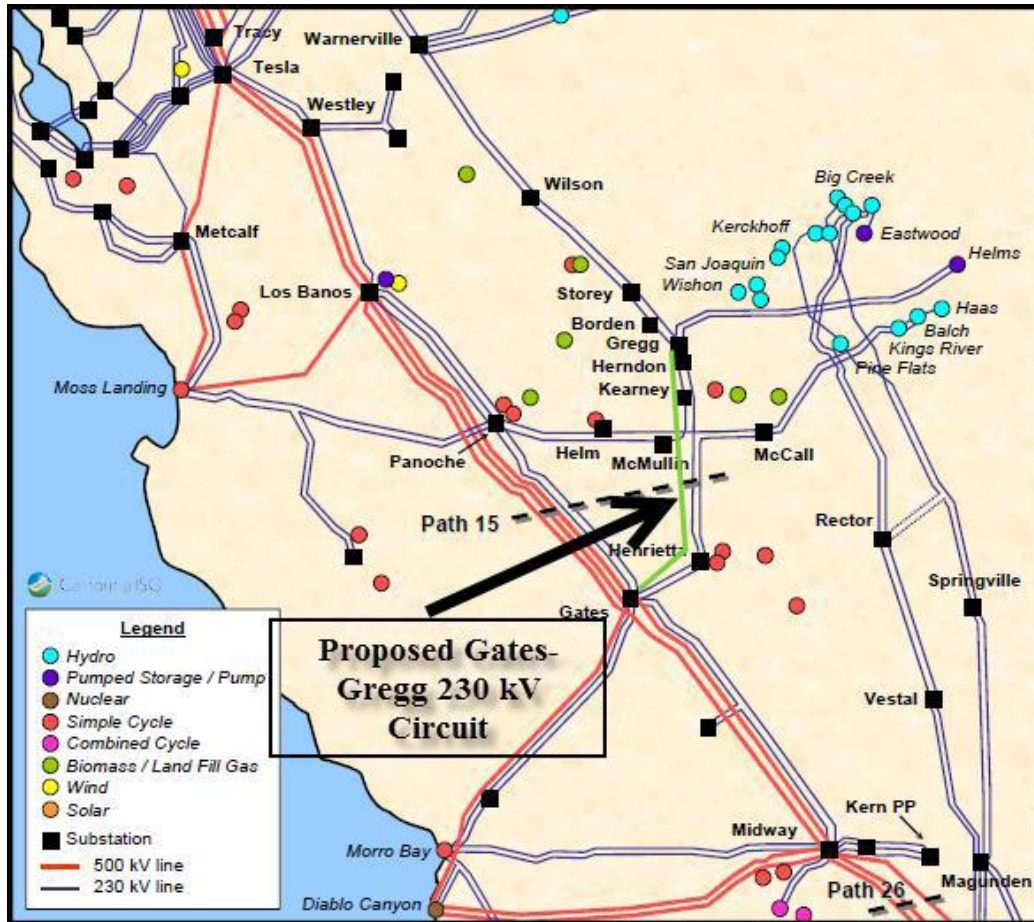


# **APPENDIX G: Description and Functional Specifications for Transmission Elements Eligible for Competitive Solicitation**

## G1 Gates-Gregg 230 kV Line Description and Functional Specifications

### G1.1 Description

In the draft 2012-2013 Transmission Plan, the ISO has identified a reliability project with policy benefits for a 230 kV transmission line between PG&E owned Gates and Gregg 230 kV substations, as depicted below:



The ISO estimates that the cost of the 230 kV line will be between \$115 and \$145 million. This proposed transmission configuration will provide a reliable means to pump water at Helms during dry year conditions in order to generate the next day without jeopardizing load reliability during peak periods, it will also provide a great increase in Helms pumping window in order to facilitate with the daily load and renewable balancing cycle, while minimizing environmental impacts in the PG&E service territory.

**G1.2 Functional Specifications**Overhead Line Construction**Line Terminus 1:** PG&E Gates 230 kV Bus**Line Terminus 2:** PG&E Gregg 230 kV Bus**Nominal Phase to Phase Voltage:** 230 kV**Minimum Continuous Ampacity - Summer:** 1,893 Amps (~754 MVA)**Minimum Continuous Ampacity – Winter:** 2,069 Amps (~824 MVA)**Minimum 4 Hour Emergency Ampacity – Summer:** 1,893 Amps (~754 MVA)**Minimum 4 Hour Emergency Ampacity – Winter:** 2,069 Amps (~824 MVA)**Approximate Line Impedance (Ohms):**  $(0.01) + j(0.08)$  pu 100 MVA base**Approximate Series Compensation Level:** N/A**Approximate Line Length:** 59 miles**Latest In Service Date:** May, 2022**Support Structures:** Double circuit structures – strung one side (one circuit).**Shield Wire Required:** Optical ground wire (minimum 6 pairs of fibers).**Failure Containment Loading Mitigation (anti-cascade structures, etc.):** Per applicable codes.**Shield Wire Ground Fault Withstand Ampacity:** Coordinate with interconnecting PTOs.**Aeolian Vibration Control (Conductor and Shield Wire):** Vibration dampers must be installed on all overhead conductors and shield wires, with the exception of slack spans.

**Transmission Line Minimum BIL:** 1,050 kV (900 kV for solidly grounded systems)

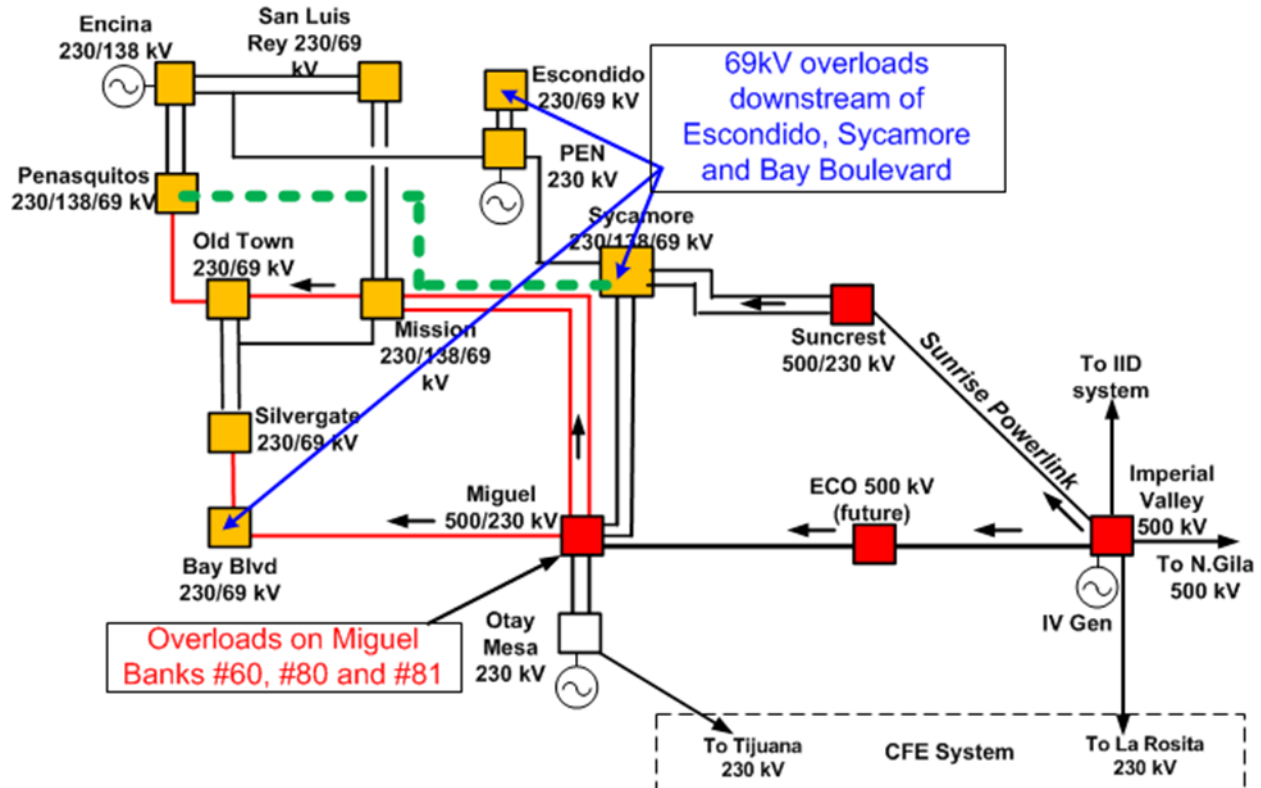
**Minimum ROW Width:** Per applicable codes; ROW should be close to Raison City Junction.

**Governing Design and Construction Standards:** (GO 95, GO 128, NESC Code, applicable municipal codes).

## G2 Sycamore-Penasquitos 230 kV Line Description and Functional Specifications

### G2.1 Description

In the draft 2012-2013 Transmission Plan, the ISO has identified a potential policy driven need for a 230 kV transmission line between SDG&E owned Sycamore and Penasquitos 230 kV substations, as depicted below:



The ISO estimates that the cost of the 230 kV line will be between \$111 and \$221 million. This proposed transmission configuration will provide a means by which renewable generation MW in the ISO interconnection queue can quickly and efficiently be delivered to the existing ISO grid, while minimizing environmental impacts in the IID service territory.

**G2.2 Functional Specifications<sup>1</sup>**

**Line Terminus 1:** SDG&E Sycamore Canyon 230 kV Bus

**Line Terminus 2:** SDG&E Penasquitos 230 kV Bus

**Nominal Phase to Phase Voltage:** 230 kV

**Approximate Line Impedance (Ohms):** (0.0005 to 0.001) + j(0.005 to 0.01) pu 100 MVA base.

**Approximate Line Length:** 11 miles

**Latest In Service Date:** May, 2017

**Transmission Line Minimum BIL:** 1,050 kV (900 kV for solidly grounded systems)

**Minimum ROW Width:** Per applicable codes.

**Governing Design and Construction Standards:** (GO 95, GO 128, NESC Code, applicable municipal codes).

Overhead Line Construction

**Minimum Continuous Ampacity - Summer:** 2,290 Amps (~912 MVA)

**Minimum Continuous Ampacity – Winter:** 2,290 Amps (~912 MVA)

**Minimum 4 Hour Emergency Ampacity – Summer:** 2,950 Amps (~1175 MVA)

**Minimum 4 Hour Emergency Ampacity – Winter:** 2,950 Amps (~1175 MVA)

**Approximate Series Compensation Level:** N/A

**Support Structures:** Single circuit structures or underground.

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<sup>1</sup> The ISO has identified the need for the specified AC transmission line with at least 1175 MVA of capacity. However, it is expected that a DC transmission line from Sycamore to Penasquitos with at least 1175 MVA of capacity would also meet the identified need.

**Shield Wire Required:** Optical ground wire (minimum 6 pairs of fibers)

**Failure Containment Loading Mitigation (anti-cascade structures, etc.):** Per applicable codes.

**Shield Wire Ground Fault Withstand Ampacity:** Coordinate with interconnecting PTOs.

**Aeolian Vibration Control (Conductor and Shield Wire):** Vibration dampers must be installed on all overhead conductors and shield wires, with the exception of slack spans.

Underground Construction (if required)

**Minimum Ampacity – Summer and Winter:** Must meet the minimum continuous and emergency Ampacity of the overhead portion.

**Spare Conduit:** A spare conduit to be installed, if conduit/manhole construction is used.

**Insulation type:** If conduit/manhole construction is used, then solid dielectric is preferred.