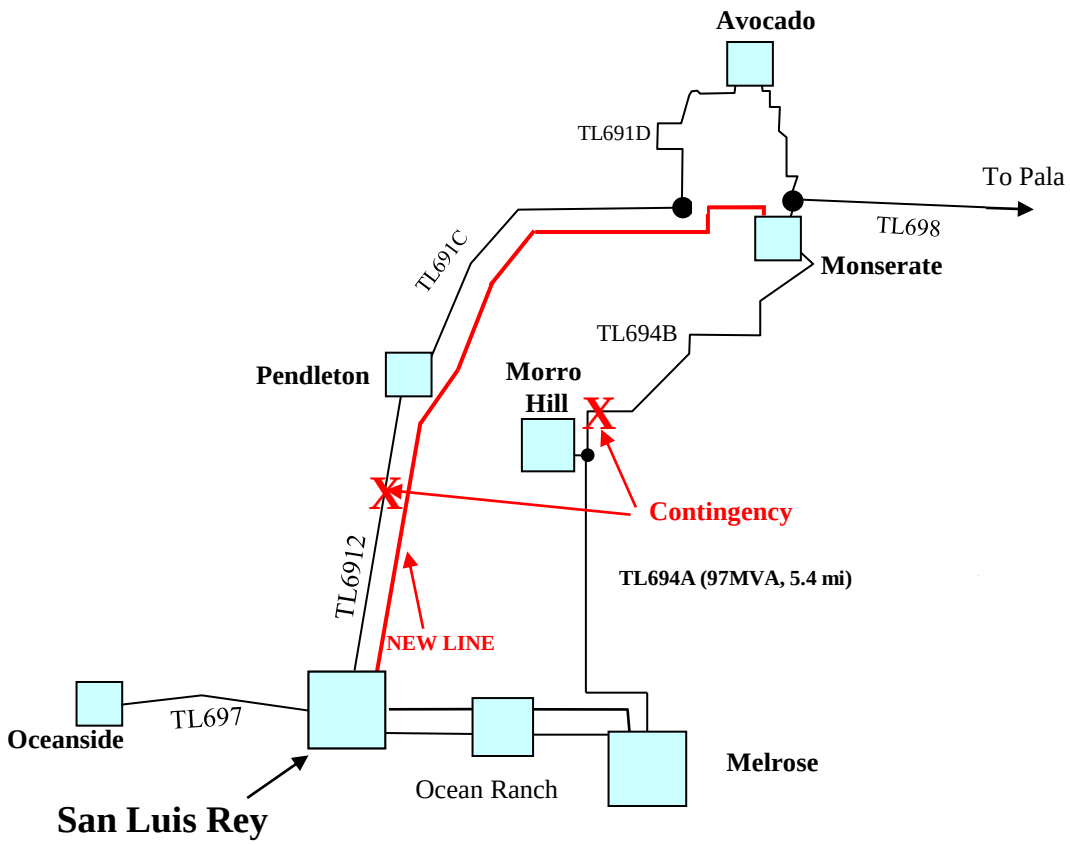
With Pala Gens OFF:

- N-1 TL6912 OL's TL694 by 2.1% in 2017
- N-1 TL694 OL's TL6912 by 4.9% in 2017

Alternatives:

- Dispatch Orange Grove peakers (Pala) - *Not an acceptable long-term mitigation*

- Reconductor TL694A to a minimum continuous rating of 115 MVA and reconductor TL6912 to a minimum continuous rating of 137 MVA



Project Title:	***District:***	***Need-Date:***	***Project:***
Reconductor TL698A (Avocado – Monserate Tap)	**NC/NE**	**Cap Install 2015** **Reconductor - Project Dependent**	**P13XXX**

History:

- **Identified in 2011**:
  - N-1 of TL6912 OL's TL694

  or
  - N-1 of TL694 OL's TL6912
- **Mitigation:**
  - Build new SA-MN line (ISD 2017)
- **Issue:**
  - Project pending CASIO approval
  - Relies on re-dispatch of the Pala gen

Driving Factor:

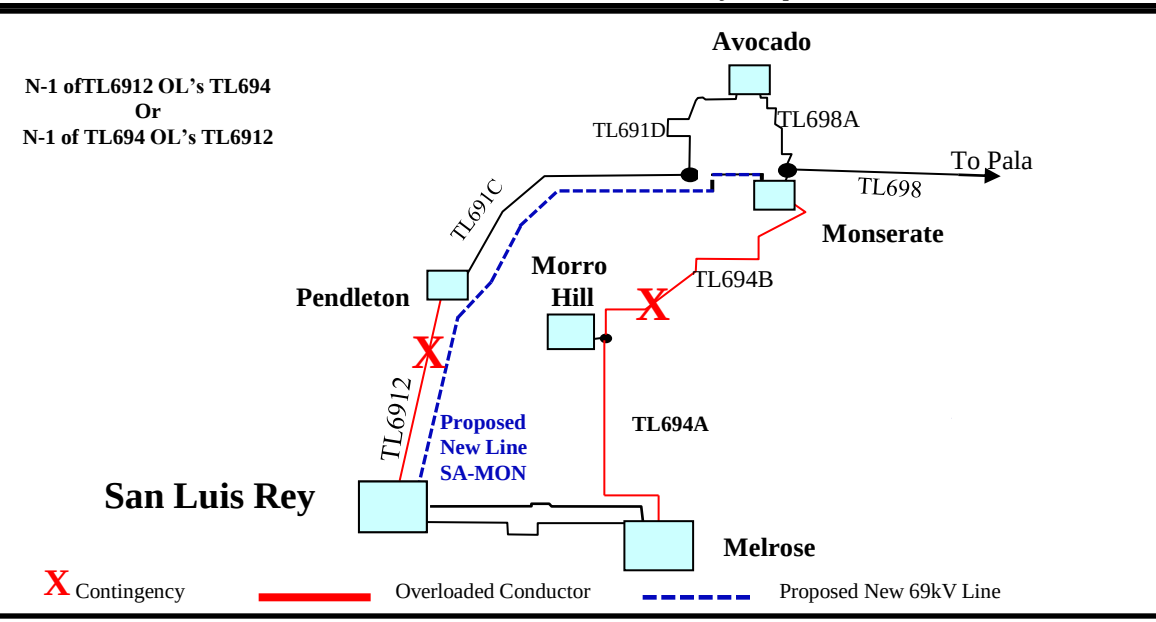
- Greater than 5% voltage deviation for N-1 of TL6912
- Pending CAISO approval for new SA-MN line
- New Cat B Criteria violation identified:
  N-1 of TL6912 (SA – PN) OL's TL698A

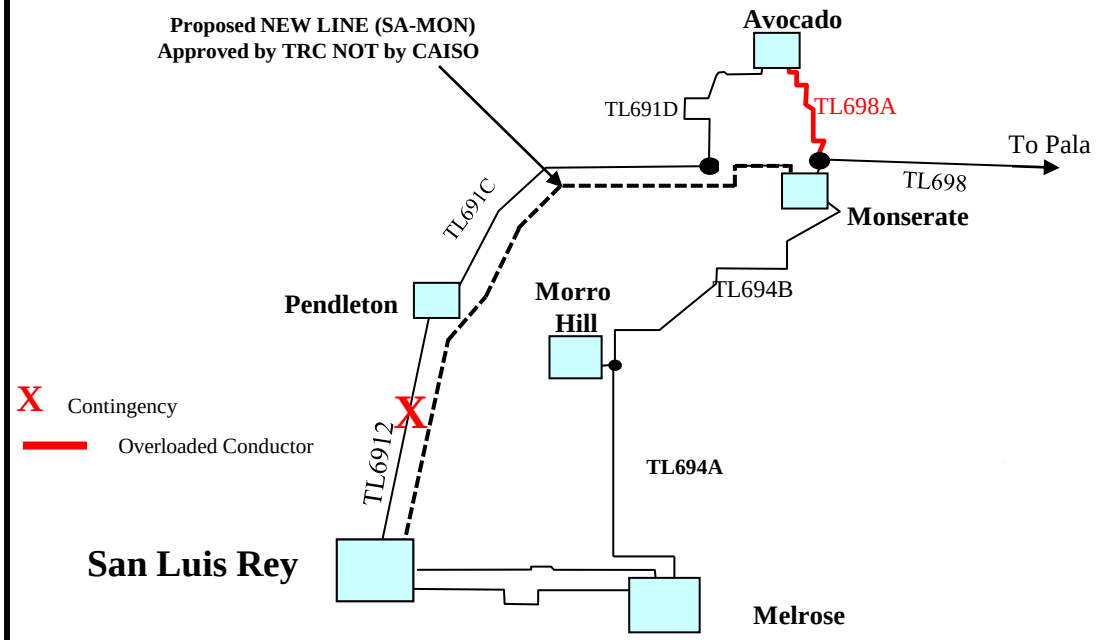
Scope:

- Install Capacitor at either Avocado or Pendleton (Cost Range: $1.3M - $1.6M)
- Reconductor TL698A (AV-MN Tap) to achieve 102 MVA rating. (Cost Range: $11.7M - $14.4M)

Alternatives:

Continue using Pala Gens as mitigation for Cat B contingencies





Project Title:	***District:***	***Need-Date:***	***Project:***
Reconductor TL690E: Stuart Tap – Las Pulgas	**North Coast**	**June 2015**	**P13XXX**

Driving Factor:

Cat B criteria violations
Loss of TA BK50 69/138 kV

Issues:

Outage at TA BK50 causes a 3% overload in TL690E in 2015

Scope:

Reconductor TL690E to a minimum continuous rating of 102 MVA

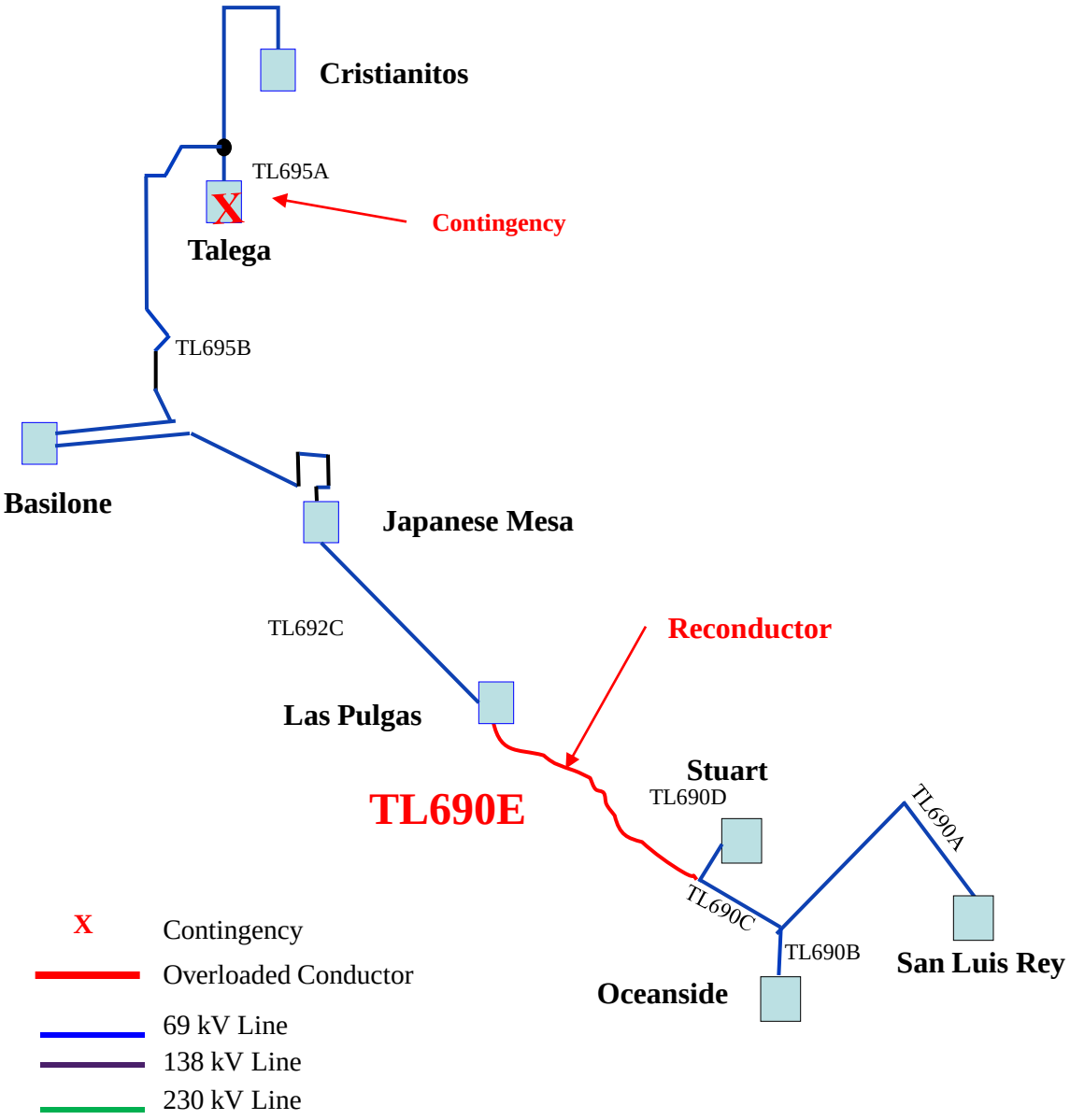
Alternative:

Advance Wood-to-Steel Re-conductor Project ISD 2015

Cost Range: $12 - $14 Million

Status:

CAISO – Approval Pending



Project Title:	***District:***	***Need-Date:***	***Project:***
Reconductor TL605 Silvergate-Urban	**Metro**	**June 2017**	**P13XXX**

Driving Factor:

Cat B violations

Scope:

Reconductor TL605 to a minimum continuous rating of 137 MVA

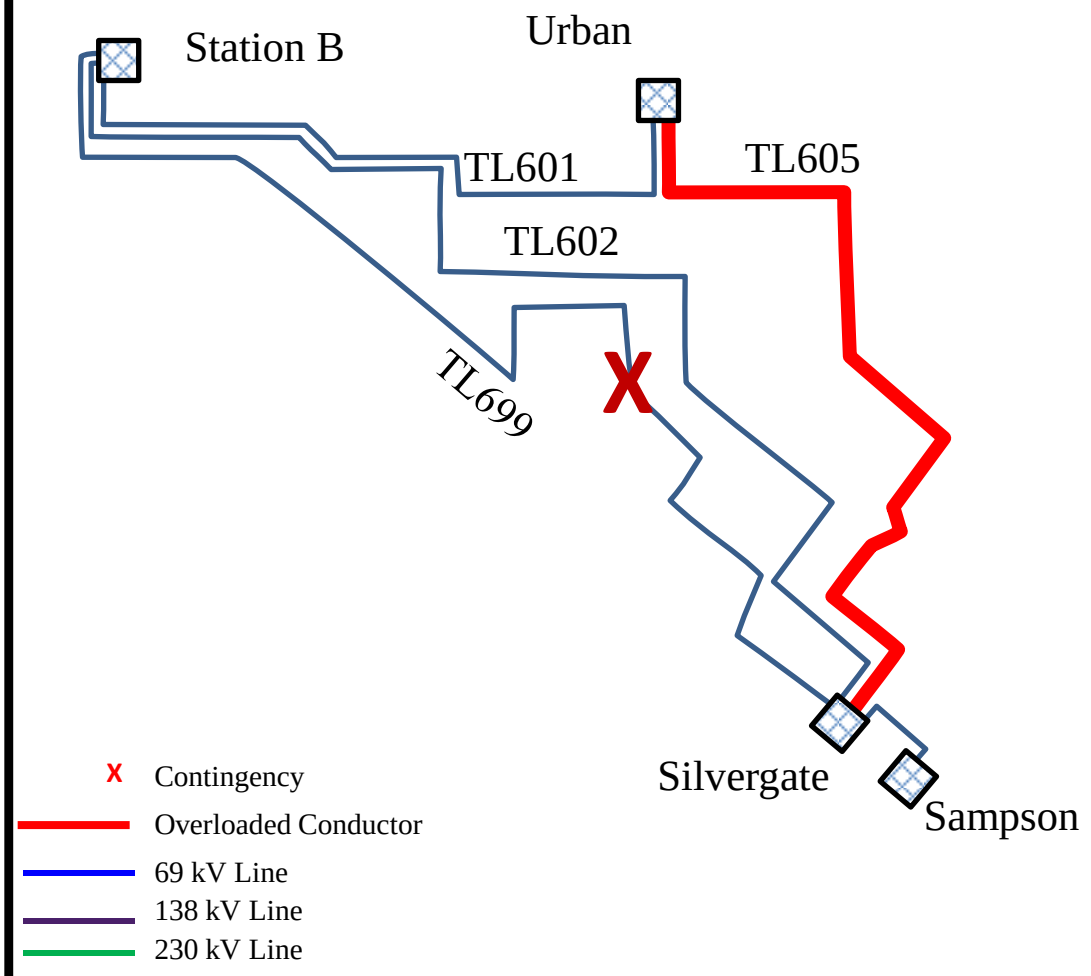
Issues:

- Beginning in 2017, an N-1 contingency loss of TL699 (Silvergate – Station B) will overload TL605 to 100.2% of its continuous rating.
- There is no effective generation re-dispatch or other system adjustment available post-contingency to reduce line loading to below its continuous rating.

Alternatives:

- None:- Due to a lack of local dispatchable generation it is not possible to mitigate the high loading on TL605. To reduce the line loading to be within the continuous rating, load shed will be required for N-1 contingency.

- **Cost Range:** $9M – $11M



Project Title:	***District:***	***Need-Date:***	***Project:***
Removal of Rose Canyon Tap	**Beach Cities**	**June 2018**	**P13XXX**

Driving Factor:
Cat B (N – 1) Criteria Violations beginning in 2018.

Scope:
Remove Rose Canyon Tap to create 2 new circuits:

- Rose Canyon – Pacific Beach and
- Rose Canyon – La Jolla #2

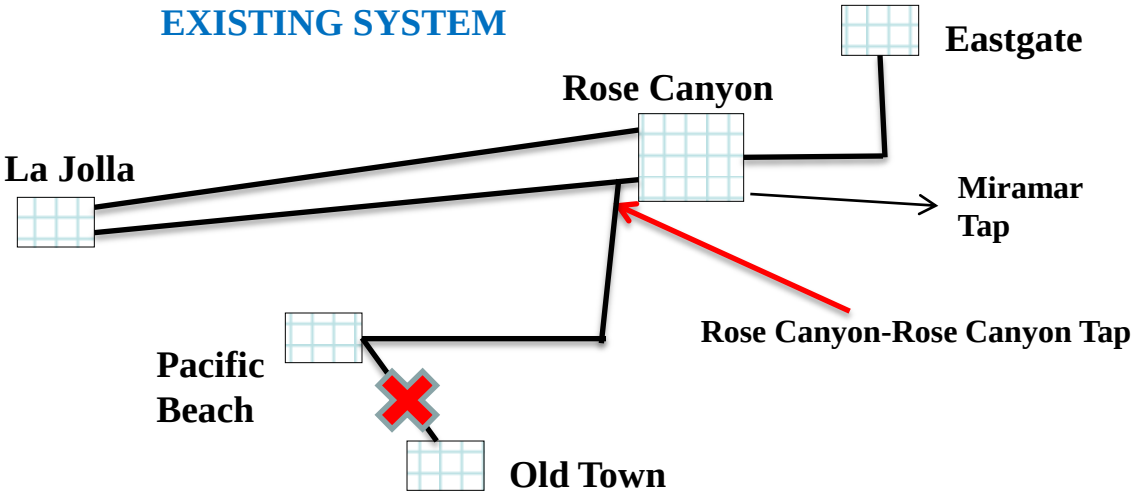
Cost Range: $3.2 M – 4.0 M

Status:

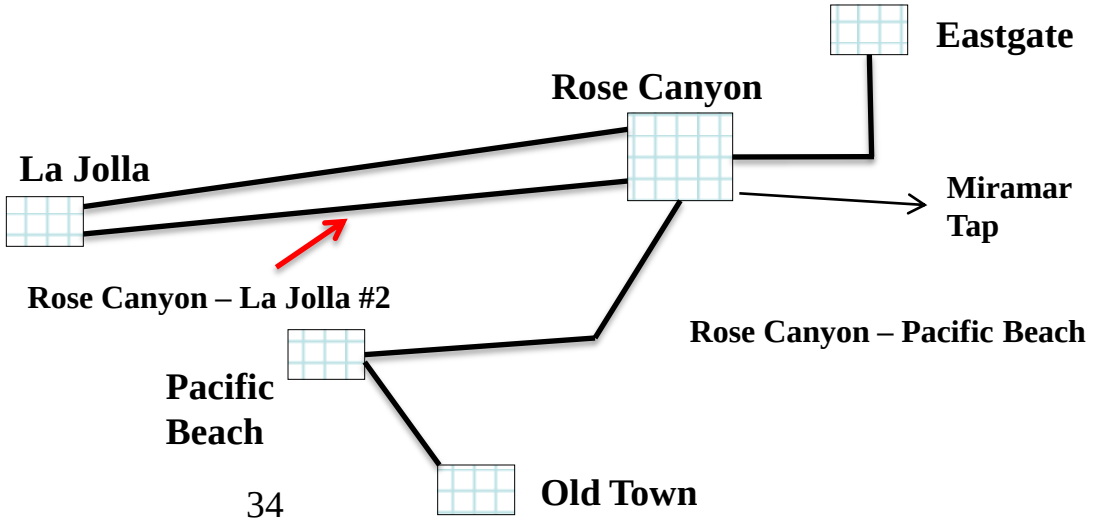
CAISO – Approval Pending

Alternative:
Reconductor Rose Canyon – Rose Canyon Tap

EXISTING SYSTEM



NEW CONFIGURATION



Project Title:	***District:***	***Need-Date:***	***Project:***
TL649D Reconductor	**Metro**	**June 2023**	**P13XXX**

Driving Factor:

Cat B (N – 1) Criteria Violations:
Loss of TL623 (Otay – San Ysidro – Imperial Beach)

Issues:

- TL649D experiences a 99.4% load starting in 2023
- Only has 50 MVA Emergency Rating

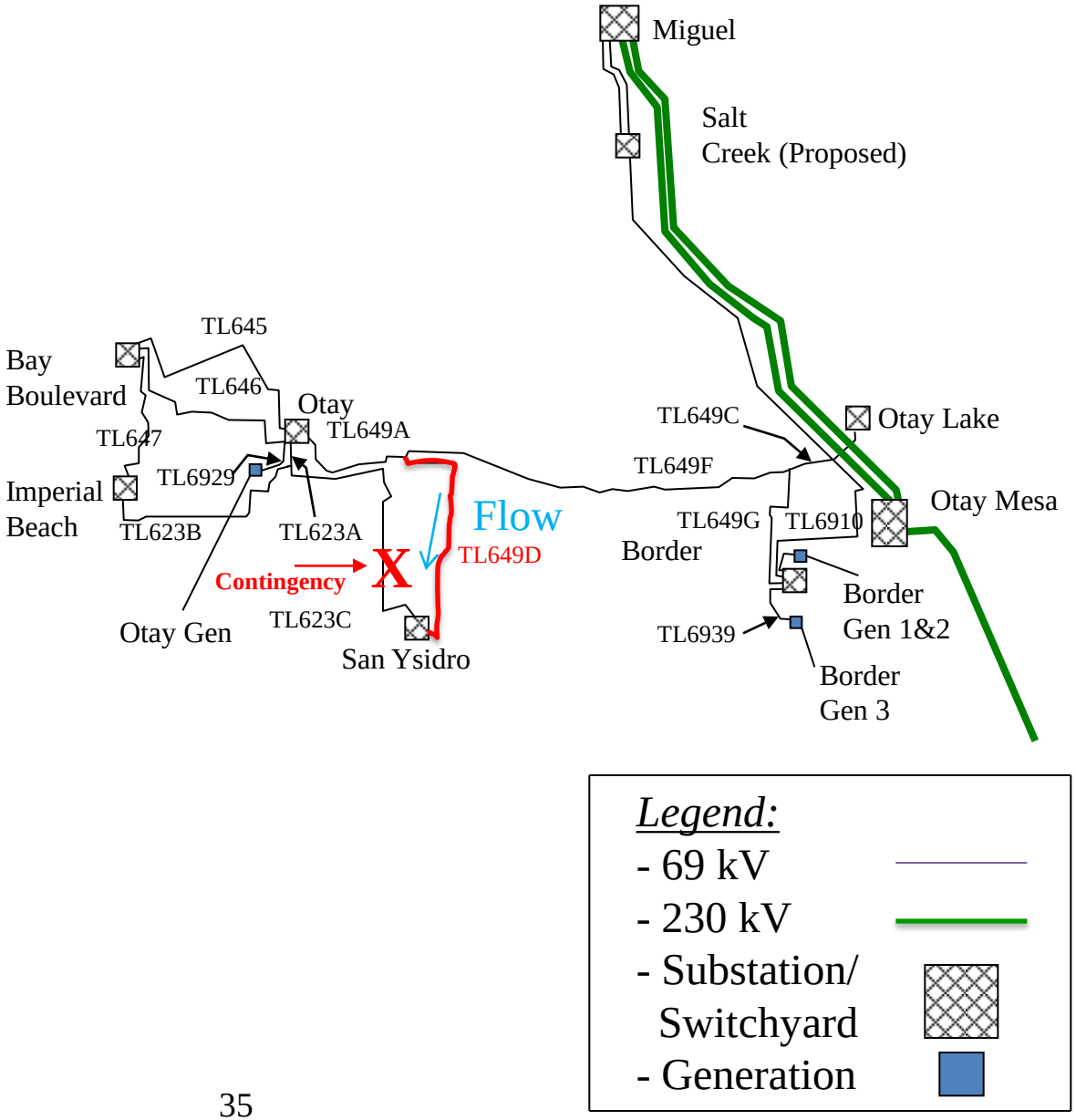
Mitigation Options:

- There is no effective generation re-dispatch or other system adjustment available post-contingency to reduce line loading.
- Load Shed--Not acceptable long-term mitigation for Cat B events

Cost Range: TL649D $3M - $4M

Status:

CAISO – Approval Pending



Project Title:	***District:***	***Need-Date:***	***Project:***
TL623C Reconductor	**Metro**	**June 2023**	**P13XXX**

Driving Factor:

Cat B (N – 1) Criteria Violations:
Loss of TL649 (Otay – San Ysidro – Border)

Issues:

- TL623C experiences a 0.4% overload starting in 2023
- Only has 50 MVA Emergency Rating

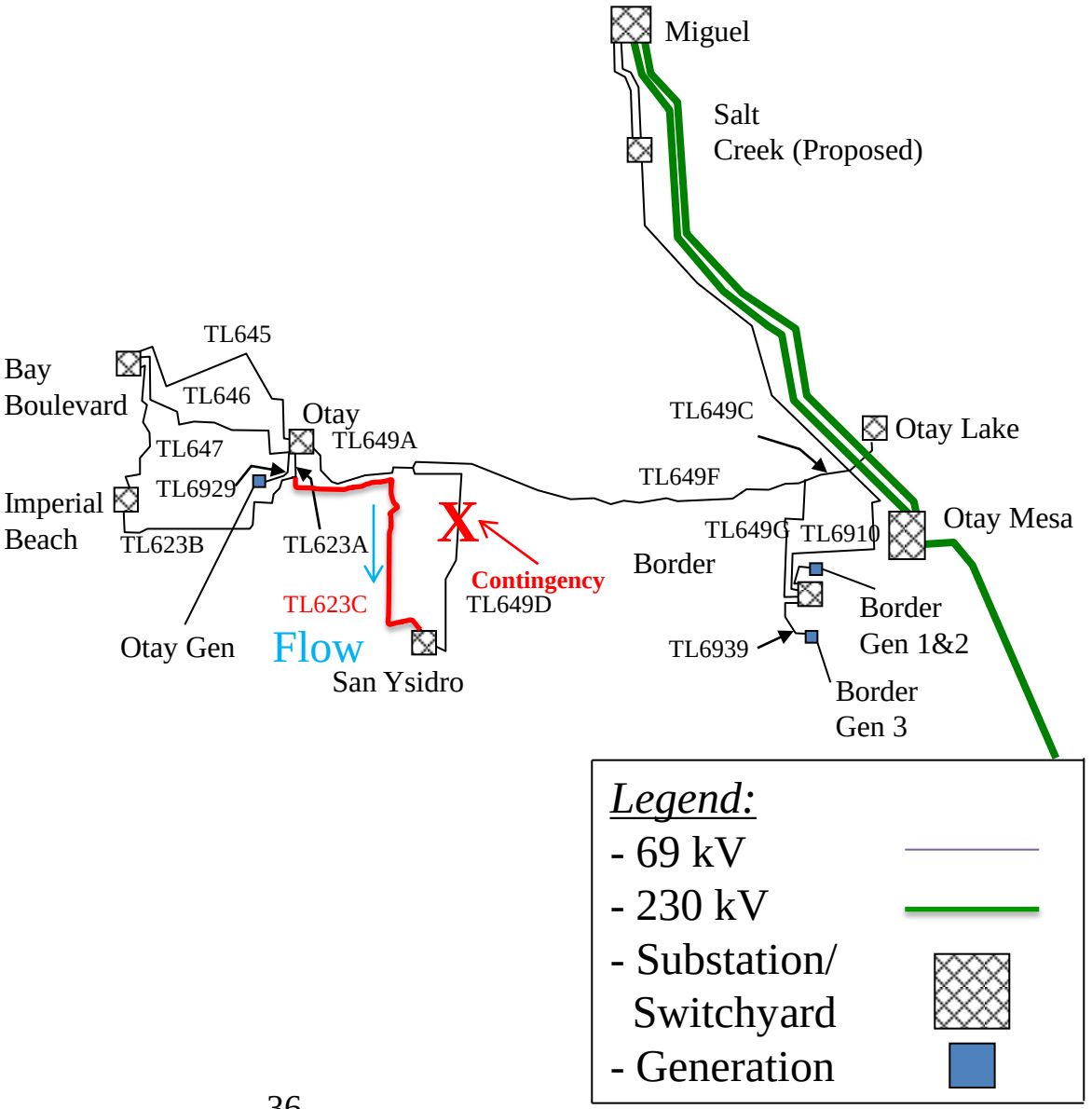
Mitigation Options:

- There is no effective generation re-dispatch or other system adjustment available post-contingency to reduce line loading.
- Load Shed--Not acceptable long-term mitigation for Cat B events

Cost Range: TL623C $9M - $11 M

Status:

CAISO – Approval Pending



Questions?

- **Send comments to:**

Huang Lin
San Diego Gas & Electric
8316 Century Park Court, CP-52A
San Diego, CA 92123
Phone: (858) 654-8687
e-mail: HLin@semprautilities.com

SDGE
A Sempra Energy® utility

Southern California Edison's Metro Area 2013 Request Window Proposals

Jonathan Yuen
Power Systems Planner

2013-2014 CAISO Transmission Plan
September 26, 2013
Folsom, CA

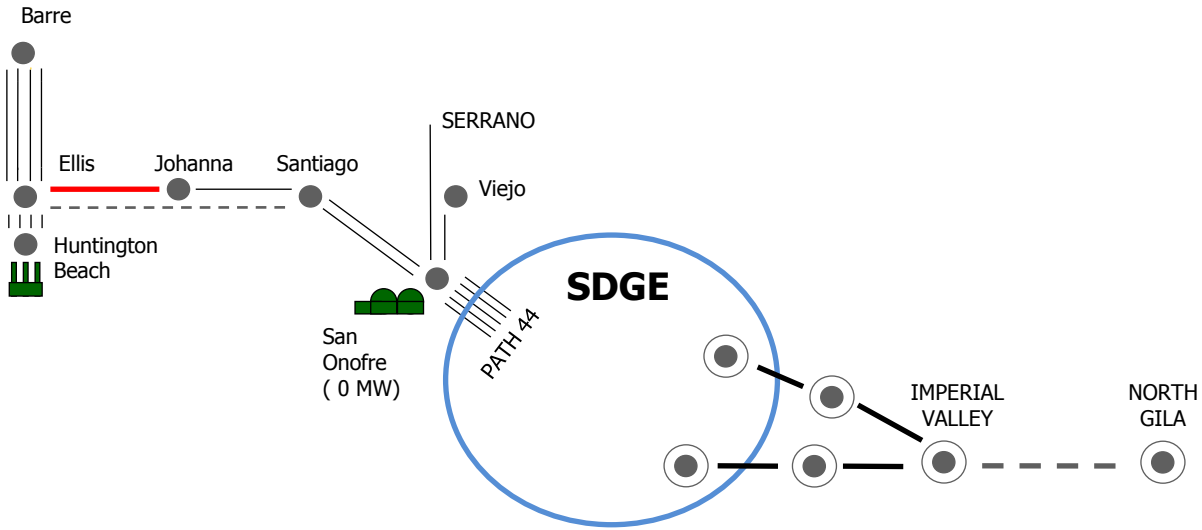
SCE Metro Area Reliability Projects

1. Ellis Corridor Upgrade
2. Mesa 500 kV Loop-In

Ellis Corridor Upgrade

Background: A forced outage of the Imperial Valley-North Gila 500 kV line followed by a forced outage of the Ellis-Santiago 230 kV line (or vice-versa) will cause a thermal overload on the Ellis-Johanna 230 kV line (Category C.3 contingency).

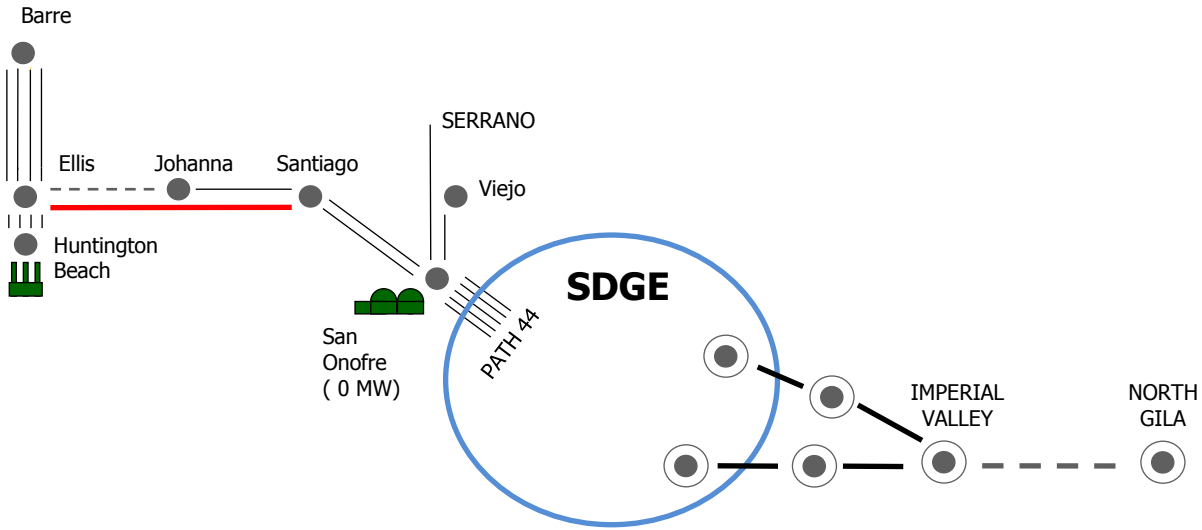
Pre-Mitigation (~2600 MW- SDGE IMPORTS)			
Overloaded Facilities	Contingency	Performance Category	Percentage (4-hr. rating)
Ellis-Johanna 230 kV	Imperial Valley – North Gila 500 kV & Ellis-Santiago 230 kV	C.3 (L-1-1)	104%



Ellis Corridor Upgrade

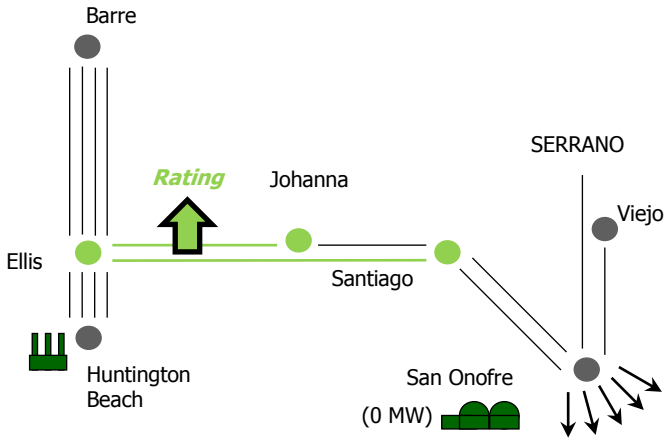
Background: A forced outage of the Imperial Valley-North Gila 500 kV line followed by a forced outage of the Ellis-Johanna 230 kV line (or vice-versa) will cause a thermal overload on the Ellis-Santiago 230 kV line (Category C.3 contingency).

Pre-Mitigation (~2600 MW- SDGE IMPORTS)			
Overloaded Facilities	Contingency	Performance Category	Percentage (4-hr. rating)
Ellis-Santiago 230 kV	Imperial Valley – North Gila 500 kV & Ellis-Johanna 230 kV	C.3 (L-1-1)	110%



Ellis Corridor Upgrade

Project Scope: This project will increase the rating of the Ellis-Johanna and Ellis-Santiago 230 kV transmission lines to their conductor rating by replacing terminal equipment at the three substations and increasing clearance on transmission spans along the two lines.



Expected In Service Date: 06/01/2015

Estimated Cost: $ 26 million

Post-Mitigation

Impacted Facilities	Contingency	Performance Category	Percentage (4-hr. rating)
Ellis-Johanna 230 kV	Imperial Valley – North Gila 500 kV & Ellis-Santiago 230 kV	C.3 (L-1-1)	60%
Ellis-Santiago 230 kV	Imperial Valley – North Gila 500 kV & Ellis-Johanna 230 kV	C.3 (L-1-1)	57%

Mesa 500kV Loop-In - Vincent and Serrano Banks

Background: A forced outage of the Vincent 500/230 kV #3 Bank followed by a forced outage of Vincent 500/230 kV #4 Bank (or vice-versa) will cause a thermal overload on the Vincent 500/230 kV #1 Bank with the Vincent #2 Spare Bank energized (Category C.3 contingency).

Pre-Mitigation			
Overloaded Facilities	Contingency	Performance Category	Percentage (Long term rating)
Vincent 500/230 kV #1 Bank	Vincent 500/230 kV #3 and #4 Banks with available #2 spare energized	C.3 (T-1-1)	120%

Background: A forced outage of the Serrano 500/230 kV #1 Bank followed by a forced outage of Serrano 500/230 kV #2 Bank (or vice-versa) will cause a thermal overload on the Serrano 500/230 kV #3 Bank (Category C.3 contingency).

Pre-Mitigation			
Overloaded Facilities	Contingency	Performance Category	Percentage (Long term rating)
Serrano 500/230 kV #3 Bank	Serrano 500/230 kV #1 and #2 Banks	C.3 (T-1-1)	116%

Mesa 500kV Loop-In - Once Through Cooling (OTC)

2023 Peak Assumption: Approximately 2,600 MW of online OTC generation was modeled in the Western LA Basin.

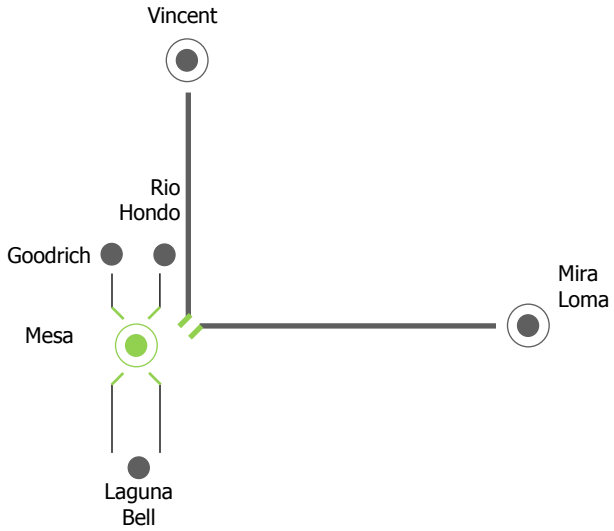
- Further reduction of online coastal generation can lead to increased flows into the LA Basin with potential thermal overloads and low voltages in the metro area.

Long Term Procurement Plan - Track 4: SCE filed 08/26/13 analysis of generation needs in the Western LA Basin due to OTC shutdown including San Onofre Nuclear Generating Station

- Mesa 500kV Loop-In can reduce 734 MW to 1,200 MW of gen need

Mesa 500 kV Loop-In

Project Scope: This project will expand SCE's existing Mesa 230/66/16 kV Substation to include 500 kV service. Includes three 500/230 kV and four 230/66 kV transformer banks. The Vincent-Mira Loma 500 kV, Laguna Bell-Rio Hondo 230 kV, and Goodrich-Laguna Bell 230 kV lines will be looped into the expanded Mesa Substation.



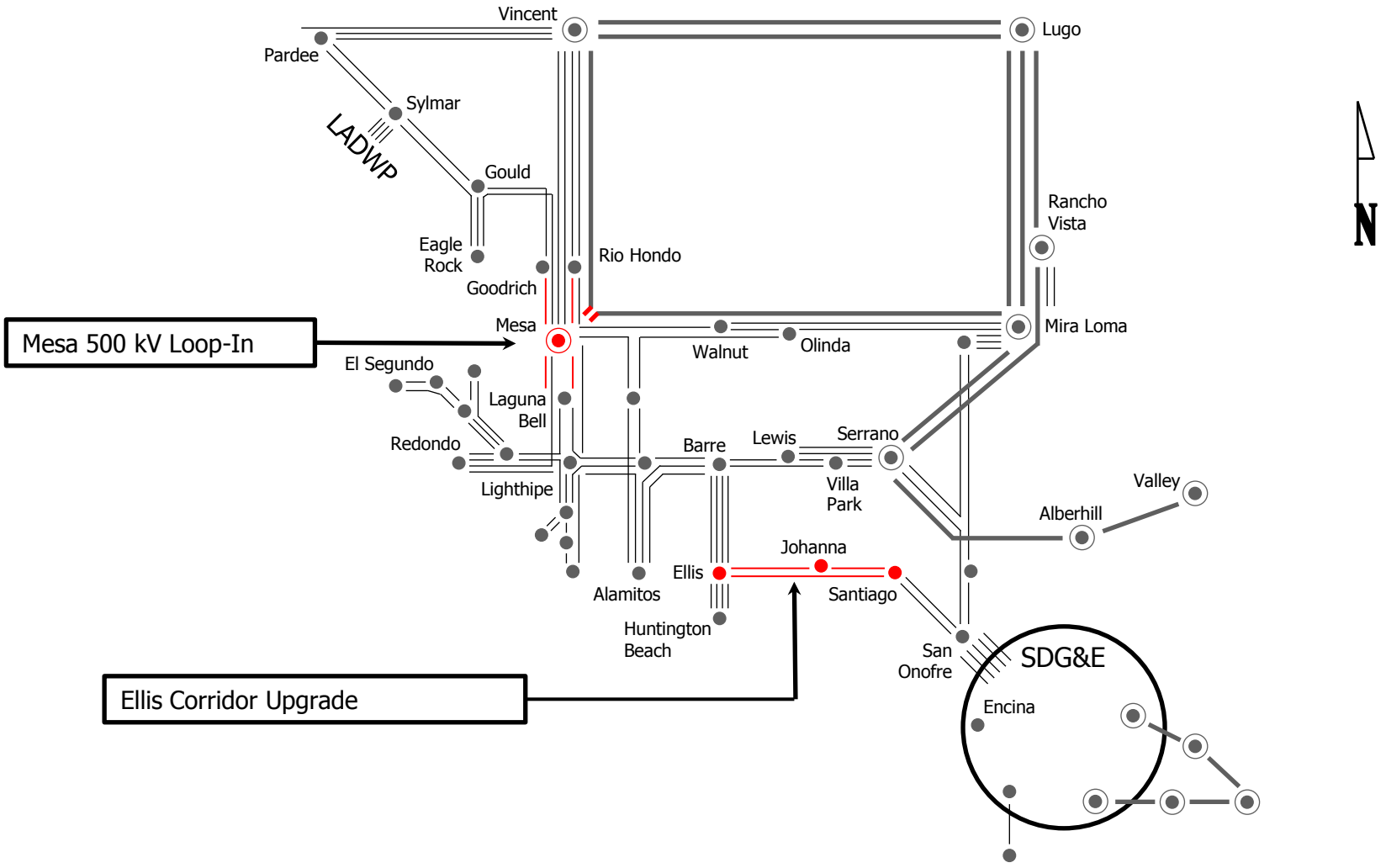
Expected In Service Date: 12/31/2020

Estimated Cost: $ 550 - 700 million

Post-Mitigation

Impacted Facilities	Contingency	Performance Category	Percentage (4-hr. rating)
Vincent 500/230 kV #1 Bank	Vincent 500/230 kV #3 and #4 Banks with available #2 spare energized	C.3 (T-1-1)	60%
Serrano 500/230 kV #3 Bank	Serrano 500/230 kV #1 and #2 Banks	C.3 (T-1-1)	95%

Summary of Projects:



Southern California Edison's North of Lugo Area 2013 Request Window Proposals

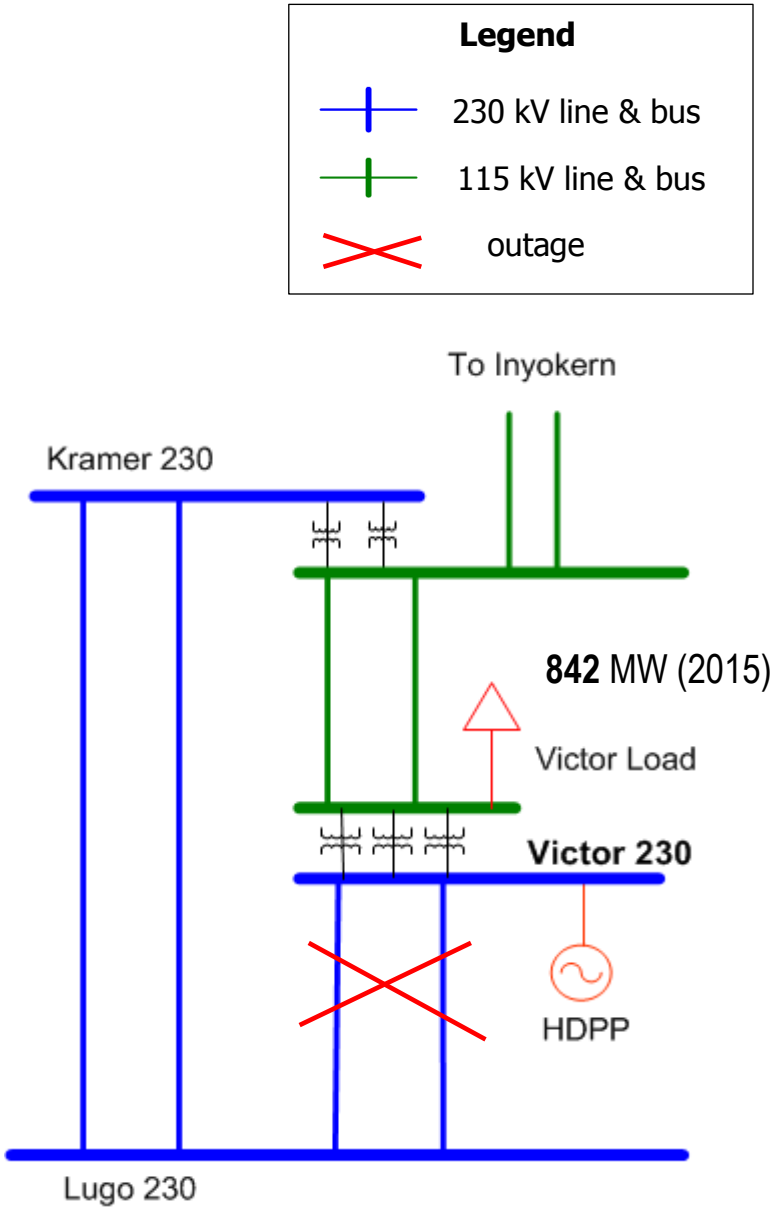
Yan Zou
Power Systems Planner

2013-2014 CAISO Transmission Plan
September 26, 2013
Folsom, CA

North of Lugo Area

Issue:

- Under outage of two Lugo-Victor 230 kV lines (N-2)
  - High Victor load & high HDPP output – System Instability
  - High Victor load & HDPP off – Voltage Collapse
  - Currently this problem is addressed by RAS



North of Lugo Area

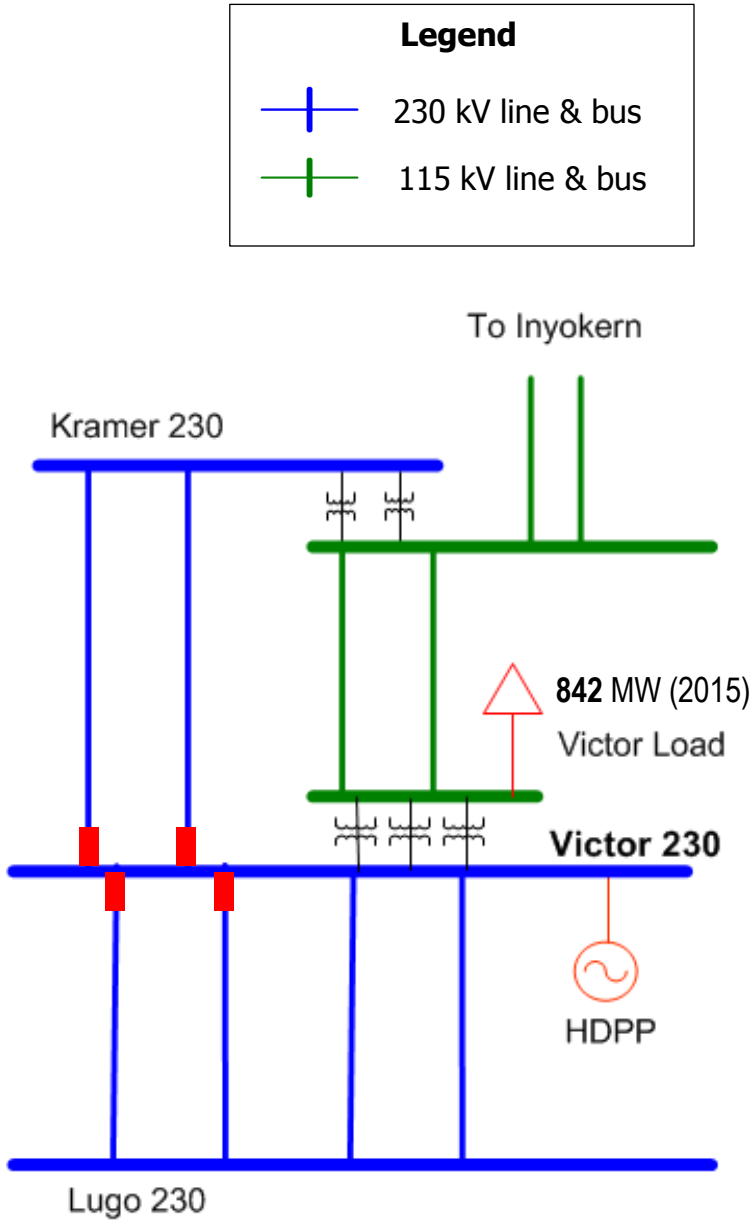
Recommendation:

Loop in Kramer-Lugo lines into Victor

- Existing Kramer-Lugo lines are routed through the Victor 230 kV switchrack, all required is to add six breakers
- Cost: $12M
- OD: 6/1/2015

Benefit:

- Reduces generation trip
- Eliminates load shedding and system instability



Valley Electric Association, Inc.

A Touchstone Energy® Cooperative

Valley Electric Association's 2013 Request Window Proposals

Chris Tomchuk
EVP of Engineering & Operations

2013/2014 ISO Transmission Plan
September 26, 2013
Folsom, CA

Valley Electric Association, Inc.
A Touchstone Energy® Cooperative

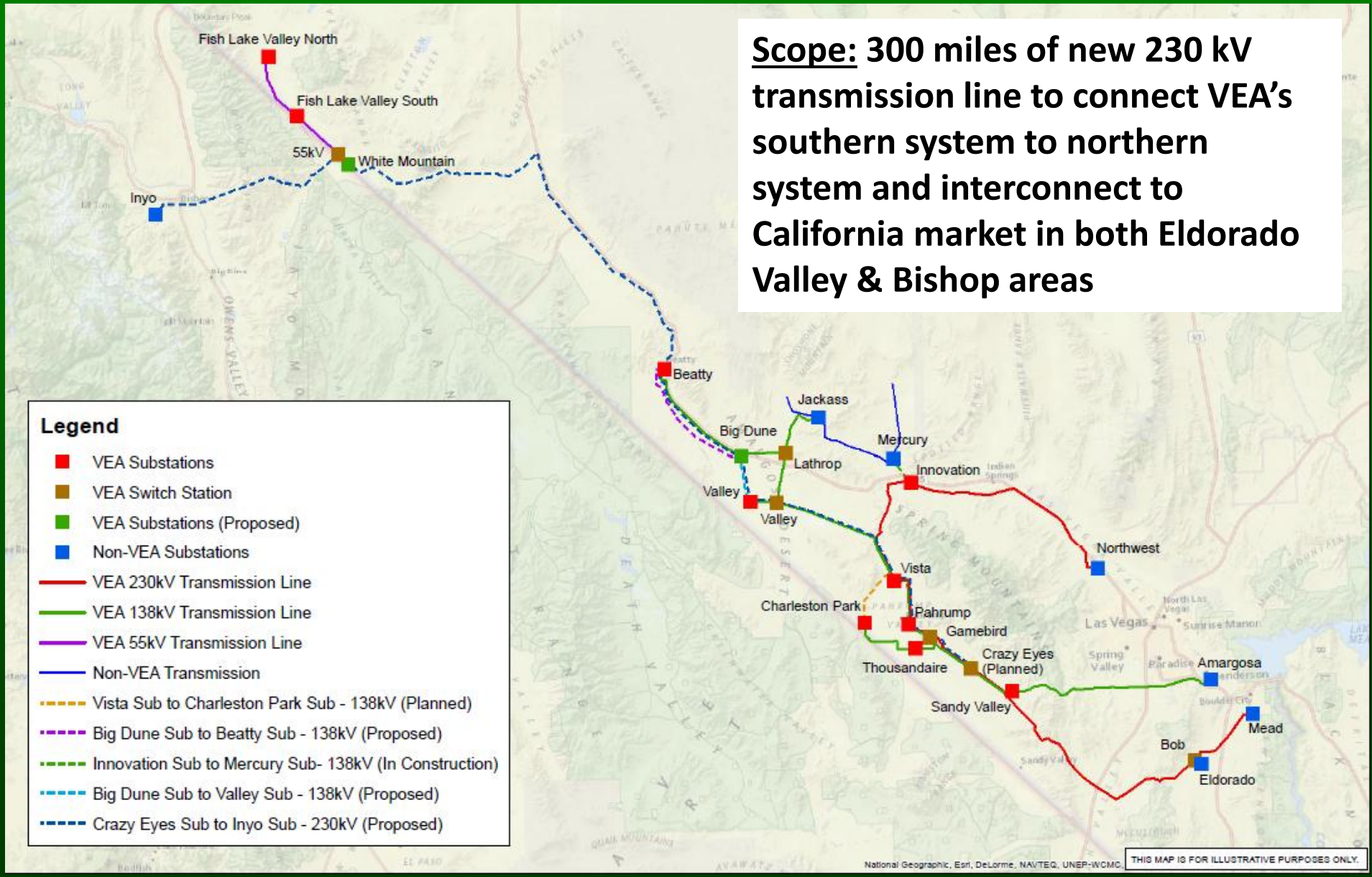
Projects Seeking CAISO Approval

- Nevada West Connect 230 kV New Line
- Pahrump-Mead 230kV CT Upgrade

Valley Electric Association, Inc.
A Touchstone Energy® Cooperative

Nevada West Connect 230 kV New Line

Scope: **300 miles of new 230 kV transmission line to connect VEA's southern system to northern system and interconnect to California market in both Eldorado Valley & Bishop areas**



Valley Electric Association, Inc.
A Touchstone Energy® Cooperative

Nevada West Connect 230 kV New Line

Needs Addressed: Mitigates impacts of Category B and C contingencies in the VEA area noted in 2013-2014 TPP studies and may also alleviate reliability issues in the North of Lugo Area

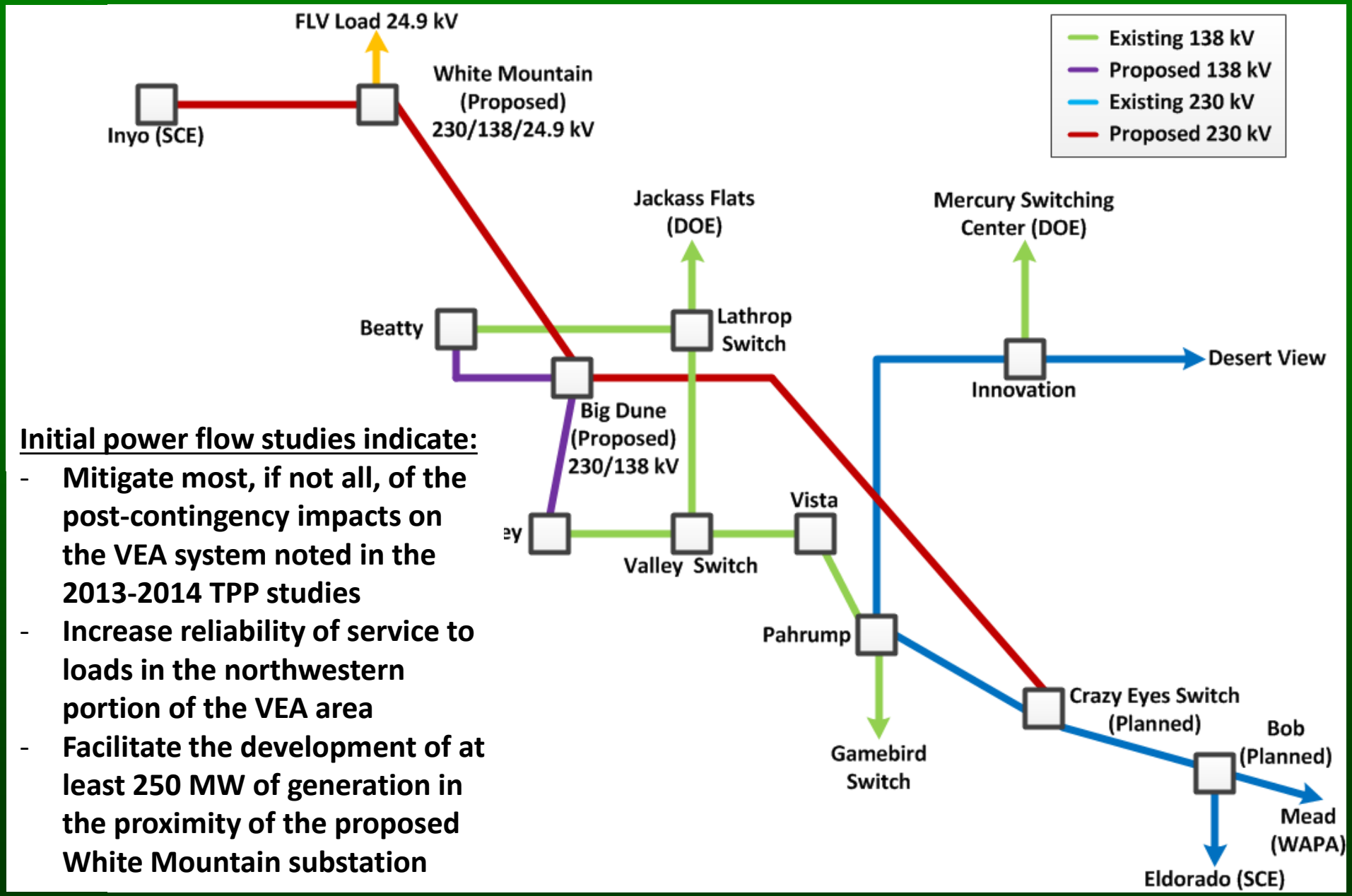
Also provides for integration of renewal resources, relieve congested areas, and increase transfer/import capacity between CA and NV

Cost: Approximately $500M

In Service Date: Late 2018

Valley Electric Association, Inc.
A Touchstone Energy® Cooperative

Nevada West Connect 230 kV New Line



Initial power flow studies indicate:

- **Mitigate most, if not all, of the post-contingency impacts on the VEA system noted in the 2013-2014 TPP studies**
- **Increase reliability of service to loads in the northwestern portion of the VEA area**
- **Facilitate the development of at least 250 MW of generation in the proximity of the proposed White Mountain substation**

Valley Electric Association, Inc.
A Touchstone Energy® Cooperative

Pahrump-Mead 230kV CT Upgrade

Scope: Upgrade line limiting CT at Mead (WAPA) terminal on Pahrump-Mead 230 kV.

Needs Addressed: Increases line capacity from 159 MVA nominal to 287 MVA nominal, and thereby increases the import/export capability into the VEA area.

Cost: Approximately $100k

In Service Date: Late 2014

Valley Electric Association, Inc.

A Touchstone Energy® Cooperative

Questions?

PG&E's 2013 Request Window Proposals

CAISO 2013-2014 Transmission Planning Cycle

Isaac Read
PG&E
September 26, 2013

Transmission Projects Overview

Projects Seeking CAISO Approval – Fresno / Kern

1. Kearney-Kerman 70 kV Line Reconductor
2. Taft-Maricopa 70 kV Line Reconductor
3. San Bernard-Tejon 70 kV Line Reconductor
4. Wheeler Ridge-Weedpatch 70 kV Line Reconductor
5. McCall-Reedley #2 115 kV Line
6. Reedley 115/70 kV Transformer Capacity Increase
7. Midway-Kern PP #2 230 kV Line
8. Wheeler Ridge Junction Station
9. Gill Ranch 115 kV Tap load interconnection
10. Sanger-Reedley 115 kV load interconnection

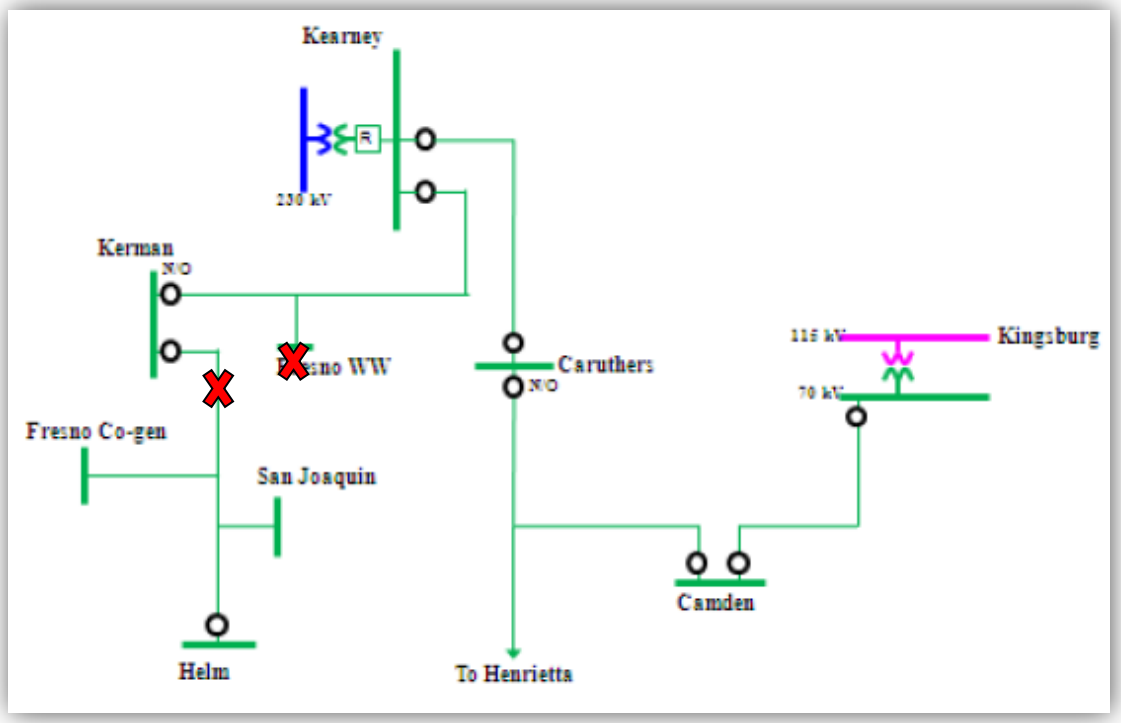
Kearney – Kerman 70 kV Line Reconductor

Area Background

- The interim solution is splitting the 70 kV bus by opening switch 87, which does not allow the Kerman substation load of 47 MW to be automatically restored during transmission outages.
- Assumes Kearney 230/70 kV Transformer Addition project in-service

Assessment

- L-1/G-1 outage: Helm-Kerman 70 kV Line with Fresno Waste Water Unit #1 Offline
- Overloaded facility: Kearney-Kerman 70 kV Line in 2014



Kearney – Kerman 70 kV Line Reconductor

Preferred Scope

- Reconductor 11 miles of the Kearney-Kerman 70 kV line with a conductor capable of at least 600 amps during summer normal and at least 700 amps during summer emergency conditions.

Alternatives Considered

- Alt 1: New Kearney-Kerman-Biola 70 kV Line

Proposed In Service Date

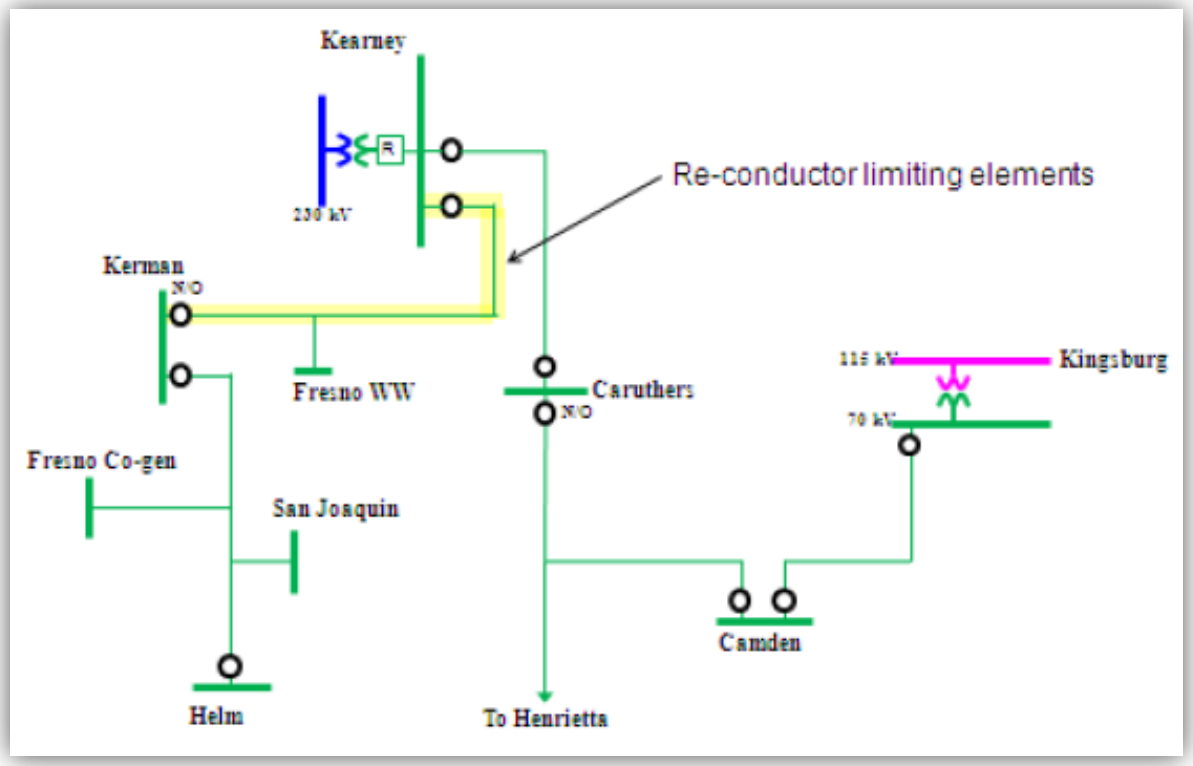
- May 2018

Estimated Cost

- $12M - $18M

BCR

- 1.41



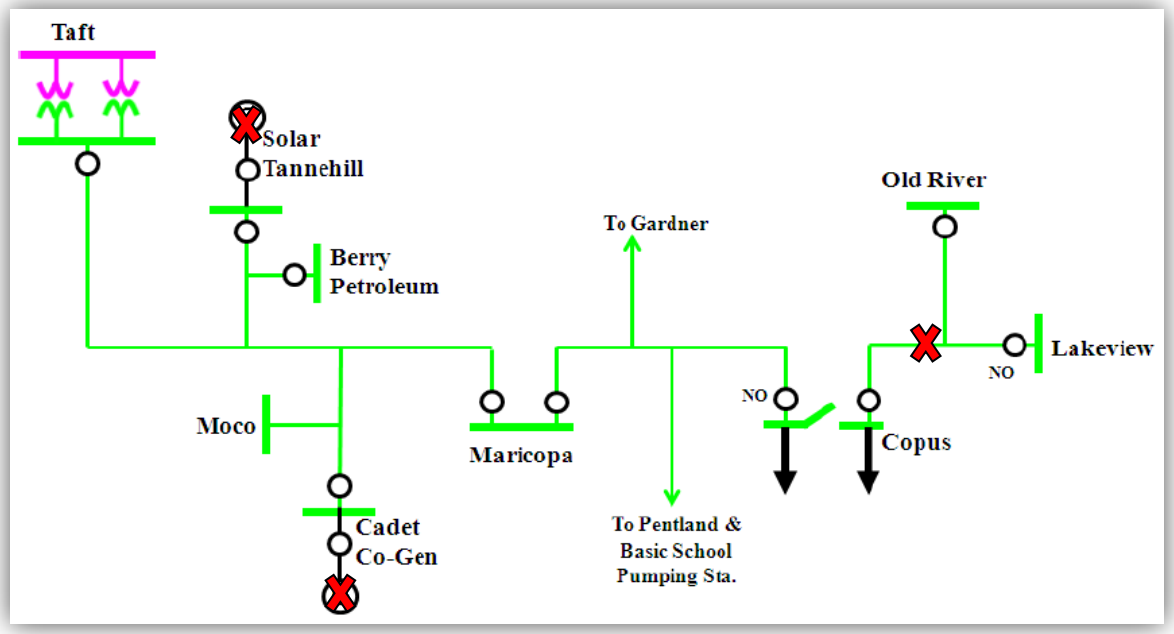
Taft – Maricopa 70 kV Line Re-conductor

Area Background

- Copus Bank 1 is normally fed from Taft Substation, while Bank 2 is normally fed from Old River.
- Once Kern-Old River #1 and #2 reconductor project is completed, Copus will be entirely fed from Old River.
- A new customer load of 3 MW fed from Copus Substation is expected to come online in October 2014

Assessment

- L-1/G-1 outage:
  - Old River-Copus 70 kV Line w/ Solar Tannehill and Cadet Co-generation Offline
- Overloaded facility:
  - Taft-Maricopa 70 kV Line in 2014



Taft – Maricopa 70 kV Line Reconductor

Preferred Scope

- Reconductor approximately 6 miles of the Taft-Maricopa 70 kV line with a conductor capable of at least 631 amps during summer normal and at least 742 amps during summer emergency conditions.

Alternatives Considered

- Disable Automatic Load Restoration at Copus substation

Proposed In Service Date

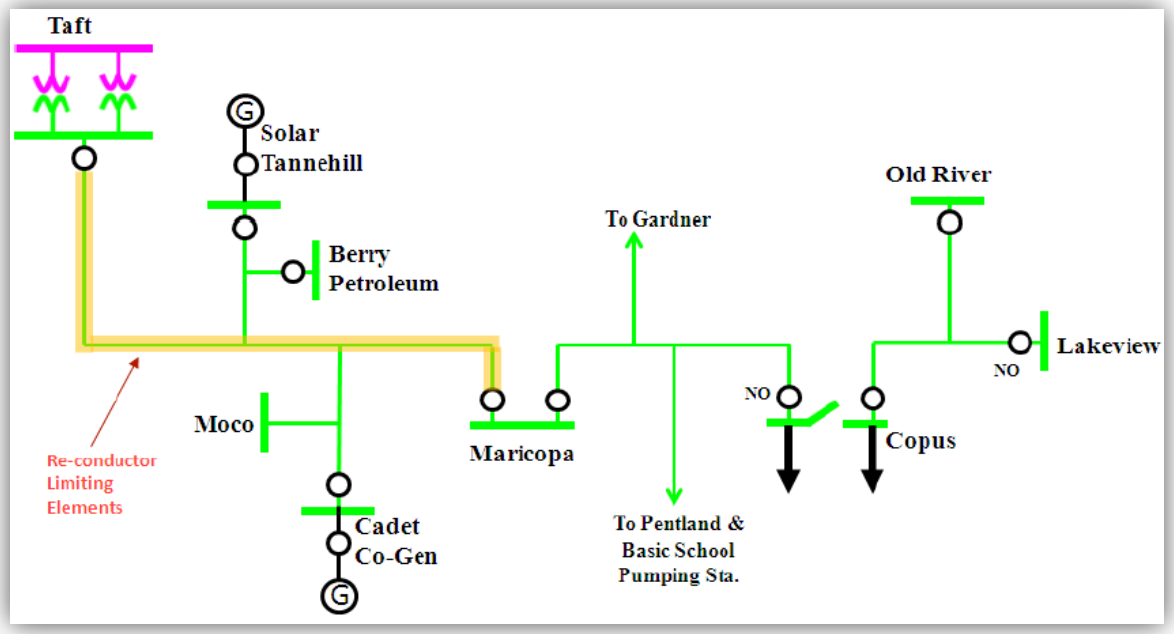
- May 2018

Estimated Cost

- $6M - $10M

BCR

- 1.05



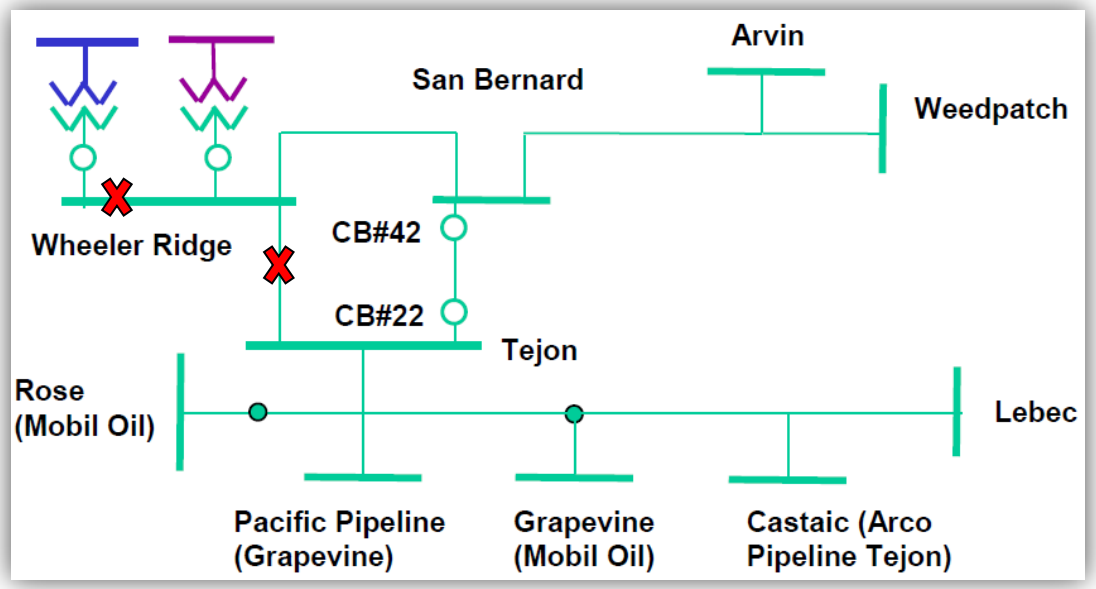
San Bernard – Tejon 70 kV Line Re-conductor

Area Background

- The interim solution is normally opening the San Bernard-Tejon line.
- This set up exposes customers served via Wheeler Ridge-Tejon 70 kV line to increased amount of sustained outages.
- Assumes Installation of Tejon Bank #2 is completed in 2012.

Assessment

- N-1 outage:
  - Wheeler Ridge – Tejon 70 kV Line
  - Bus D Fault on Wheeler Ridge 70 kV Bus
- Overloaded facility:
  - San Bernard – Tejon 70 kV Line in 2014



San Bernard- Tejon 70 kV Line Reconductor

Preferred Scope

- Reconductor approximately 7 miles of the San Bernard- Tejon 70 kV line with a conductor capable of at least 631 amps during summer normal and at least 742 amps during summer emergency conditions.

Alternatives Considered

- Alt 1: New Line from Wheeler Ridge to Tejon

Proposed In Service Date

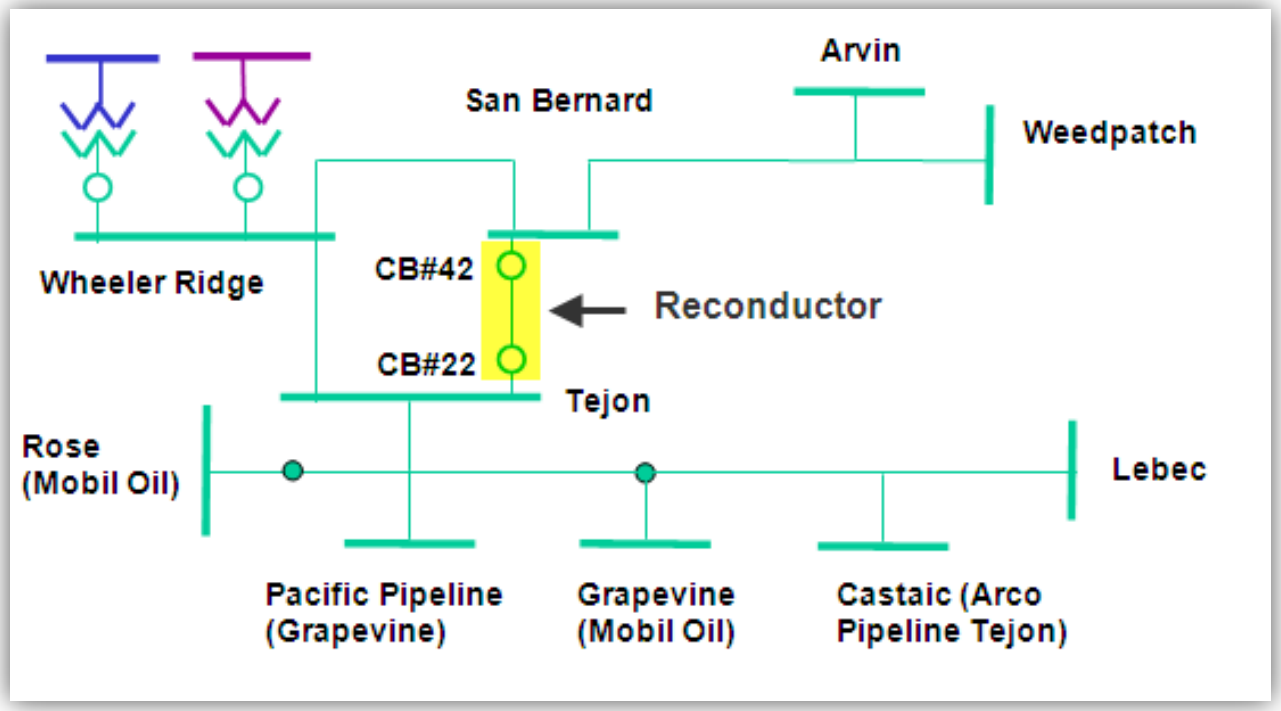
- May 2018

Estimated Cost

- $8M - $12M

BCR

- 1.06



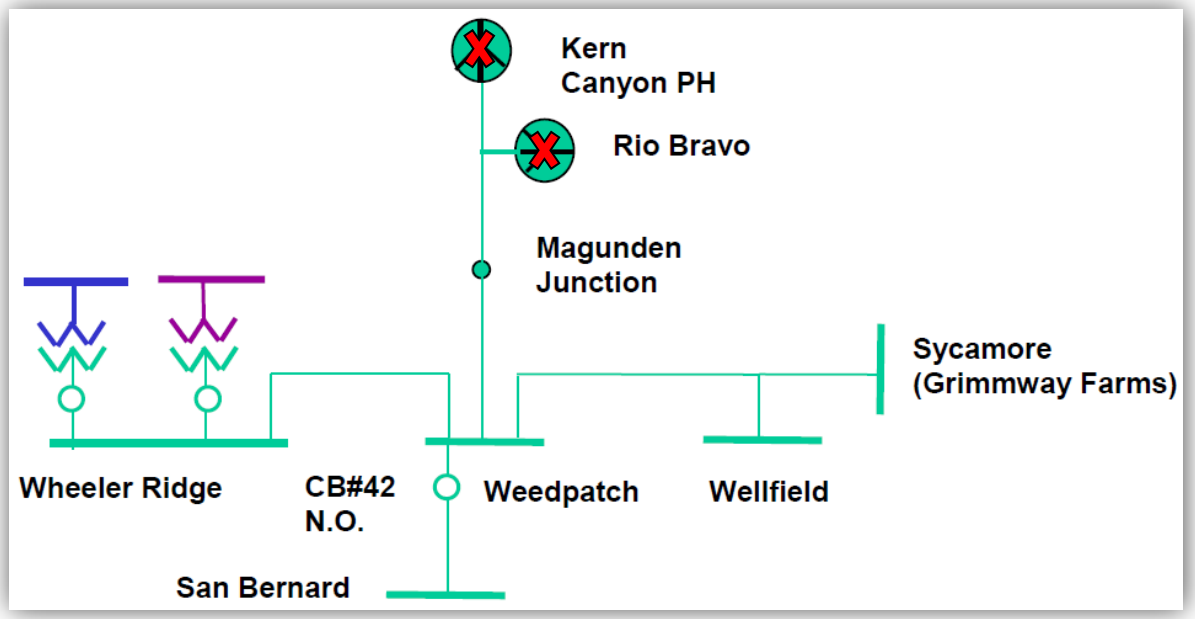
Wheeler Ridge- Weedpatch 70 kV Line Reconductor

Area Background

- Temporary Shoofly was installed in June 2013 to address normal overloads seen on the Wheeler Ridge-Weedpatch line.
- Weedpatch – San Bernard 70 kV line, a back feed to Weedpatch, doesn't have enough capacity to serve load.
- Rio Bravo Hydro and Kern Canyon PH are run-of-river hydro units.

Assessment

- N-1-1 outage:
  - Rio Bravo Hydro and Kern Canyon PH
- Overloaded facility:
  - Wheeler Ridge-Weedpatch 70 kV Line in 2014



Wheeler Ridge- Weedpatch 70 kV Line Reconductor

Preferred Scope

- Reconductor approximately 15 miles of the Wheeler Ridge-Weedpatch 70 kV line with a conductor capable of at least 631 amps during summer normal and at least 742 amps during summer emergency conditions.

Alternatives Considered

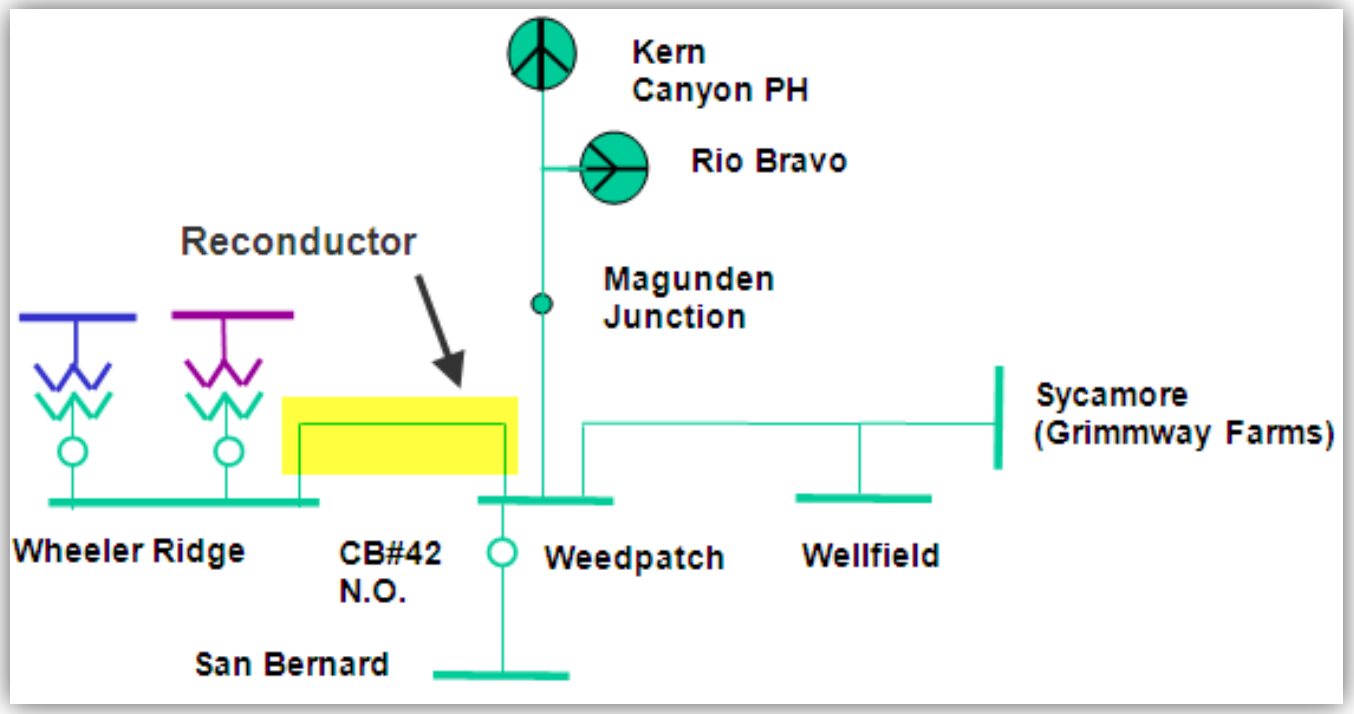
- Re-conductor the Kern Canyon-Magunden-Weedpatch 70 kV Line

Proposed In Service Date

- May 2018

Estimated Cost

- $15M - $25M



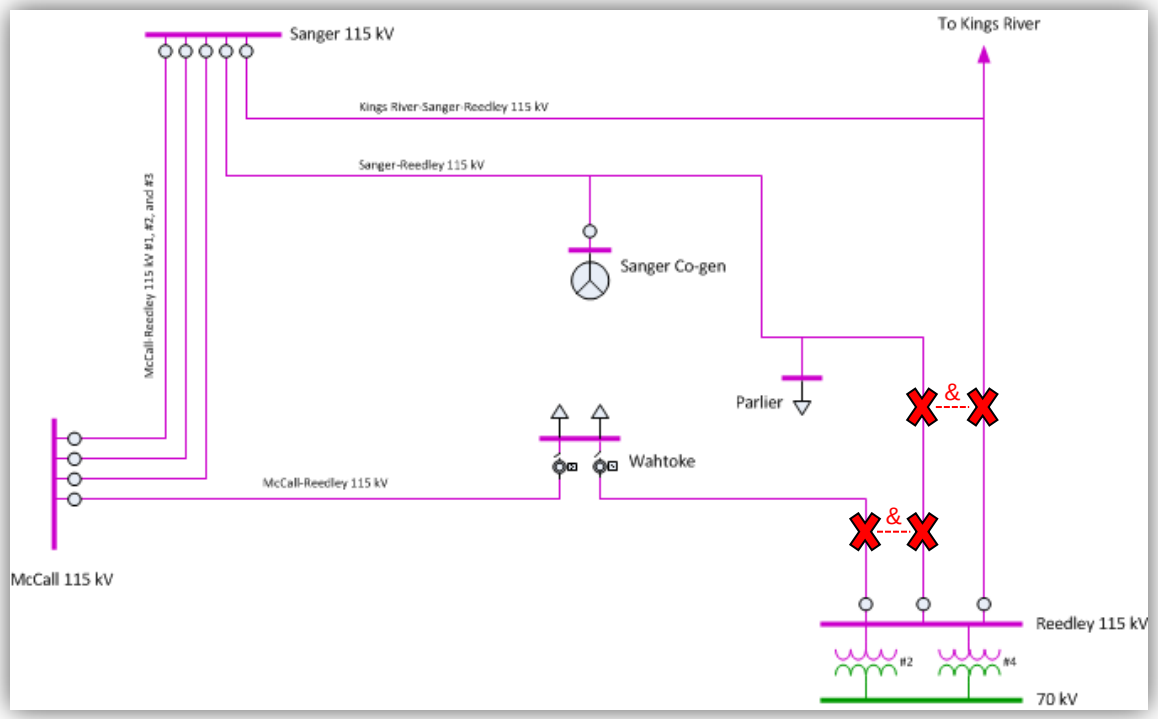
McCall-Reedley #2 115 kV Line

Area Background

- Wahtoke and Reedley substations serve roughly 45,000 customers, and up to 175 MW of load
- Three 115 kV lines serve Reedley substation from McCall and Sanger

Assessment

- Outage Facility:
  - Any combination of the Kings River-Sanger-Reedley, Sanger-Reedley, or McCall-Reedley 115 kV lines
- Overloaded Facility:
  - Remaining line, either the Kings River-Sanger-Reedley, Sanger Reedley, or McCall-Reedley 115 kV line



McCall-Reedley #2 115 kV Line

Preferred Scope

- Double circuit the existing McCall-Reedley 115 kV line and string a new 15 mile circuit from McCall to Reedley substations

Alternatives Considered

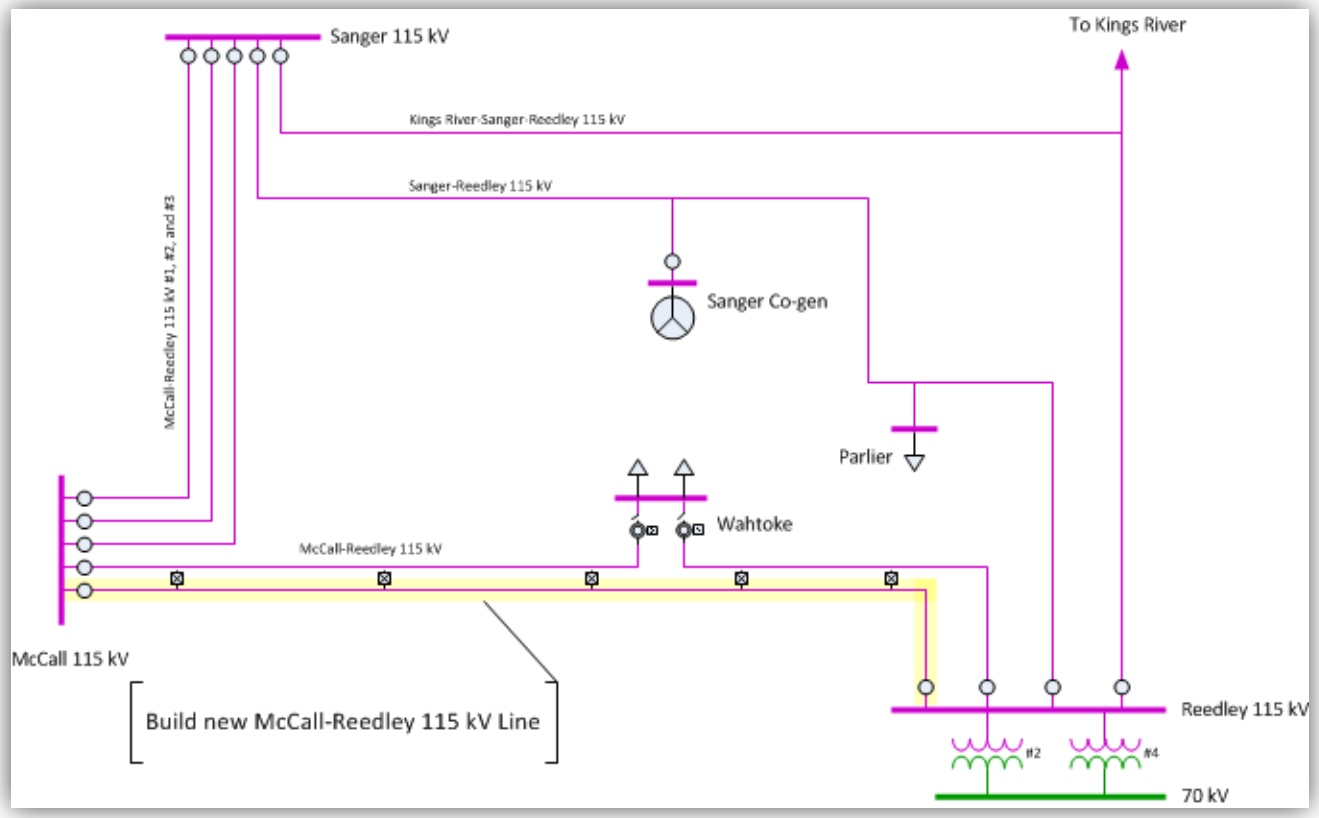
- Alt 1: Disable automatic load restoration at Wahtoke substation and reconductor the McCall-Reedley 115 kV Line from Wahtoke to Reedley

Proposed In Service Date

- May 2019

Estimated Cost

- $25M - $40M



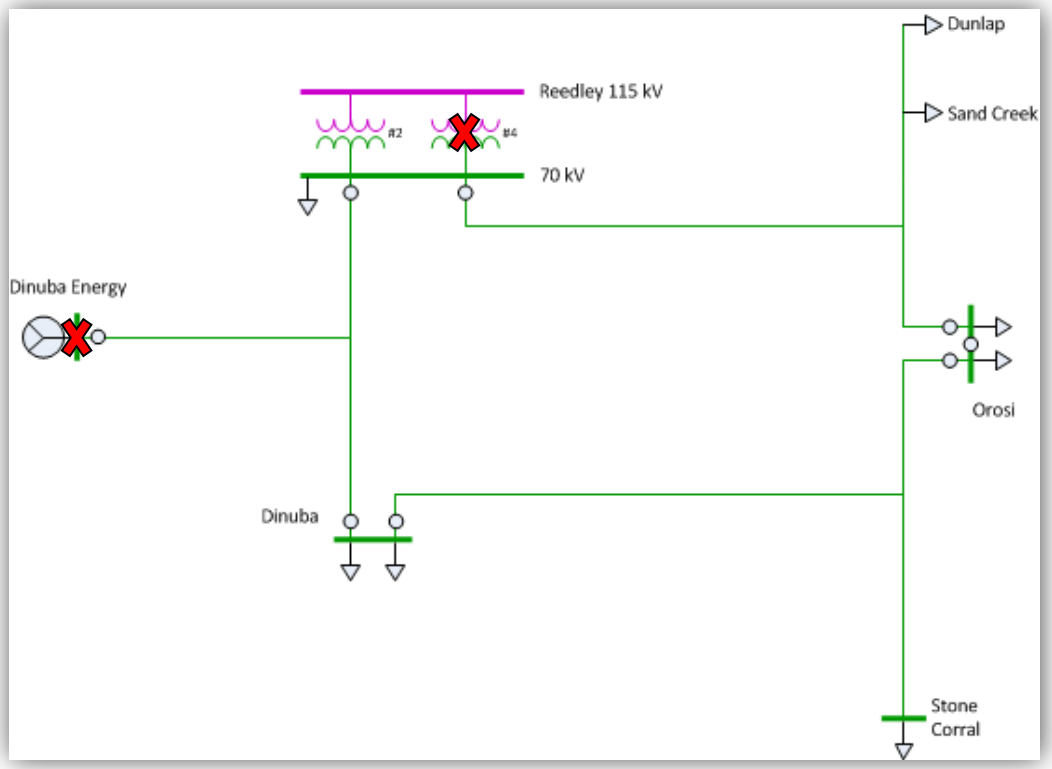
Reedley 115/70 kV Transformer Capacity Increase

Area Background

- The Reedley 70 kV system is comprised of a number of substations which are normally operated as radial
- In 2013 the recorded peak load for the 70 kV system was around 95 MW

Assessment

- Outage Facilities:
  - (T-1/G-1) Reedley 115/70 kV Transformer No. 4 and Dinuba Energy offline, or
  - (T-1/G-1) Reedley 115/70 kV Transformer No. 2 and Dinuba Energy offline
- Overloaded Facility:
  - Reedley 115/70 kV Transformer No. 2, or
  - Reedley 115/70 kV Transformer No. 4



Reedley 115/70 kV Transformer Capacity Increase

Preferred Scope

- Phase 1:
  - Replace limiting substation equipment on Reedley 115/70 kV Transformer No. 2 to obtain full bank rating
- Phase 2:
  - Replace Reedley 115/70 kV Transformer No. 2 with 180 MVA summer normal rated bank
  - Request custom 4-hour emergency rating for Reedley 115/70 kV Transformer No. 4

Alternatives Considered

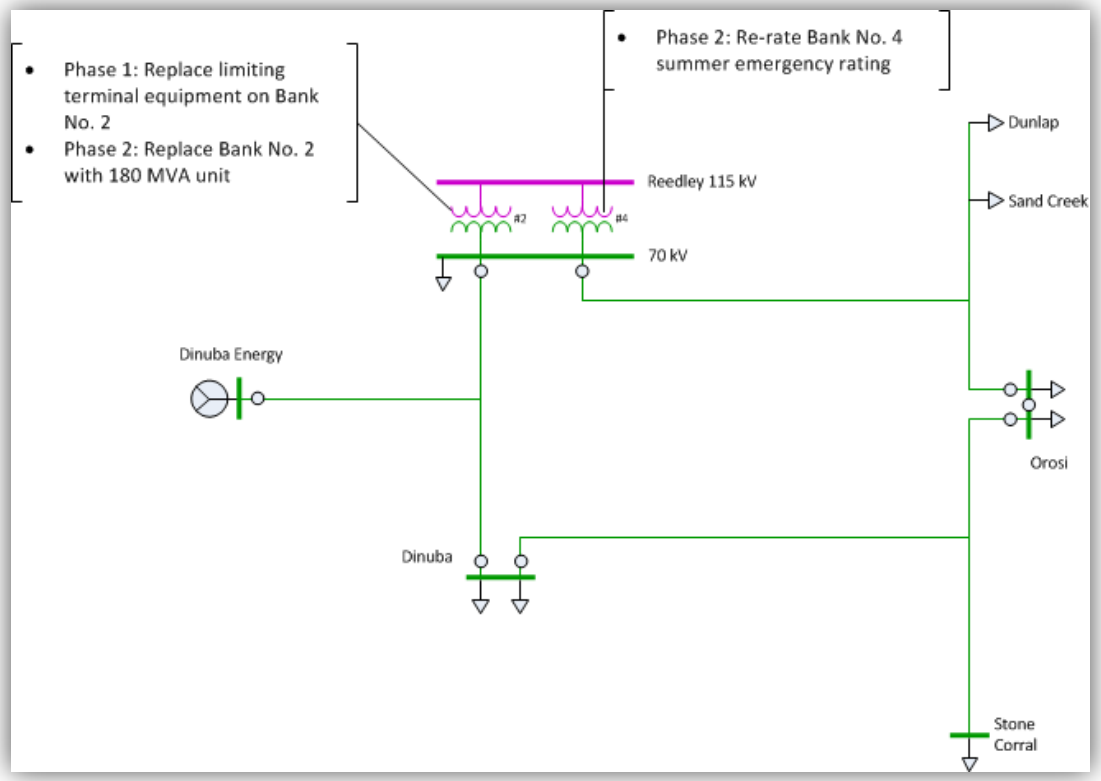
- Alt 1: Install third 115/70 kV Transformer at Reedley substation

Proposed In Service Date

- Phase 1: May 2015
- Phase 2: May 2018

Estimated Cost

- $12M - $18M



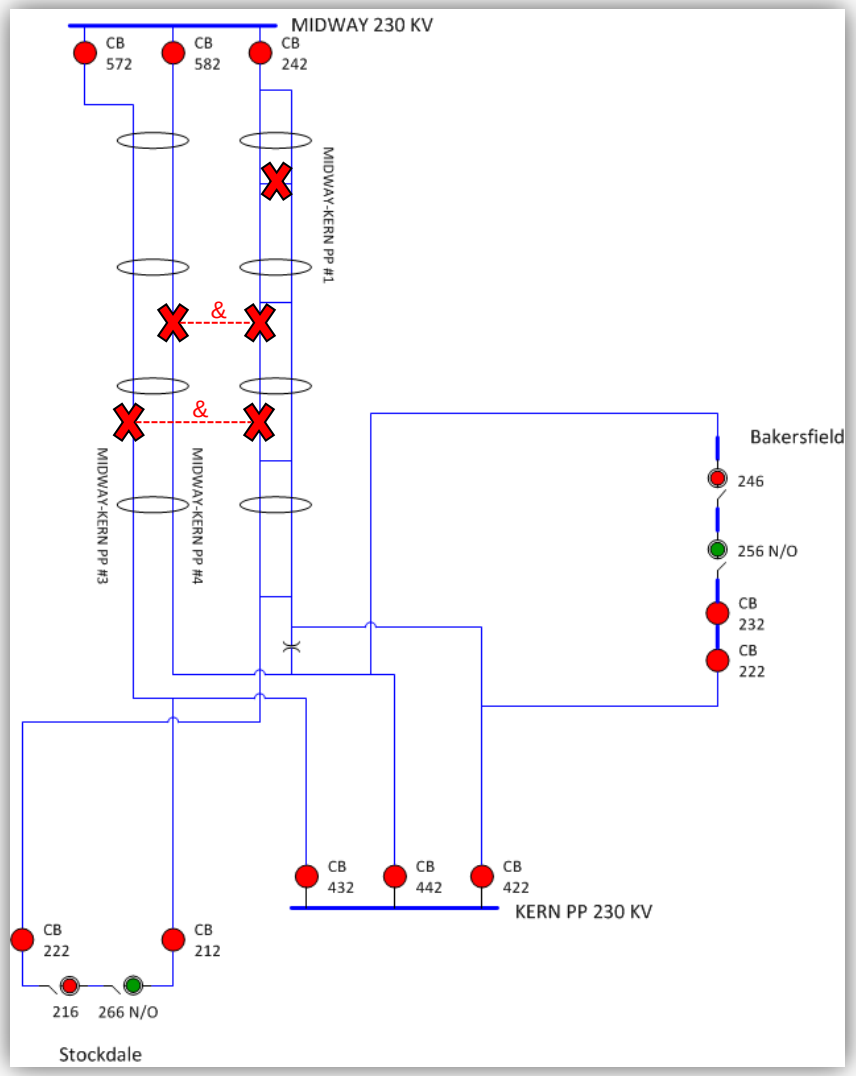
Midway-Kern PP #2 230 kV Line

Area Background

- Kern PP is served by three 230 kV transmission lines from Midway substation
- In 2013, the load served by the three Midway-Kern 230 kV lines was recorded up to 1,200 MW
- Bakersfield and Stockdale 230 kV substations both have a peak electrical demand above 100 MW

Assessment

- Outage Facility:
  1. (B) Midway-Kern PP #1
  2. (L-1/G-1) Midway-Kern PP #1 230 kV and PSE Bear
  3. (C) Midway-Kern PP #1 230 kV & Kern-Kern Front 115 kV
  4. (C) Midway-Kern PP #3 & #4 230 kV lines
  5. (C) Midway-Kern PP #1 & #3 230 kV lines
- Overloaded Facility:
  1-3. Midway-Kern PP #3 230 kV line
  4. Midway-Kern PP #1 230 kV line
  5. Midway-Kern #4 230 kV line



Midway-Kern PP #2 230 kV Line

Preferred Scope

- Reconductor 21 miles of the Midway-Kern PP #1 230 kV Line
- Remove crossties and split the Midway-Kern PP #1 line into two circuits
- Loop Bakersfield substation onto the Midway-Kern PP #1 or the new circuit. Re-conductor taps (6 miles each) to match line rating
- Remove Stockdale 230 kV taps and terminate at Kern PP 230 kV bus, looping Stockdale substation

Alternatives Considered

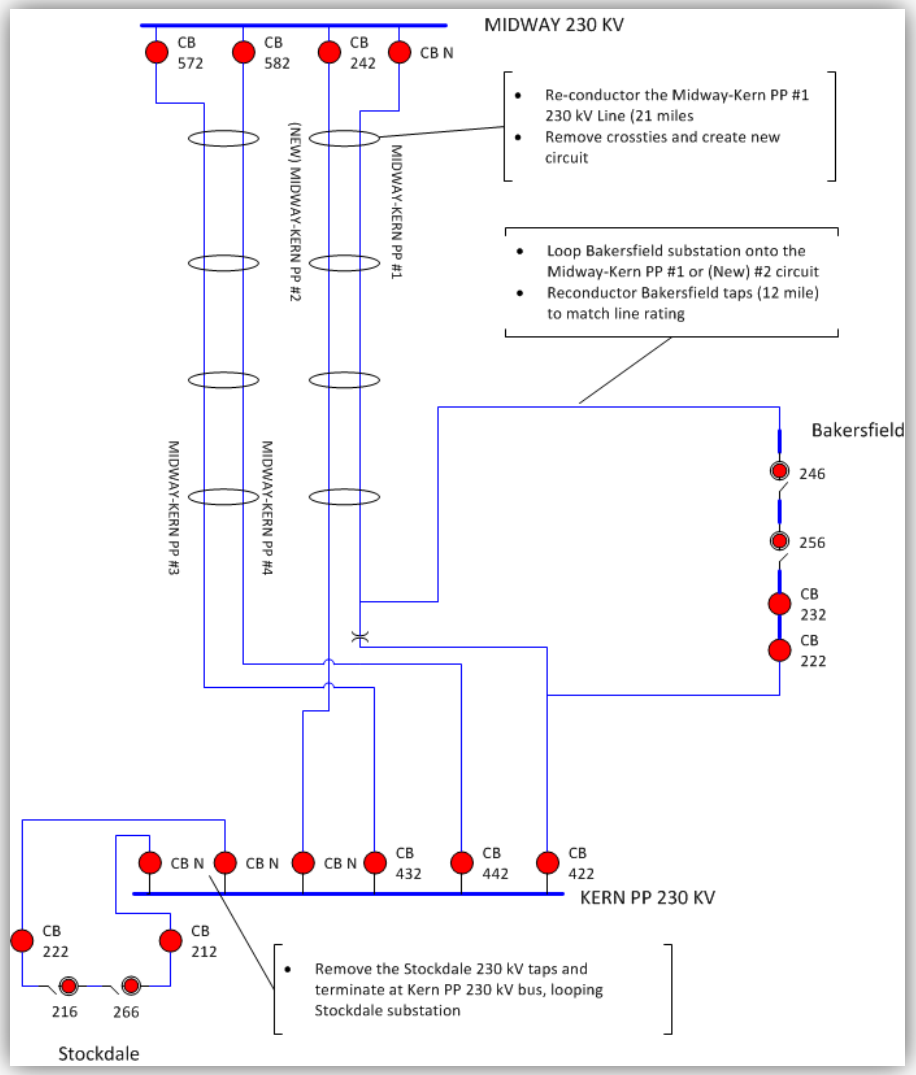
- Alt 1: New Midway-Kern PP 230 kV line (on new right-of-way)

Proposed In Service Date

- May 2019

Estimated Cost

- $60M - $90M



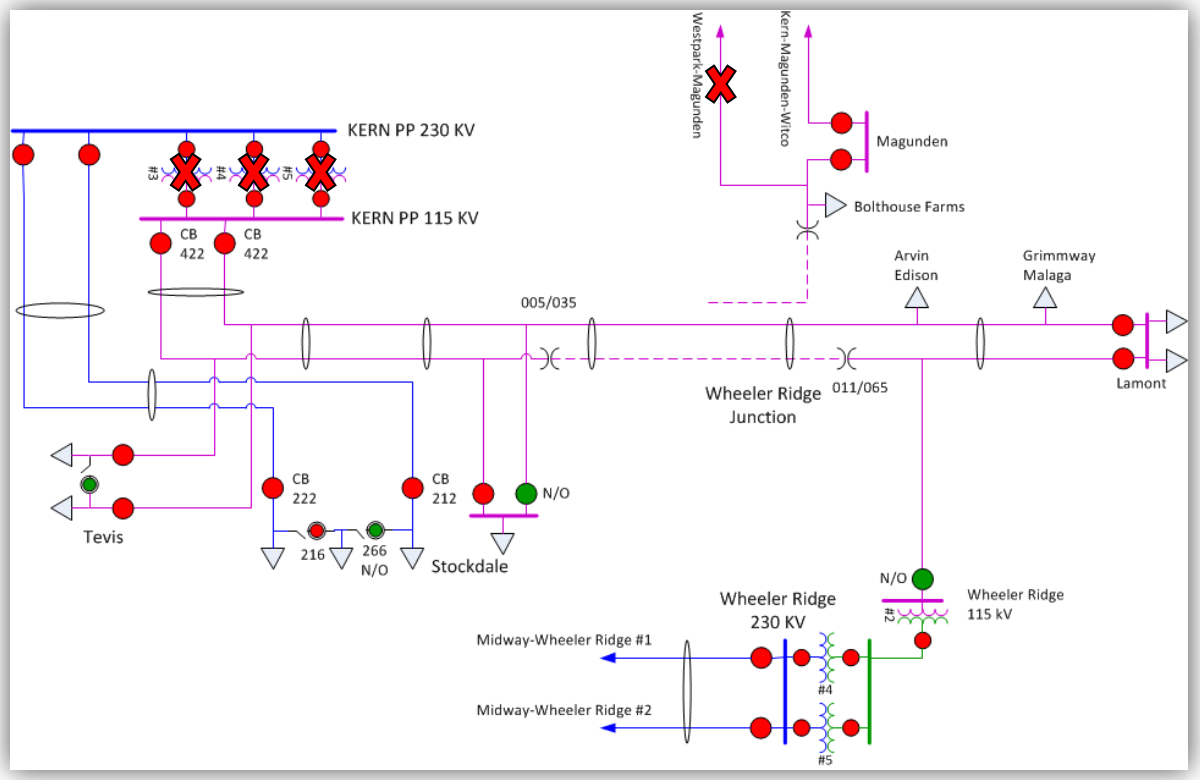
Wheeler Ridge Junction Station

Area Background

- Kern PP serves electric demand mainly on the 115 kV system to the north, south, and east. Which is primarily radial
- Three 420 MVA 230/115 kV transformers serve this 115 kV system
- In 2013, the load served by the three Midway-Kern 230 kV lines was recorded up to 1,200 MW
- Assumes Midway-Kern PP #2 230 kV line is completed

Assessment

- Outage Facility:
  1. (L-1/G-1) Westpark-Magunden and MT Poso
  2. (C5) Kern PP-Westpark #1 & #2
  3. (C3) Kern PP 230/115 kV XFMR #4 or #5 and Kern-Kern Front 115 kV line
  4. (C3) Kern PP 230/115 kV XFMR #4 and #5, or #3 and #4, or #3 and #5
  5. (C1) Midway 230 kV Bus 1D or 2D
- Overloaded Facility:
  1-2. Kern-Magunden-Witco 115 kV line
  3-4. Kern PP 230/115 kV XFMR #3, #4, or #5
  5. Midway-Wheeler Ridge 230 kV Line #1 or #2



Wheeler Ridge Junction Station

Preferred Scope

- Construct new 230/115 kV station near Wheeler Ridge Junction (WRJ) with two 230/115 kV XFMRs
- Convert 5 miles of 115 kV line to 230 kV from Stockdale to WRJ, bypassing and looping Stockdale substation. Continue 115 kV lines from WRJ to Lamont
- Convert 16 miles of 115 kV line to 230 kV from WRJ to Wheeler Ridge
- Re-build idle line to 115 kV from WRJ to Magunden substation

Alternatives Considered

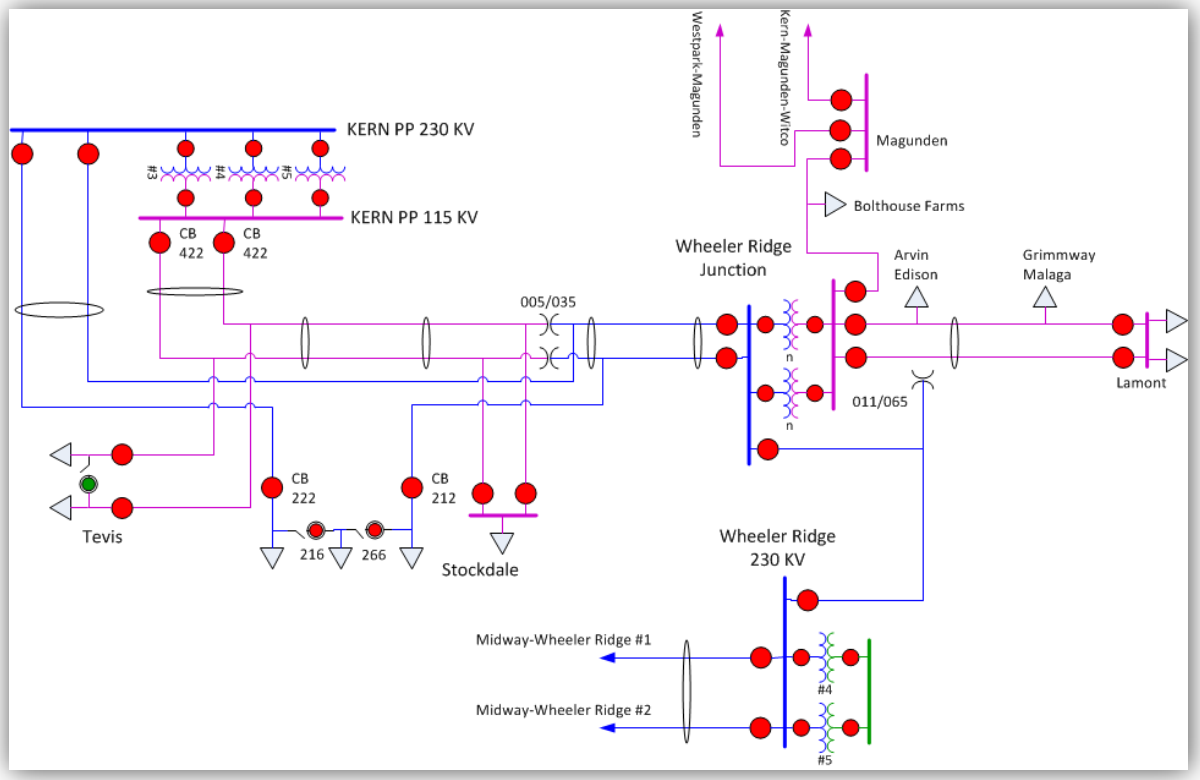
- Alt 1: Midway-Wheeler Ridge Capacity Increase and Reconductoring

Proposed In Service Date

- May 2020

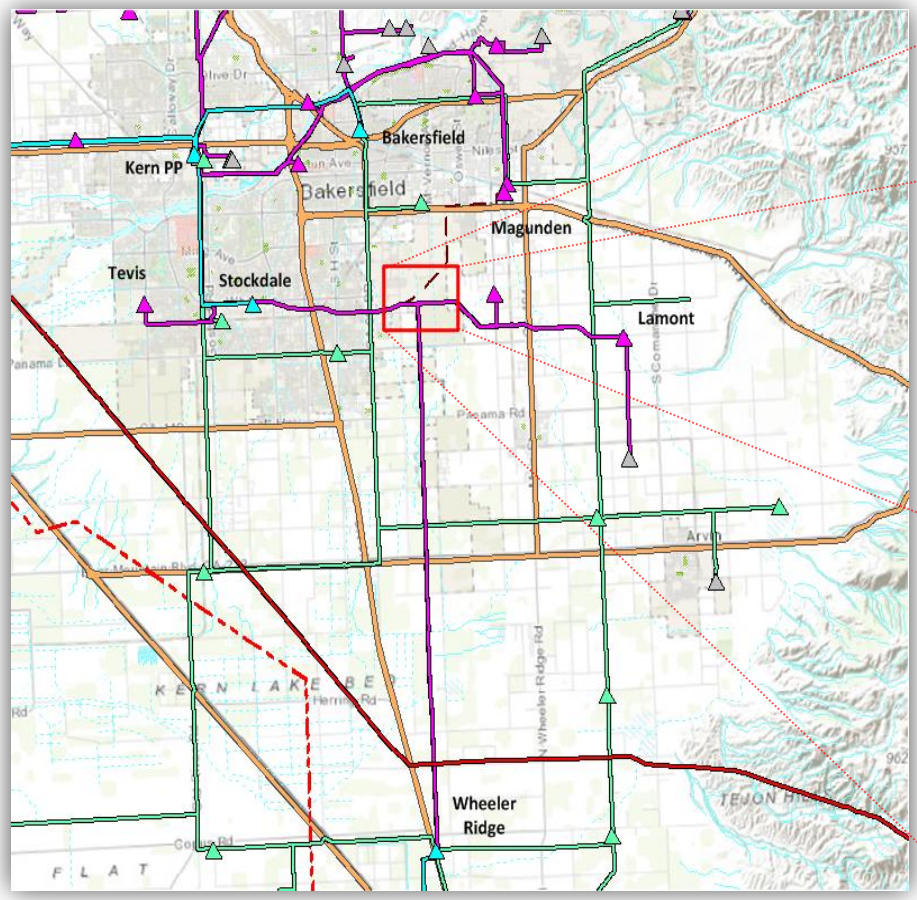
Estimated Cost

- $90M - $140M



Wheeler Ridge Junction Station - Continued

Vicinity Map



Wheeler Ridge Junction

Gill Ranch 115 kV Tap Load Interconnection

Proposed Scope

- Interconnect a new customer owned substation via a tapped connection to PG&E's Gill Ranch 115 kV Tap.
- To reliably serve the maximum proposed 17 MW load, the addition of 30 MVAr voltage support is proposed at Mendota.
  - Under 90% post-project voltage for Category B contingencies

Alternatives Considered

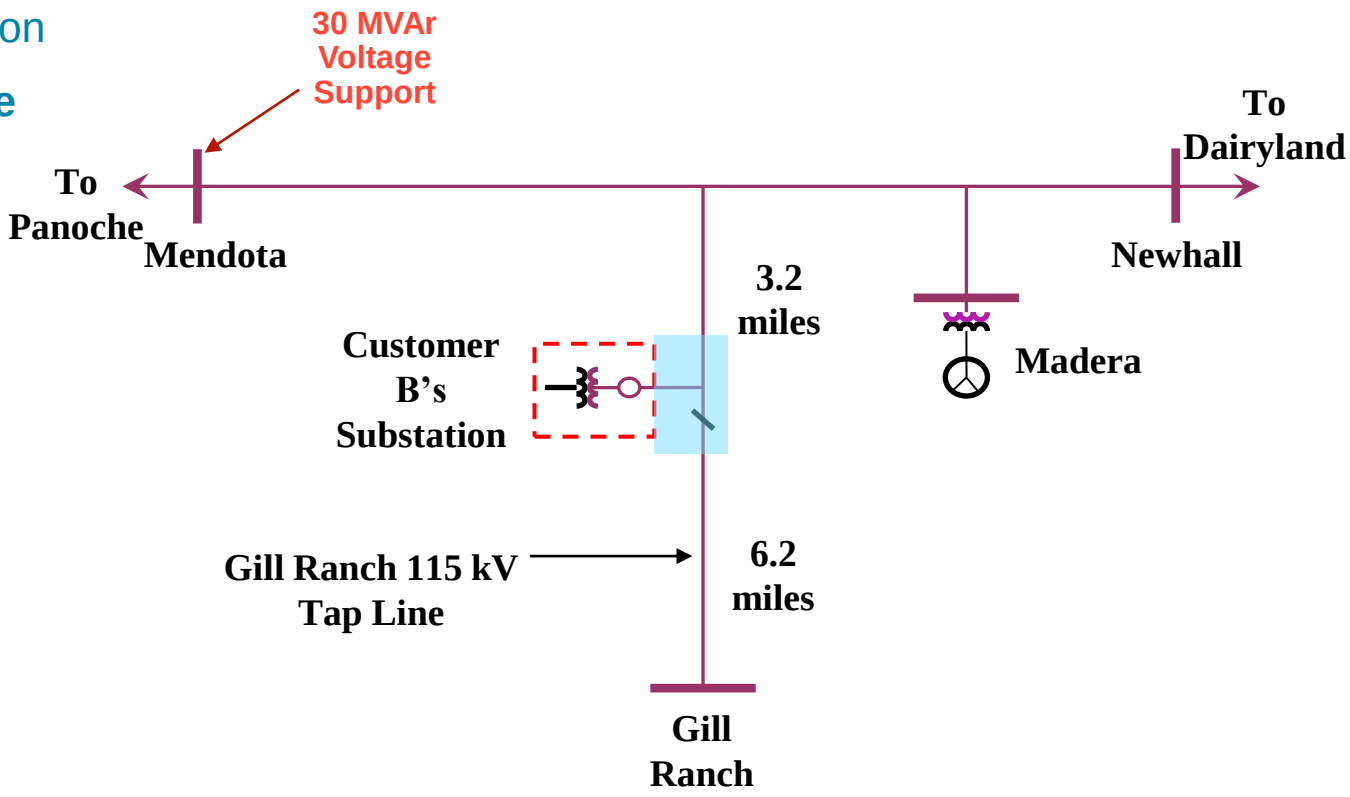
- Newhall 115 kV Substation

Proposed In Service Date

- June 1, 2014

Estimated Cost

- Interconnection
  - $1M to $2M
- Network Upgrades
  - $5M to $10M



Sanger-Reedley 115 kV Load Interconnection

Proposed Scope

- Interconnect a new customer owned substation via a tapped connection to PG&E's Sanger – Reedley 115 kV Line.

Alternatives Considered

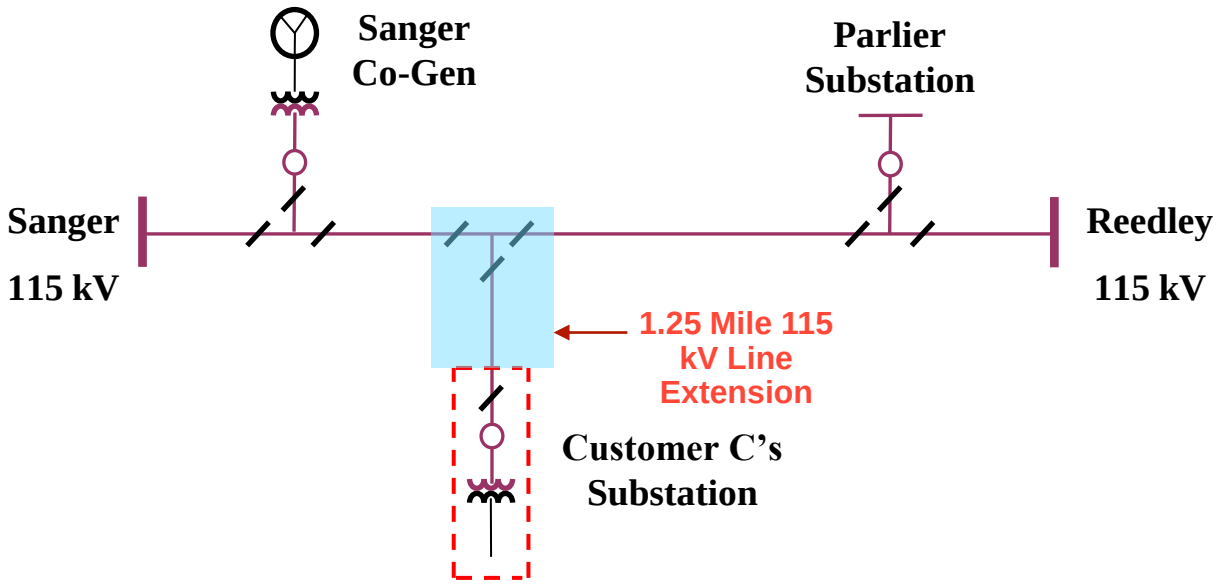
- Tap PG&E's McCall – Sanger #2 or #3 115 kV Lines

Proposed In Service Date

- June 2015

Estimated Cost

- Interconnection
  - $2M to $3M
- Network Upgrades
  - None



Thank you

PG&E's 2013 Request Window Proposals

CAISO 2013-2014 Transmission Planning Cycle

Meng Zhang
PG&E
September 26, 2013

Transmission Projects Overview

Projects Seeking CAISO Approval – Stockton / North Valley

1. Mosher Transmission Project
2. Weber-French Camp 60 kV Line Reconfiguration
3. Glenn 230/60 kV Transformer No.1 Replacement
4. Stockton A-Lockeford-Bellota load interconnection
5. Stagg No. 1 load interconnection

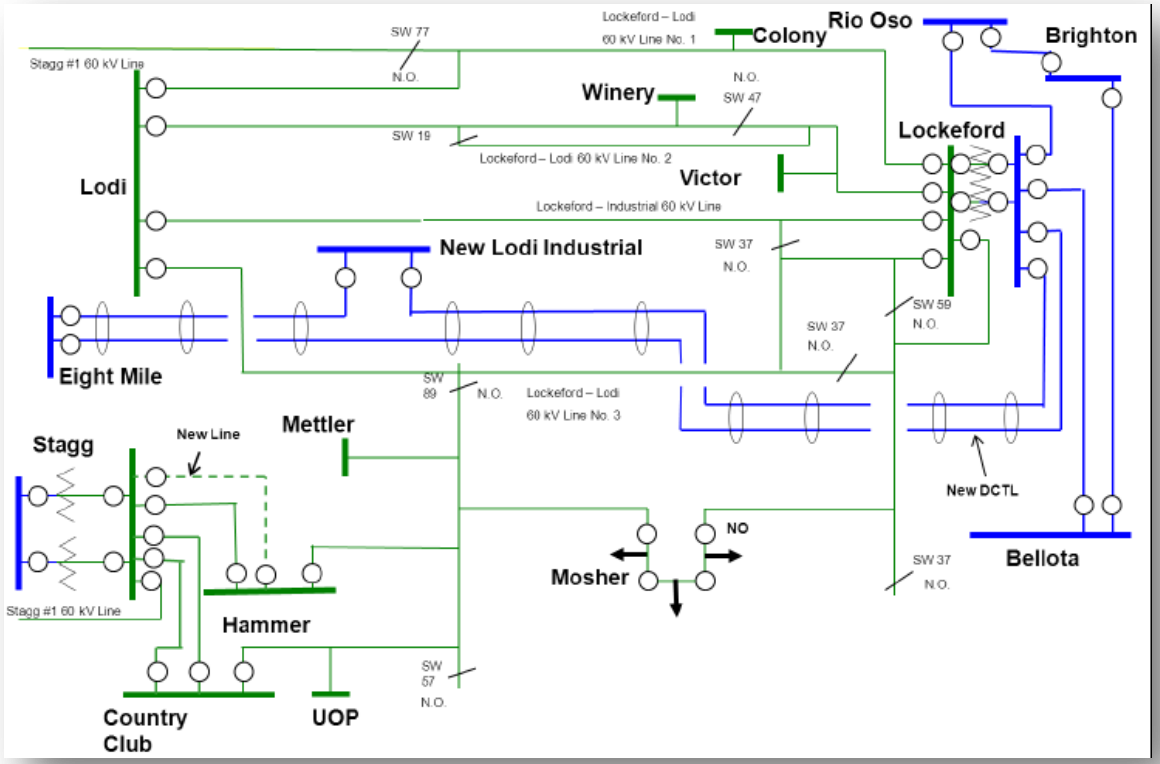
Mosher Transmission Project

Area Background

- Hammer- Country Club 60 kV line radially feeds the majority of customers within the Stockton division (65 MW) through UOP, Mettler, and Mosher Substations. Mosher alone comprises of 55 MW of load.
- Mosher 60 kV bus is already partially converted to a ring bus when the third 60/12 kV transformer was added. One more circuit breaker needs to be added to complete ring bus
- Assumes New Stagg- Hammer 60 kV Line and New Lockeford -Lodi 230 kV DCTL projects in-service

Assessment

- Outages
  - N-1: Hammer – County Club 60 kV Line
  - N-1-1: Stagg- Country Club 60 kV Lines No 1 & 2
- Overloaded facility
  - Lockeford No. 1 60 kV Line in 2014
  - Hammer- Country Club 60 KV Line in 2014



Mosher Transmission Project

Preferred Scope

- Re-conductor 11.5 miles of the Lockeford No. 1 60 kV line with a conductor capable of at least 700 amps during emergency conditions.
- Add circuit breaker and SCADA to complete the Mosher 60 kV Ring Bus
- Operate all circuit breakers normally closed to loop in Mosher Substation
- Install Mosher Overload SPS to prevent Stagg and Lockeford systems from serving each other when losing 230 kV source at either substation during high loading periods.

Alternatives Considered

- New Underground Stagg-Mosher 60 kV Line
- Disable Mosher Automatics

Proposed In Service Date

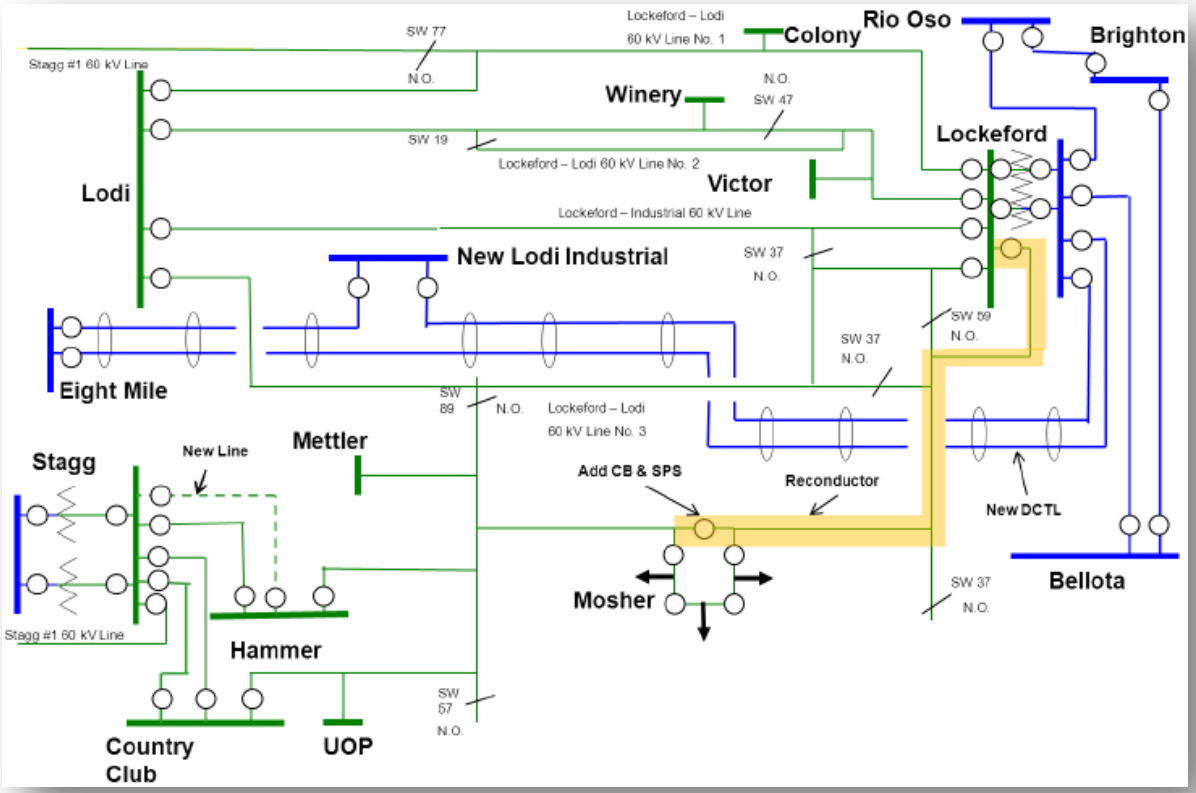
- May 2018

Estimated Cost

- $10M - $15M

BCR

- 1.55



Weber – French Camp 60 kV Line Reconfiguration Project

Area Background

- French Camp Substation and three single customer substations (Dana, Cargill, and JM Manufacturing) are served radially from the Weber 60 kV Line No. 1
- French Camp serves 4,711 customers and a total of 23.2 MW. The three single customers have a total load of 7.2 MW
- The Weber 60 kV Line No. 1 has an average of 1.4 sustained outages every year with an average duration of approximately 1.5 hours per outage. The Weber 60 kV Line No. 1 also experiences 1.2 momentary outages per year

Assessment

- Outage of the Weber 60 kV Line No. 1 results in sustained outages to French Camp, Dana, Cargill and JM Manufacturing substations

Preferred Scope

- Extend the Weber 60 kV Line No. 1 from Pole No. B0/10 to Weber Substation (0.2 miles) to create a second line from Weber to French Camp Substation
- Remove the conductor from Pole No. 00/08 to A0/09
- Extend the Weber 60 kV Bus for a new bay and install new 60 kV circuit breaker
- Install three 60 kV circuit breakers at French Camp Substation and upgrade to a loop arrangement
- Install station bypass switch at French Camp Substation

Proposed In Service Date

- December 2016

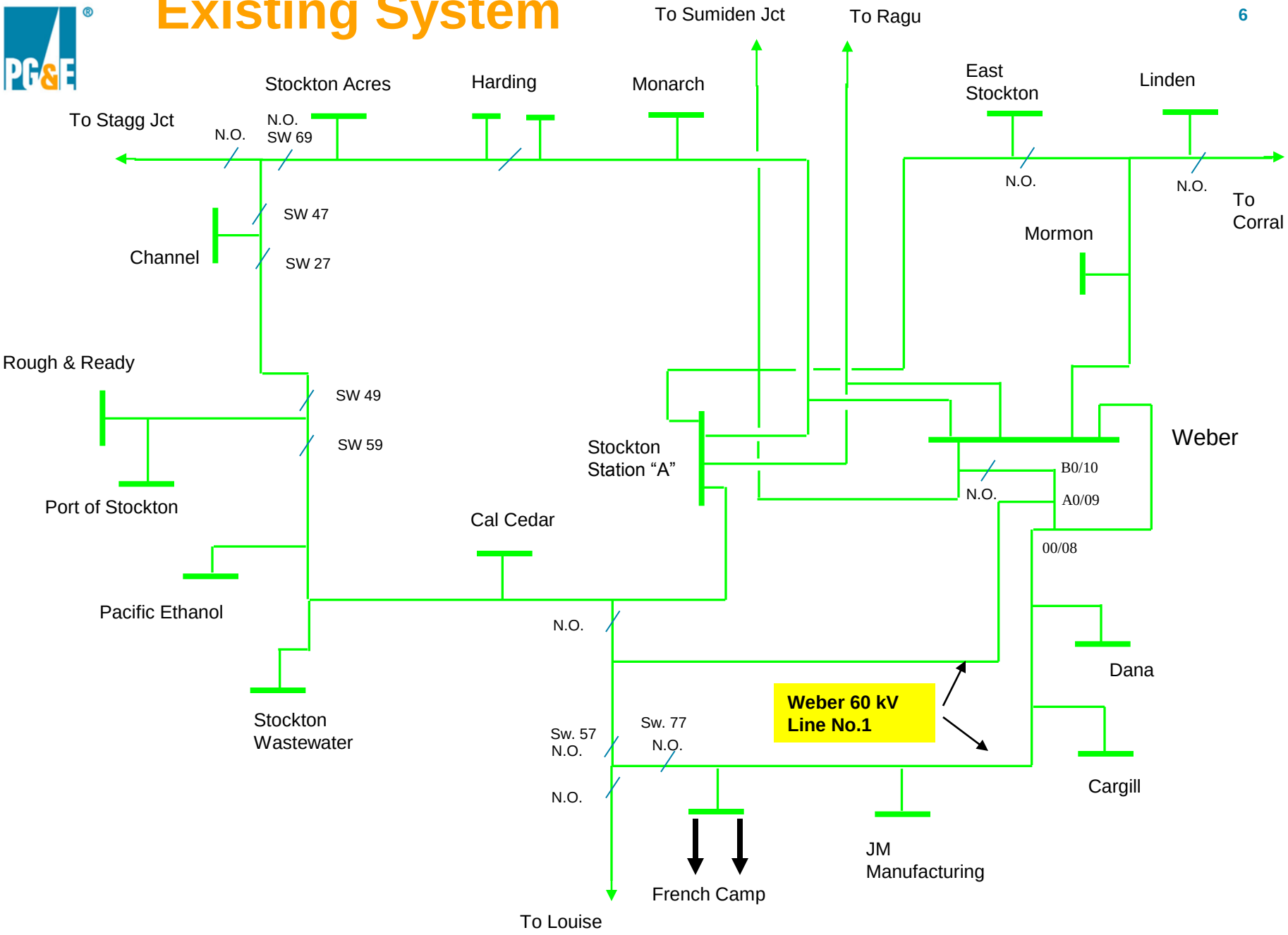
Estimated Cost

- $7M to $9M

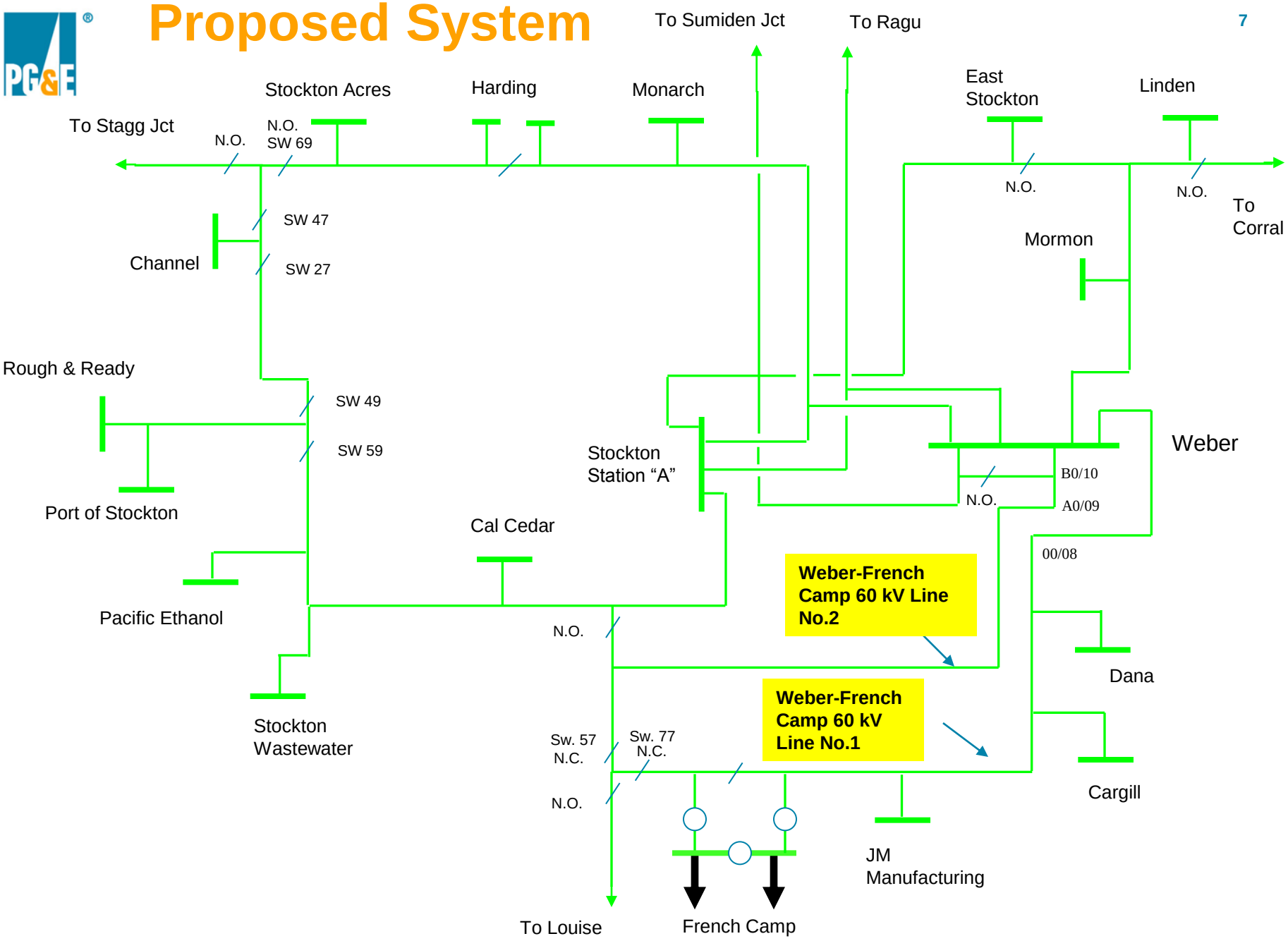
Benefits

- This project will improve reliability for customers served by French Camp Substation and reduce customer outage minutes per year by approximately 573,800.
- The BCR is 1.21

Existing System



Proposed System



Glenn 230/60 kV Transformer No. 1 Replacement

Area Background

- Glenn 230/60 kV Transformer No. 2, rated at 175 MVA, is a radial transformer bank which serves Orland, Willows, Elk Creek, Hamilton and Corning
- The station has a redundant 230/60 kV transformer (No. 1) rated at 83 MVA that serves as an undersized transformer during maintenance and emergency conditions

Assessment

- Outage of Transformer No. 2 results in sustained outages to 24,175 electric customers (123 MW)
- Incrementally restore load with Transformer No. 1
- Load at Willows A, Rice, Anita and Corning (14,713 customers) cannot be restored due to weak ties

Preferred Scope

- Replace Transformer No. 1 with a new 200 MVA three-phase 230/60 kV transformer with LTC

Proposed In Service Date

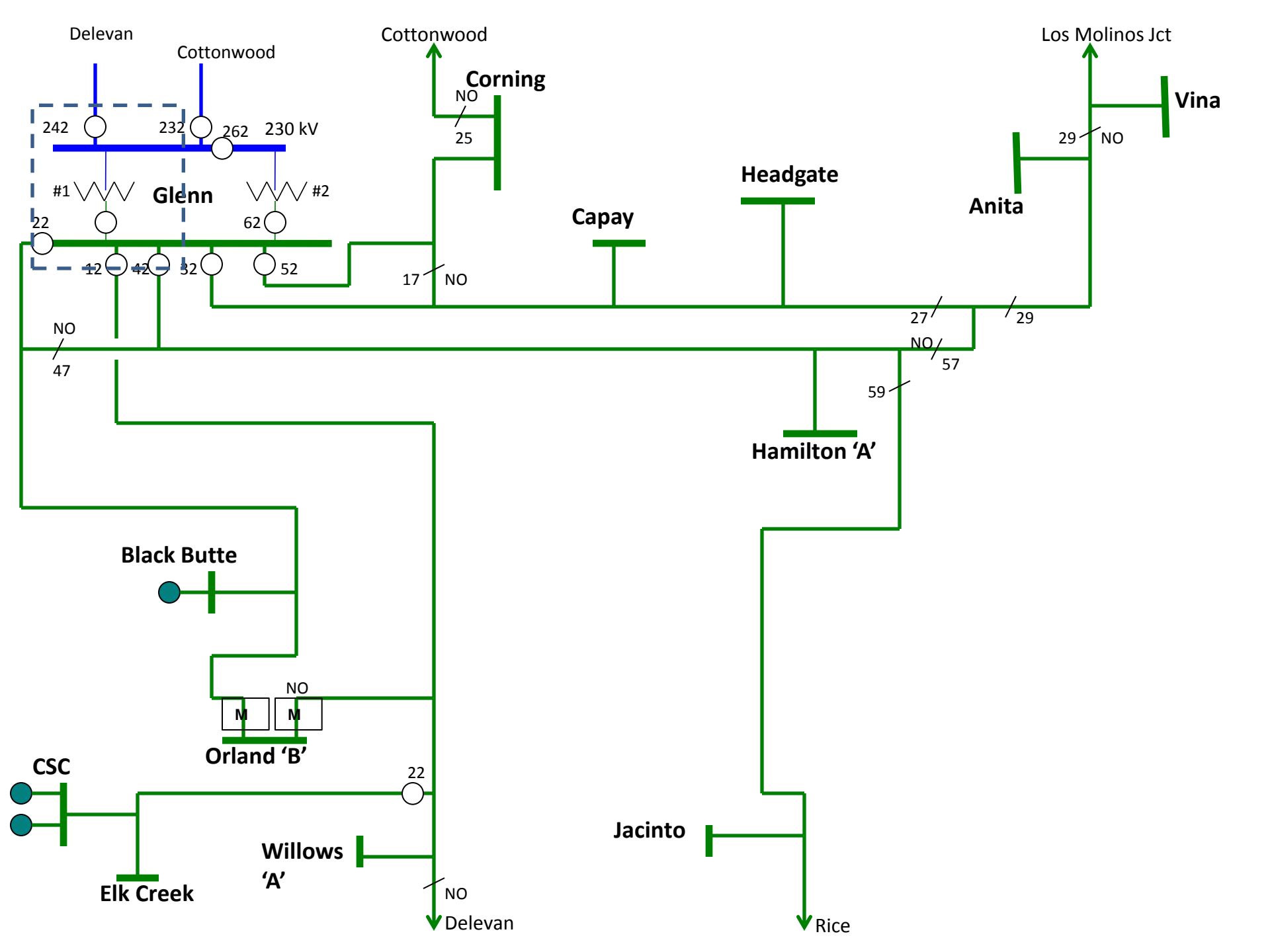
- May 2018

Estimated Cost

- $5M to $10M

Benefits

- This project will improve reliability for PG&E customers in Glenn area
- The BCR is 1.54


Delevan
Cottonwood
Cottonwood
Corning
NO
25
Los Molinos Jct
Vina
29
NO
242
232
262
230 kV
#1
Glenn
#2
22
62
12
42
32
52
17
NO
Capay
Headgate
Anita
27
29
NO
57
NO
47
59
Hamilton 'A'
Black Butte
NO
M
M
Orland 'B'
CSC
22
Jacinto
Willows
'A'
Elk Creek
NO
Delevan
Rice

Stockton A-Lockeford-Bellota Load Interconnection

Preferred Scope

- Interconnect a new customer owned substation via a tapped connection to PG&E's Stockton A – Lockeford – Bellota #1 115 kV Line.
- To reliably serve the maximum proposed 9.7 MW load, the addition of 15 MVAr voltage support and a re-rate of the Bellota-Riverbank-Melones 115 kV Line are proposed.
  - Over 5% voltage deviation for a Category B contingency at the Lockeford and Stockton Subs

Alternatives Considered

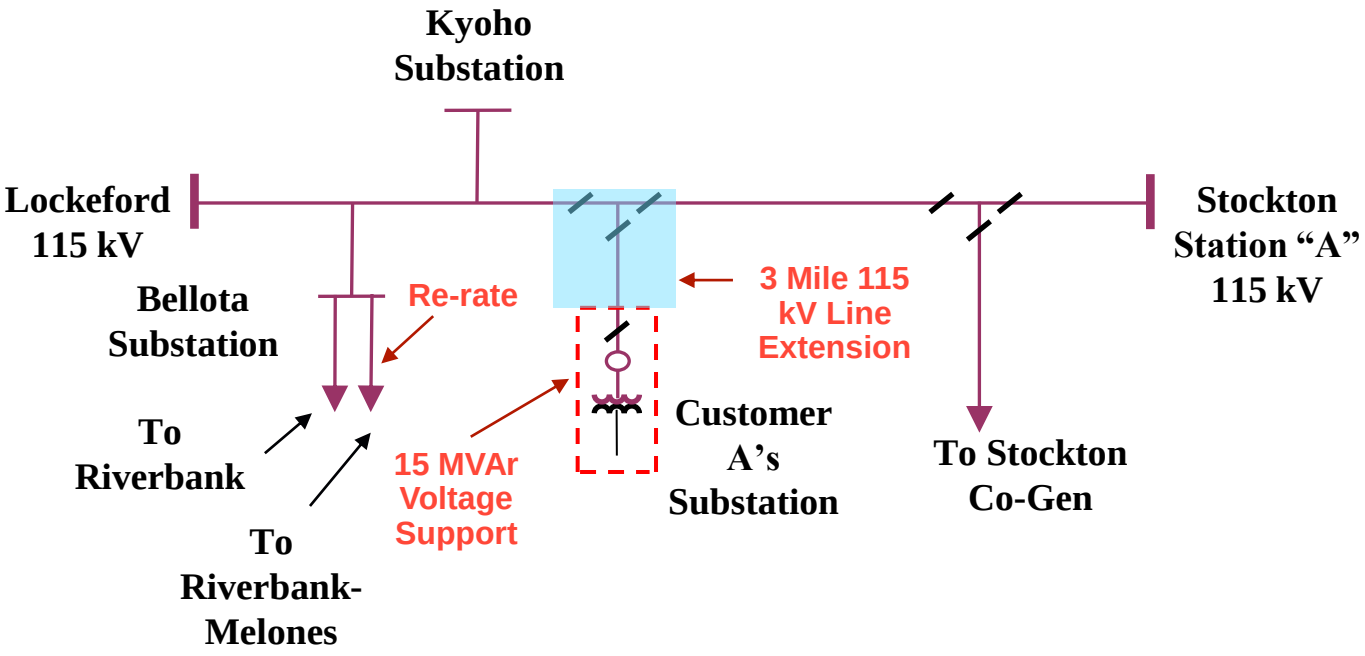
- Distribution Service via Weber Substation

Proposed In Service Date

- April 30, 2014

Estimated Cost

- Interconnection
  - $7M
- Network Upgrades
  - $3M to $5M



Stagg No. 1 Load Interconnection

Preferred Scope

- Interconnect a new customer owned substation via a tapped connection to PG&E's Stagg No.1 60 kV Line.

Alternatives Considered

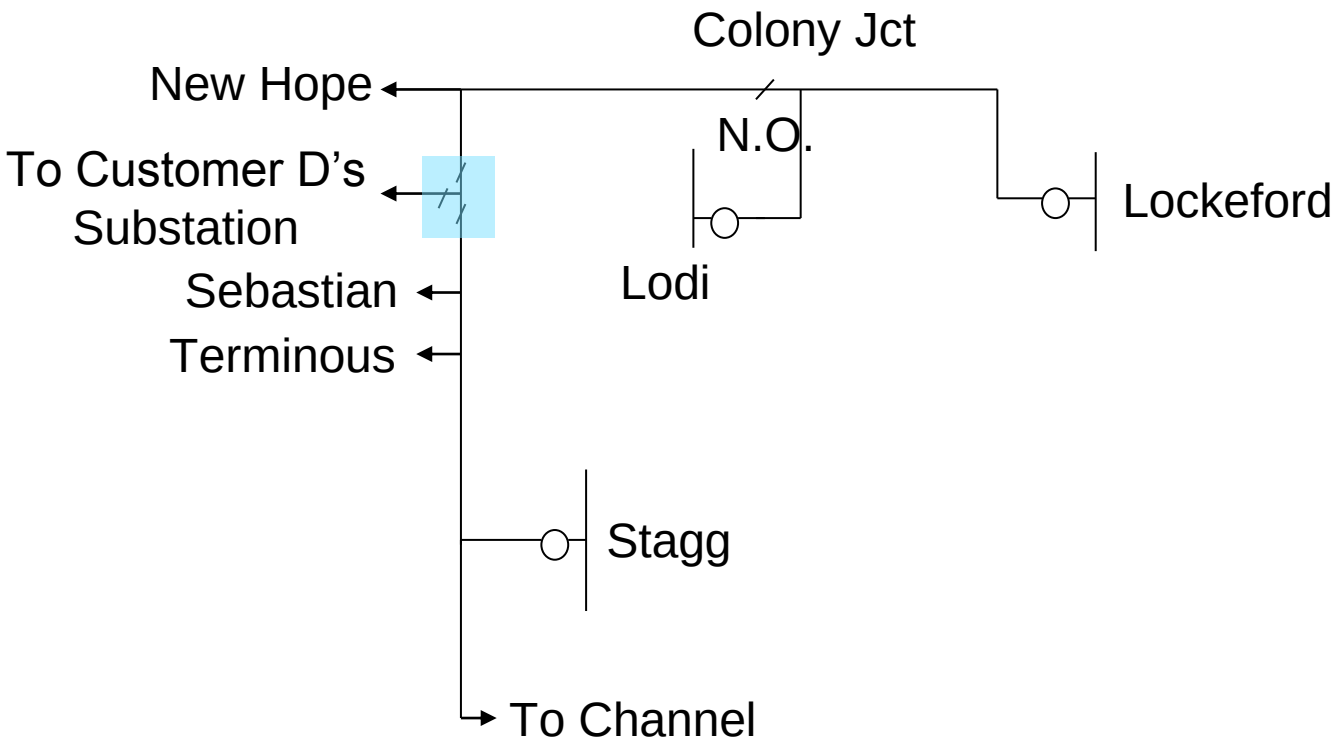
- Distribution Service via Terminous

Proposed In Service Date

- Mid to Late 2014

Estimated Cost

- Interconnection
  - $1M to $2M
- Network Upgrades
  - None



Thank you

PG&E's 2013 Request Window Proposals

CAISO 2013-2014 Transmission Planning Cycle

Greg Ligon
PG&E
September 26, 2013

Transmission Projects Overview

Projects Seeking CAISO Approval – Coastal Regions

1. Estrella Substation Project
2. Morgan Hill Area Reinforcement Project
3. Laytonville 60 kV Circuit Breaker Project
4. Cotati 60 kV Circuit Breaker Project
5. East San Jose Load Interconnection

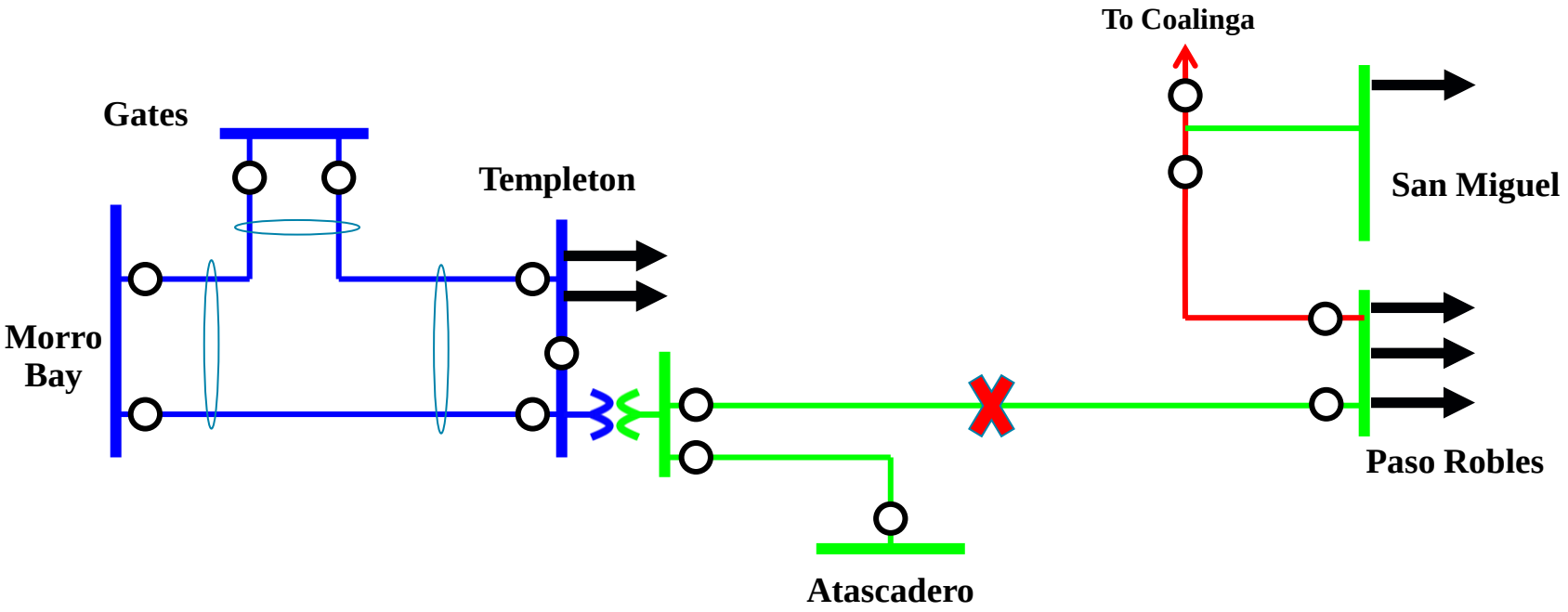
Estrella Substation Project

Area Background

- This project will increase the capacity of the Paso Robles Distribution Planning Area (DPA) by adding a new substation equipped with a 45 MVA distribution transformer.

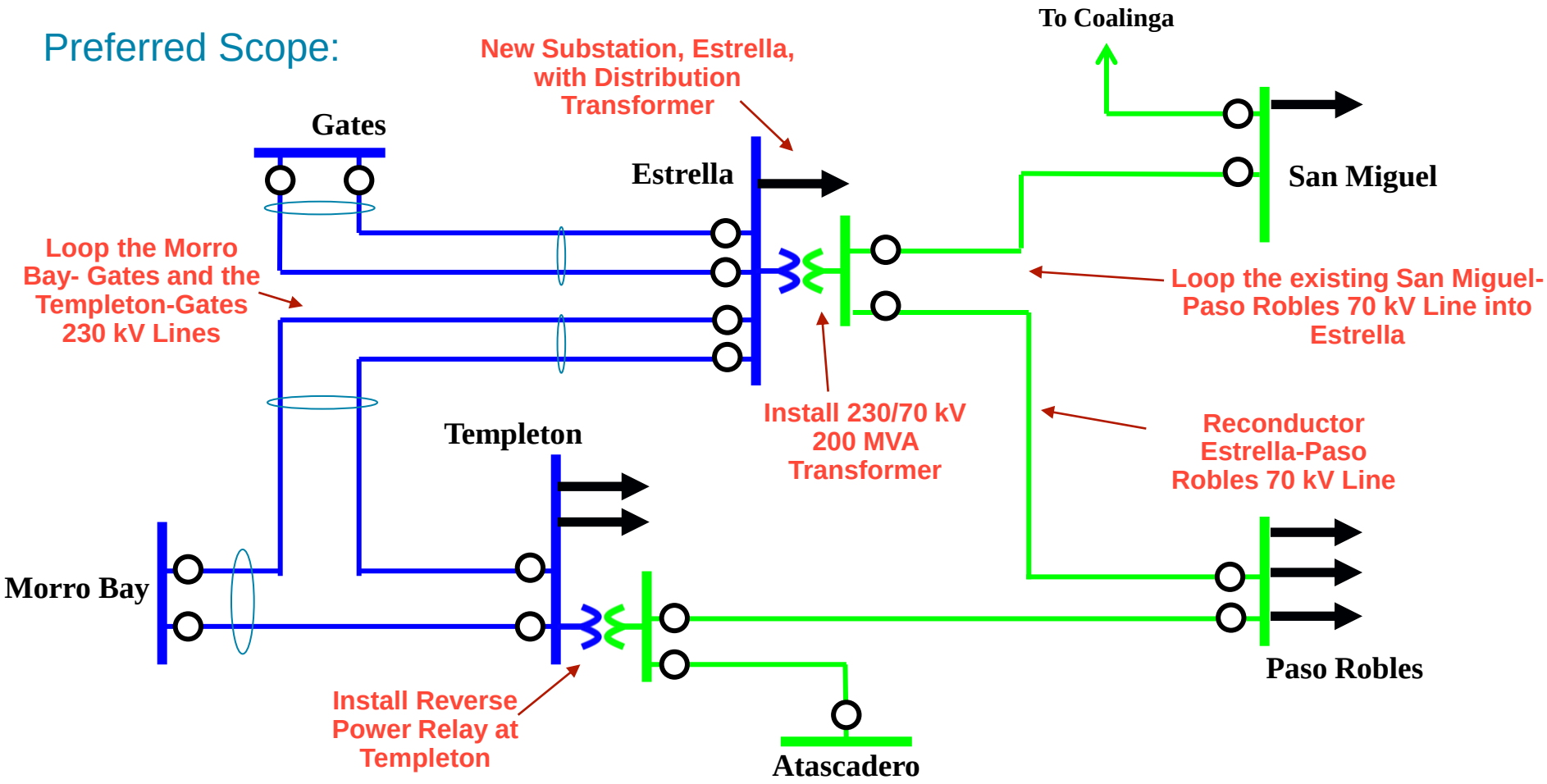
Assessment

- L-1 outage: Paso Robles-Templeton 70 kV Line
- Violation: Paso Robles Substation Voltage, San Miguel-Paso Robles 70 kV Line



Estrella Substation Project

Preferred Scope:



Proposed In Service Date

- May 2019

Estimated Cost

- $40M - $50M

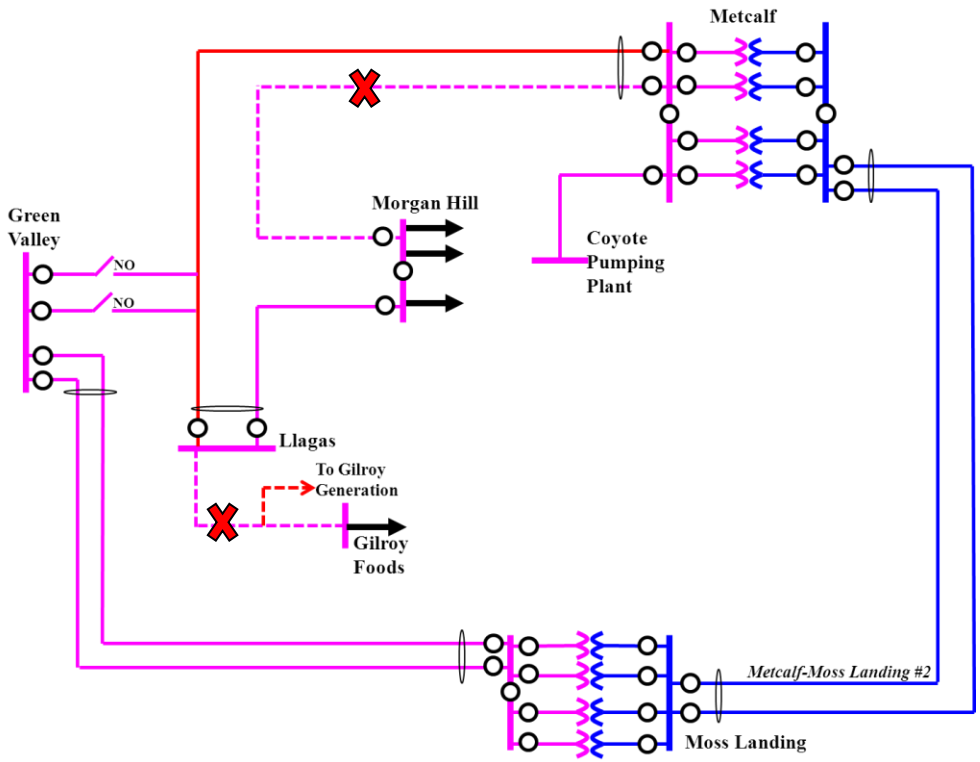
Morgan Hill Area Reinforcement

Area Background

- Morgan Hill and Llagas Substations serve over 20,000 customers each.
- The Morgan Hill pocket has over 300 MWs of local generation.

Assessment

- L-1-1 outage: Metcalf-Morgan Hill 115 kV Line and Llagas-Gilroy Foods 115 kV Line.
- Overloaded facility: Metcalf-Llagas 115 kV Line.



Morgan Hill Area Reinforcement

Preferred Scope

- Construct New 230 to 115 kV Substation
- Loop the Morgan Hill-Llagas 115 kV Line into the New Substation
- Reconductor 3 miles of Morgan Hill-Llagas 115 kV Line.

Alternatives Considered

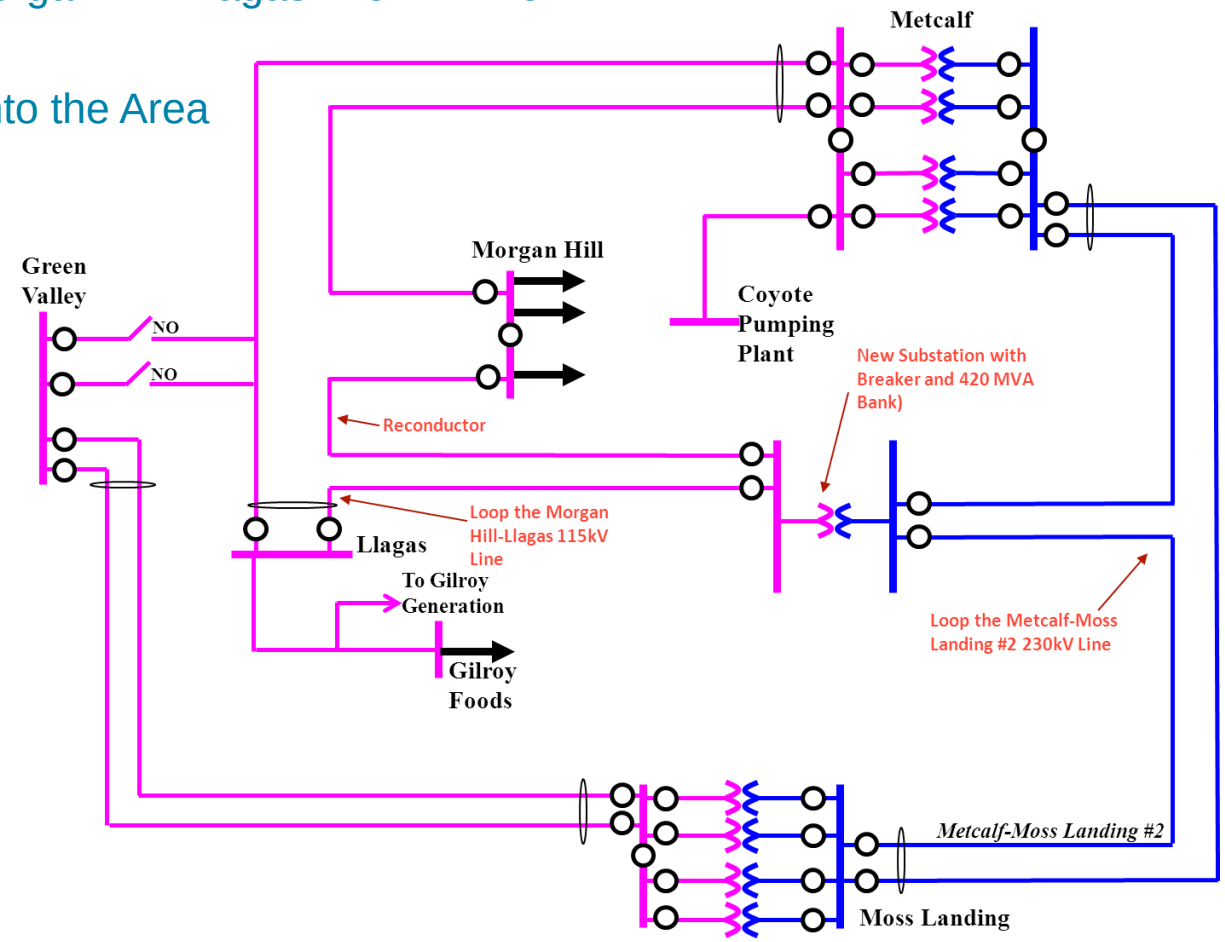
- Build a new 115 kV Line into the Area

Proposed In Service Date

- May 2021

Estimated Cost

- $35M - $45M



Laytonville 60 kV Circuit Breaker Project

Area Background

- The Garberville-Laytonville and Laytonville-Willits 60 kV Lines provide service to approximately 16,000 customers at Laytonville, Covelo and Willits substations.
- Laytonville-Willits 60 kV Line has experienced 12 outages in the last 5 years resulting in over 2.2 million customer outage minutes

Assessment

- N-1 Laytonville-Willits 60 kV Line results in a sustained outage to Covelo and momentary outage to Laytonville.

Preferred Scope

- This project proposes to construct a loop bus at Laytonville Substation, install 3 SCADA-operable circuit breakers and connect the Laytonville-Covelo 60 kV Line into the Laytonville Substation

Alternatives Considered

- Status Quo

Proposed In Service Date

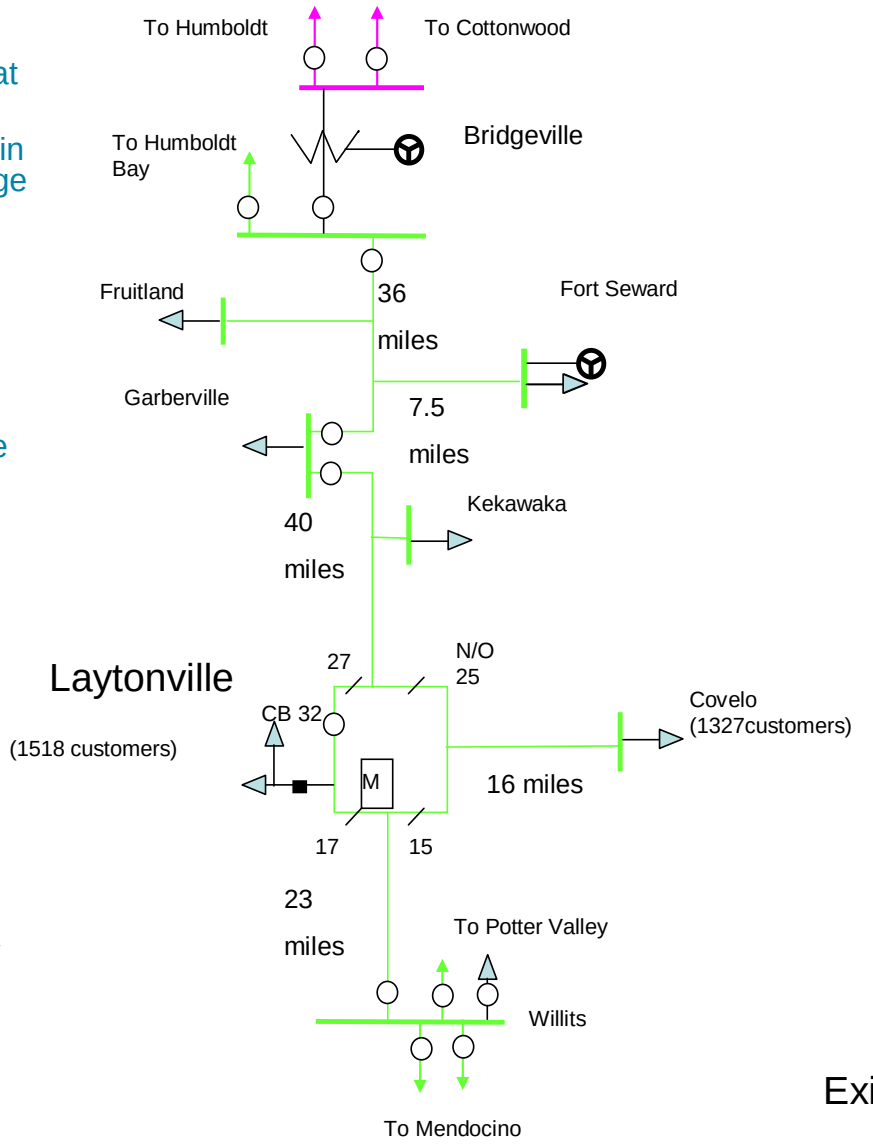
- December 2015

Estimated Cost

- $7.5M

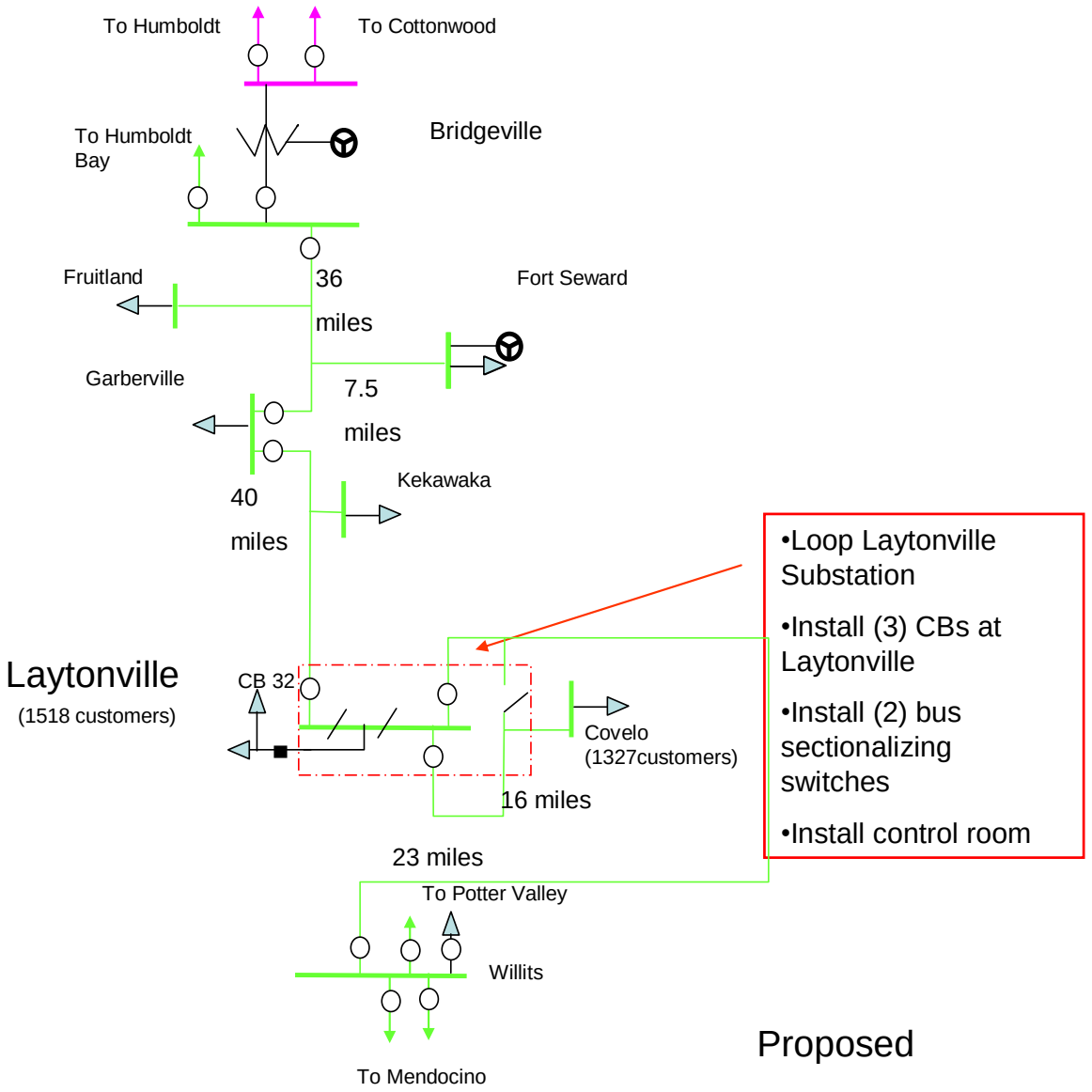
Benefits

- This project will improve reliability for customers served by Laytonville and Covelo.
- The BCR is 1.19



Existing

Proposed System in Laytonville



Cotati 60 kV Circuit Breaker Project

Area Background

- The Fulton – Molino – Cotati 60 kV Line provides service to over 27,000 customers via Molino, Cotati, Laguna and Sonoma Company Landfill 60 kV substations.
- This line has experienced 15 outages in the last 10 years resulting in over 169,000 customer outage minutes.
- Cotati is looped into the Fulton – Molino – Cotati and Lakeville No. 2 60 kV lines but is operated as a flip flop configuration

Assessment

- An outage of the Fulton – Molino – Cotati 60 kV Line results in a sustained outages to Laguna and Sonoma Co. Landfill and momentary outages to Molino and Cotati.

Preferred Scope

- Install one 60 kV circuit breaker at Cotati Substation, in order to fully loop the substation onto the Fulton – Molino – Cotati and Lakeville No. 2 60 kV lines.

Alternatives Considered

- Status Quo

Proposed In Service Date

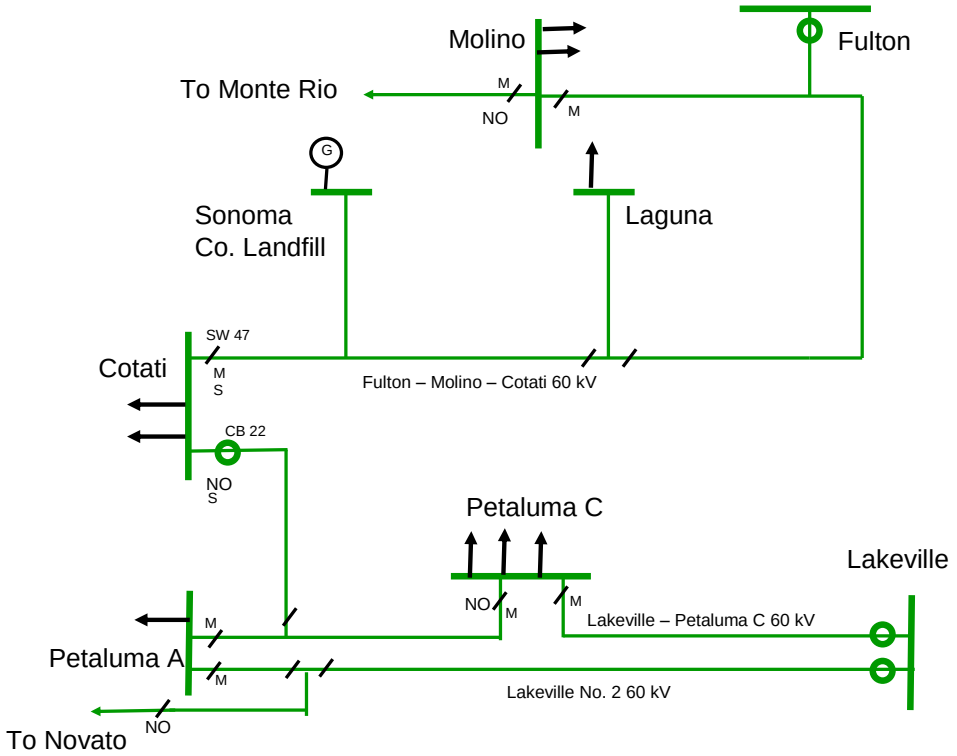
- December 2015

Estimated Cost

- $1.9M

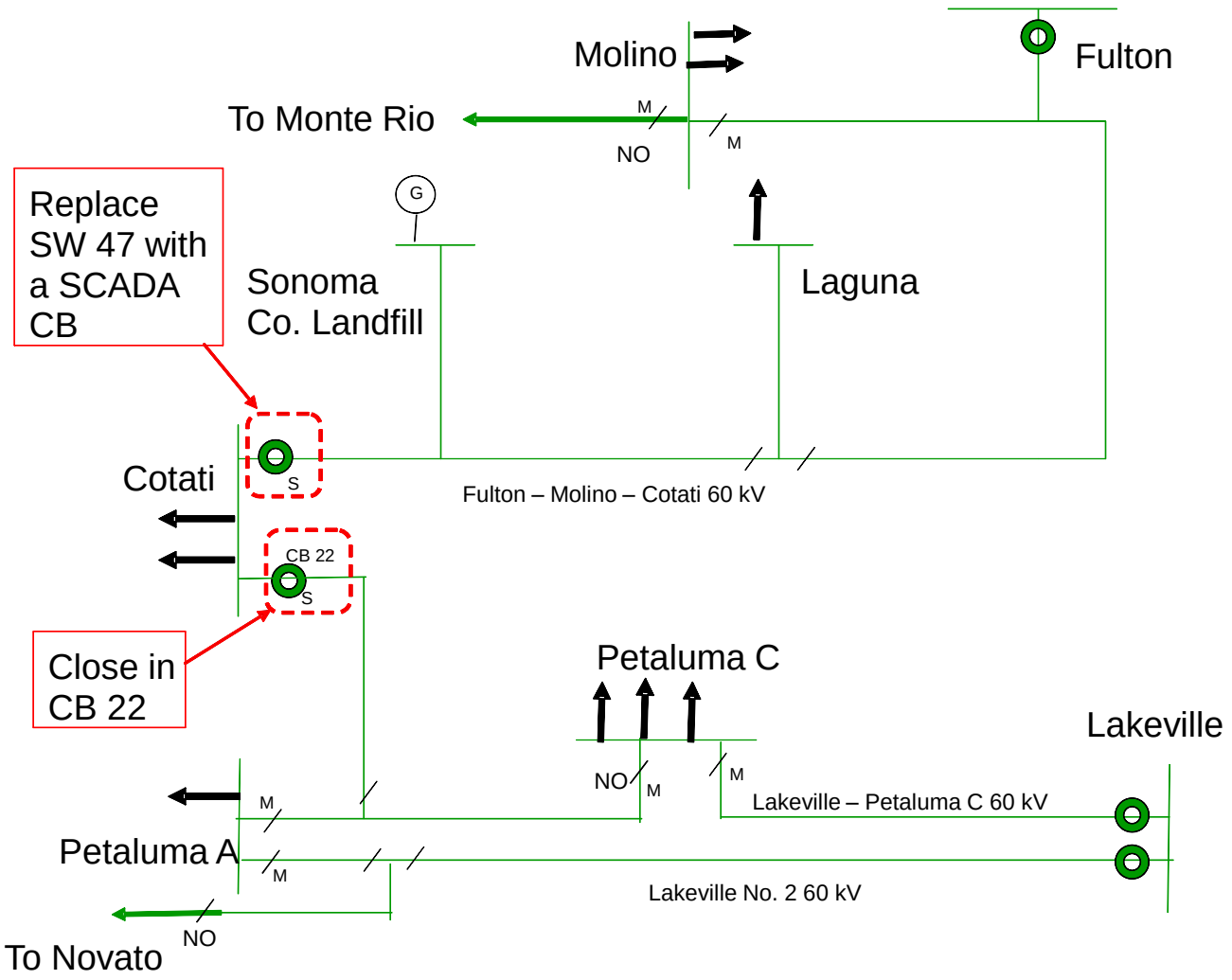
Benefits

- This project will improve reliability for customers served by Cotati.
- The BCR is 1.39



Proposed System in Cotati

Proposed



East San Jose Load Interconnection

Preferred Scope

- Interconnect two (2) new customer owned substations
  1. Railroad Ct Substation will be served via a tap of the Newark-Milpitas No. 1 115 KV Line
  2. Las Plumas Substation will be served via a tap of the Mabury 115 kV Tap Line

Alternatives Considered

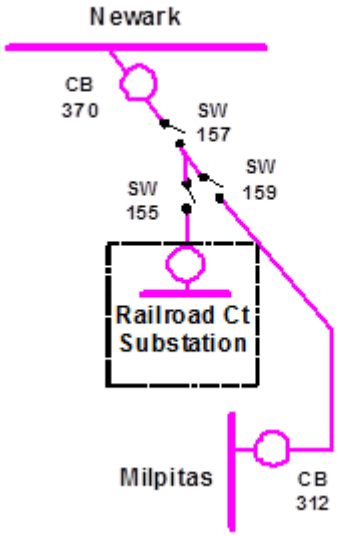
- Status Quo
- For the Railroad Ct Substation, Tap PG&E's Dixon Landing – McKee 115 kV Line

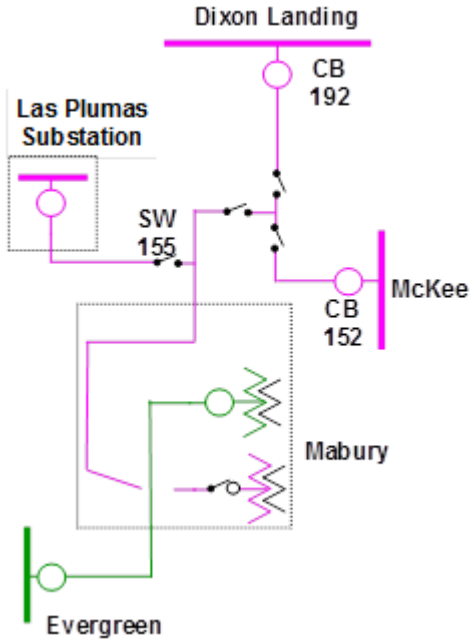
Proposed In Service Date

- 2014

Estimated Cost

- Interconnection
  - $9.1M
- Network Upgrades
  - None





Other Projects Submitted

- One Category D project
- Five conceptual projects
  - Mendocino Long Term Plan
  - San Rafael Long Term Plan
  - West San Jose Area Upgrade
  - Moraga-Oakland J 115 kV Reconductor
  - Table Mountain-Tesla Transmission Project

Thank you

Next Steps

Tom Cuccia
Senior Stakeholder Engagement and Policy Specialist

2013/2014 Transmission Planning Process Stakeholder Meeting
September 25-26, 2013

Next Steps

Date	Milestone
September 26-October 10	Stakeholder comments on ISO preliminary reliability results and PTO mitigation solutions to be submitted to regionaltransmission@caiso.com
October 15	Request window closes. Submissions to be submitted to requestwindow@caiso.com
October 31	Post final 2013/2014 reliability study results