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# 2024 Transmission Plan Deliverability Allocation Report

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California ISO

2/12/2025 Revision

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# 1. Introduction

In accordance with the California Independent System Operator (CAISO) Generator Interconnection and Deliverability Allocation Procedures (GIDAP) Tariff Appendix DD, the CAISO performed Transmission Plan Deliverability (TPD) allocation for Queue Cluster 14 (QC14) and parked Queue Cluster 13 (QC13) projects requesting Full Capacity Deliverability Status (FCDS) or Partial Capacity Deliverability Status (PCDS). The study also allocated TPD to Energy Only (EO) projects that submitted affidavits through the TP Deliverability Allocation Process. These EO projects, QC14 and parked QC13 projects are referred to as TPD candidates in this report.

This report was originally published on June 14, 2024. Sections 2.3 and 3.5 were revised in an August 9, 2024 revision. Some additional corrections were made to Sections 3.2 and 3.4. The August 9, 2024 revisions only affected generators that received a 2024 TPD allocation in the SCE Eastern Area. On February 12, 2025 revisions were made to section 3.1.1 in red color.

Table 1.1 provides the summary of the 2024 TPD candidates.

Table 1.1: Summary of 2024 TPD Candidates

PTO Area	Parked QC13		QC14		Energy Only	
	No. of Candidates	Total Seeking Interconnection Service Capacity (MW)	No. of Candidates	Total Seeking Interconnection Service Capacity (MW)	No. of Candidates	Total Seeking Interconnection Service Capacity (MW)
PG&E	0	0	87	23,371	6	580
SCE	16	1972.5	85	20,220.9	12	2168.13
GLW	0	0	7	3,070	0	0
VEA	0	0	0	0	0	0
DCRT	1	300	8	4350	3	950
SDGE	0	0	20	5354.75	28	3144.85
<b>Total</b>	<b>17</b>	<b>2272.5</b>	<b>207</b>	<b>56366.65</b>	<b>49</b>	<b>6842.98</b>

## 2. Study Assumptions and Methodology

### 2.1 Representing Prior TPD Commitments

Consistent with ISO tariff Appendix DD section 8.9.1, the TPD is preserved for the following prior commitments before allocated to the TPD candidates:

- All generators that are operational and have achieved FCDS or PCDS
- All generators that are operational and waiting for Network Upgrades to achieve FCDS or PCDS

- c. Pre-QC5 projects that have executed PPAs with Load-Serving Entities and have GIAs that are in good standing
- d. Projects in QC5 through QC13 that have previously allocated TPD and meet TPD retention criteria in accordance with ISO tariff Appendix DD Section 8.9.3
- e. Potential Distributed Generator Deliverability (PDGD) identified in 2023-2024 DGD process

Generators with preserved TPD are kept in the deliverability assessment model. Generators in the interconnection queue through QC13 that do not meet any of the above a ~ e and are not TPD candidates are deactivated (modeled offline with P<sub>MAX</sub>=0) in the deliverability assessment model.

## 2.2 Representing TPD Candidates

TPD candidates that did not submit TPD allocation affidavit are not eligible for the allocation. TPD candidates that have submitted valid TPD allocation affidavit are placed in the proper allocation group. TPD candidates not belonging to any of the allocation group are not eligible for allocation.

The TPD allocation groups are –

(A) Interconnection Customers that have executed power purchase agreements, and Interconnection Customers in the current Queue Cluster that are Load Serving Entities serving their own Load.

(B) Interconnection Customers that are actively negotiating a power purchase agreement or on an active short list to receive a power purchase agreement.

(C) Interconnection Customers that have achieved Commercial Operation for the capacity seeking TP Deliverability.

(D) Interconnection Customers electing to be subject to Section 8.9.2.3.

Table 2.1: 2024 TP Deliverability Allocation Process Groups

Allocation Group	Project/Capacity Status	Commercial Status	Allocation Rank
A	Any project (active IR or achieved commercial operation)	Executed power purchase agreement requiring FCDS or interconnection customer is an LSE serving its own load	Allocated 1st
B	Any project (active IR or achieved commercial operation)	Shortlisted for power purchase agreement or actively negotiating a power purchase agreement	Allocated 2nd
C	Any project that achieved commercial operation	Commercial operation achieved	Allocated 3rd
D	Any active project that meets the allocation group D criteria	See criteria above	Allocated 4th

Each allocation TPD candidate will fall into one of the groups A through D with its TPD score. TPD is allocated by the order of the groups and the TPD score. EO generators could be allocated TPD under the condition that TP Deliverability is available from existing transmission facilities, from already planned

upgrades in the CAISO Transmission Planning Process, or upgrades assigned to an interconnection project that has an executed GIA and currently has a TP Deliverability allocation.

## 2.3 Transmission

The following transmission upgrades are modeled in the TPD allocation study:

- ISO Approved Transmission upgrades as of January 30, 2024 were modeled in the TPD allocation study
- Network Upgrades identified in the generation interconnection studies and included in a executed Generation Interconnection Agreement
- RNUs and LDNUs still needed in the latest generation interconnection study for the TPD candidates

The ISO approved transmission upgrades required before a generation project's allocated TPD received in this 2024 TPD allocation cycle can be converted to FCDS or PCDS are listed in the section describing each constraint. The upgrades required to mitigate every constraint that the generation project is behind are required to be in-service before that generation project's allocated TPD can be converted to FCDS or PCDS.

This 2024 TPD Allocation study provides two sets of TPD information: (1) with all ISO approved transmission projects modeled and (2) with ISO approved projects that are planned to be on-line by 2030. For most of the constraints the TPD information is the same in both sets of results. This was typically because all of the relevant transmission upgrades to mitigate the constraint were planned be complete by 2030 or there were no planned upgrades. For some constraints the difference in TPD between the two sets of results was the amount of TPD that was allocated. This is because all of the relevant transmission upgrades were planned to be complete after 2030. And in some instances in the SCE Eastern Area where only a portion of the required transmission upgrades are expected to be in-service by 2030, the difference between the two sets of results is less than the amount of TPD allocated. This shows that a percentage of the TPD that was allocated would be available in 2030, but not all of it.

For example, Section 3.5.7 of the report describes the Serrano-Alberhill-Valley Area Constraint where the 4127 MW of allocated TPD is contingent on the completion of multiple transmission upgrade projects approved in the 2022-2023 TPP. These transmission projects have substantially different in-service dates. As shown in Table 3.5-18, 6651 MW and 8173 MW of TPD are available in 2030 and the year when all approved transmission projects are expected to be in-service, respectively. Because the difference in those two TPD numbers is less than 4127 MW, some of the 4127 MW of the allocated TPD is expected to be available in 2030. This is because a number of the needed transmission upgrade projects are planned to be on-line before 2030. However, some of the 4127 MW of allocation is located at Cielo Azul or Delaney substations, and those generators are also behind the Lugo-Victorville constraint, and those will need to wait until all transmission upgrades relevant to that constraint are in-service.

Based on these observations, the ISO has used the 2030 study results to identify several generators in the Eastern Area, based on having the highest scores in the 2024 TPD allocation cycle, that do not need the "Southern area reinforcement project" to be in-service before their allocated deliverability can be converted to FCDS or PCDS.

## 2.4 Deliverability Assessment

The deliverability assessment is performed for study areas where area deliverability constraints are identified. The generator and transmission setup from the above sections are used in the deliverability assessment. For each area deliverability constraint, the capacity of the TPD candidates is reduced one by one in the ascending order of the deliverability priority until the overloads are eliminated. The remaining generator capacity is the TPD allocation to the TPD candidates.

For study areas that do not have binding area constraints, typically the deliverability assessment is not performed. All eligible TPD candidates that do not contribute to area constraints receive 100% TPD allocation.

In areas where TPD candidates contribute to multiple overloaded facilities, typically only the worst overloaded facilities are reported.

Projects will be granted their requested FCDS only if they receive a TPD allocation. Furthermore, timing of obtaining the requested FCDS is dependent on the completion of DNUs identified in the Project's Phase II study and TPP upgrades identified in this report, which may be updated in any subsequent annual reassessment. Until such time that these DNUs and TPP upgrades are completed and placed in service, the Project may be granted Interim Deliverability Status based on annual system availability.

## 3. TPD Allocation Results – SCE Area

### 3.1 Northern Area

#### 3.1.1 Pardee – Sylmar Area Constraint

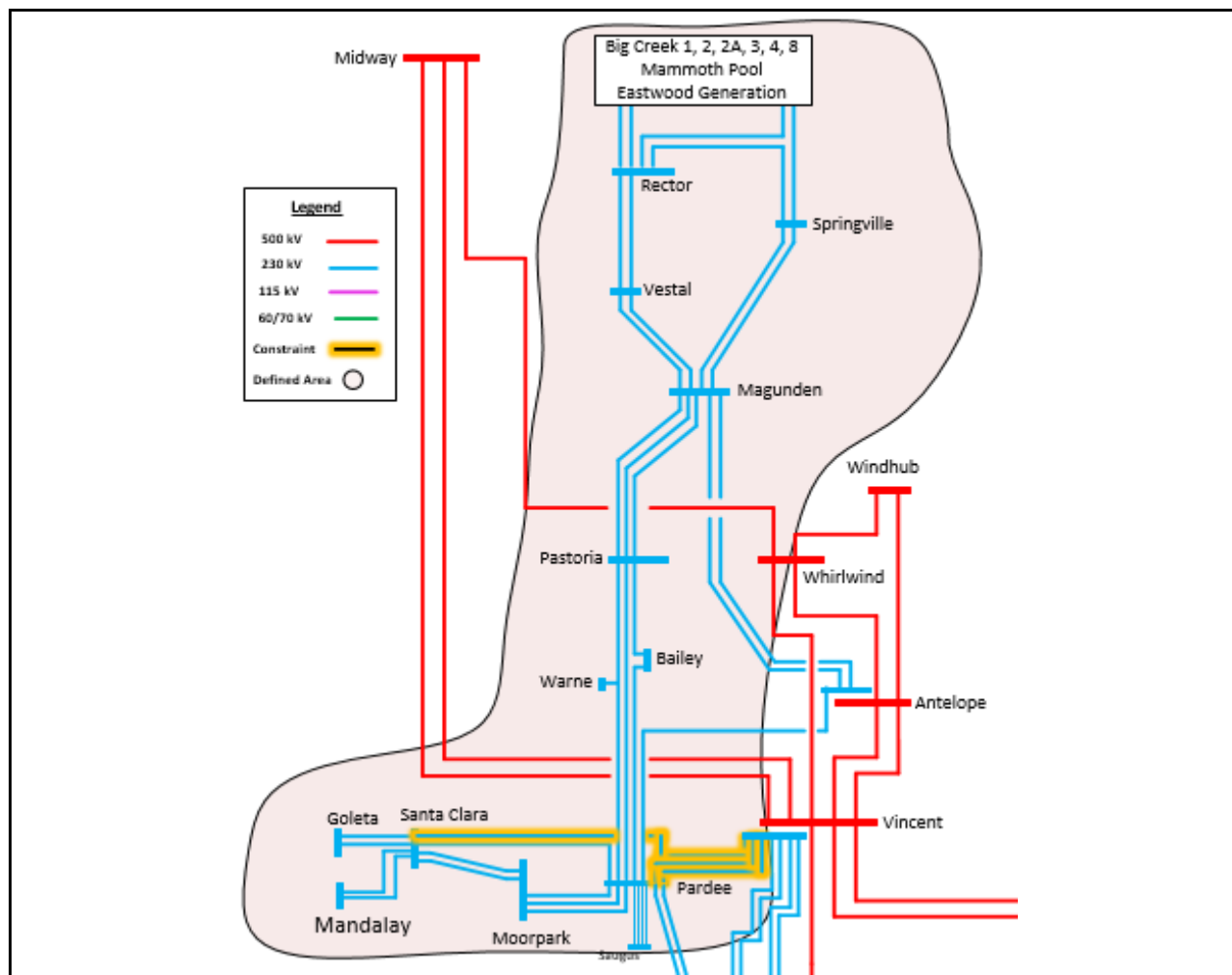
The study identified the following overloads associated with the Pardee-Sylmar Area constraint

Table 3.1: Pardee Sylmar Area Constraint

Overloaded Facility	Contingency	Overload
24114 PARDEE 230 24155 VINCENT 230 2	PARDEE 230.0 to SYLMAR 230.0 Circuit 1 Line PARDEE 230.0 to SYLMAR 230.0 Circuit 2	163%
Pardee 230-TOT1036_LOOP 230 29516 VINCNT2 230 1	PARDEE 230.0 to SYLMAR 230.0 Circuit 1 Line PARDEE 230.0 to SYLMAR 230.0 Circuit 2	115%
24128 S.CLARA 230 29516 VINCNT2 230 1 C	PARDEE 230.0 to SYLMAR 230.0 Circuit 1 Line PARDEE 230.0 to SYLMAR 230.0 Circuit 2	107%

The Pardee- Sylmar Area constraint limits the deliverability of generators connected to the 230kV system shown below. The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.1: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Pardee- Sylmar Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.2: Generation Projects Contributing to the Pardee- Sylmar Area Constraint

Queue	POI
297	Neenach- Bailey 66kV line
768	Antelope 230 kV
1335	Pastoria 230kV
1516	Vestal 230 kV
1783	Mandalay Switchyard 220kV



Queue	POI
1789	Vestal 230 kV
1792	Vestal 230 kV
2056	Vincent 230 kV
2058	Rector 230 kV
2059	Antelope 230 kV
2062	Antelope 230 kV
2064	Antelope 230 kV
2066	Moorpark 230 kV
2068	Rector 230 kV
2080	Antelope-Magunden #2 230 kV line
2081	Rector 230 kV
2082	Antelope 230 kV
2085	Springville 230 kV
2090	Moorpark 230 kV
2092	Moorpark 230 kV
2134	Sylmar-Gould line 230 kV
WDT1187	Capitan 66 kV bus
WDT1267	Bruin 66 kV
WDT1268	Bruin 66 kV
WDT1380	Rosamond 66 kV
WDT1454	Isla Vista 66 kV
WDT1490	Vestal 66 kV
WDT1517	Del Sur 66kV
WDT1519	Santa Clara- Gonzales 66 kV line
WDT1532	Wakefield 66 kV
WDT1580	Bliss 66 kV
WDT1639	Vestal 66 kV
WDT1647	Moorpark 66 kV
WDT1649	North Oaks 66 kV
WDT1650	Oakgrove – Riverway 66 kV Line
WDT1701	Wakefield 66 kV
WDT1710	Elizabeth Lake 66 kV
WDT1749	Little Rock-Sparkle-Wilsona 66 kV
WDT1755	Antelope - Ritter Ranch #1 66 kV
WDT1763	Octol 66 kV
WDT1766	Royal 66 kV
WDT1773	Mascot 66 kV
WDT1774	Elizabeth Lake 66 kV
WDT1780	Carpinteria 66 kV
WDT1782	Piute 66 kV
WDT1788	Scraper 12 kV Line
WDT1789	Scraper 12 kV Line

Queue	POI
WDT1808	San Miguel 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.3 TPD Allocation for Generation behind the Pardee- Sylmar Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	2348	1997
Eligible TPD Candidate	4311	4092
TPD Allocated	2228	2131
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	4576	4128
TPD in 2030 (informational)	4576	4128

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- **Pardee-Sylmar 230 kV Line Rating Increase Project**

### 3.1.2 Moorpark - Pardee Area Constraint

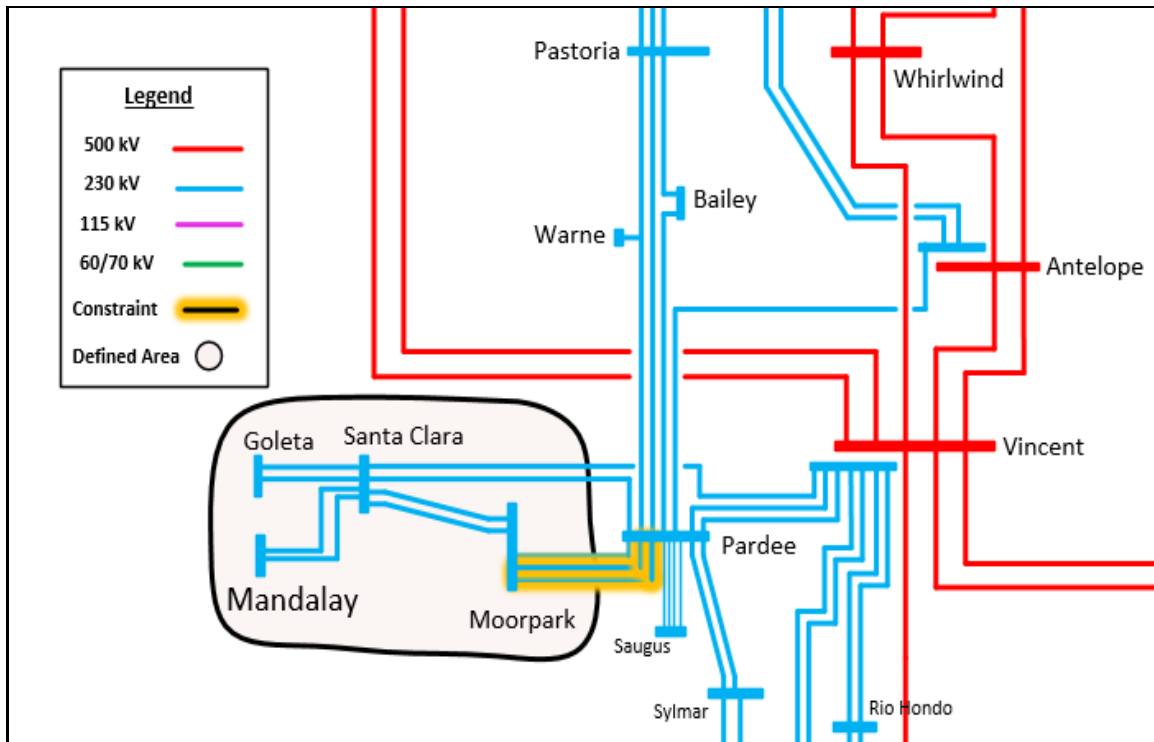
The study identified a constraint on the Moorpark -Pardee 230kV transmission lines.

Table 3.4: Moorpark - Pardee Area Constraint

Overloaded Facility	Contingency	Overload
24099 MOORPARK 230 24114 PARDEE 230 2 or 3	MOORPARK to PARDEE 230 ck 1 line MOORPARK to PARDEE 230 ck 4	124%

The Moorpark - Pardee Area constraint limits the deliverability of generators connected to the Moorpark 230 kV system. The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.2: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Moorpark - Pardee Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5: Generation Projects Contributing to the Moorpark - Pardee Area Constraint

Queue	POI
1783	Mandalay 220 kV
2066	Moorpark 230 kV
2090	Moorpark 230 kV
2092	Moorpark 230 kV
WDT1187	Capitan 66 kV bus
WDT1454	Isla Vista 66 kV
WDT1519	Santa Clara- Gonzales 66 kV line
WDT1532	Wakefield 66 kV
WDT1647	Moorpark 66 kV
WDT1701	Wakefield 66 kV
WDT1766	Carpinteria 66 kV

Queue	POI
WDT1780	North Oaks 66 kV
WDT1808	San Miguel 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.6 TPD Allocation for Generation behind the Moorpark - Pardee Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	948	923
Eligible TPD Candidate	1697	1656
TPD Allocated	45	31
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	993	954
TPD in 2030 (informational)	993	954

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.1.3 North of Magunden Area Constraint

The study identified a constraint on the North of Magunden 220kV transmission lines.

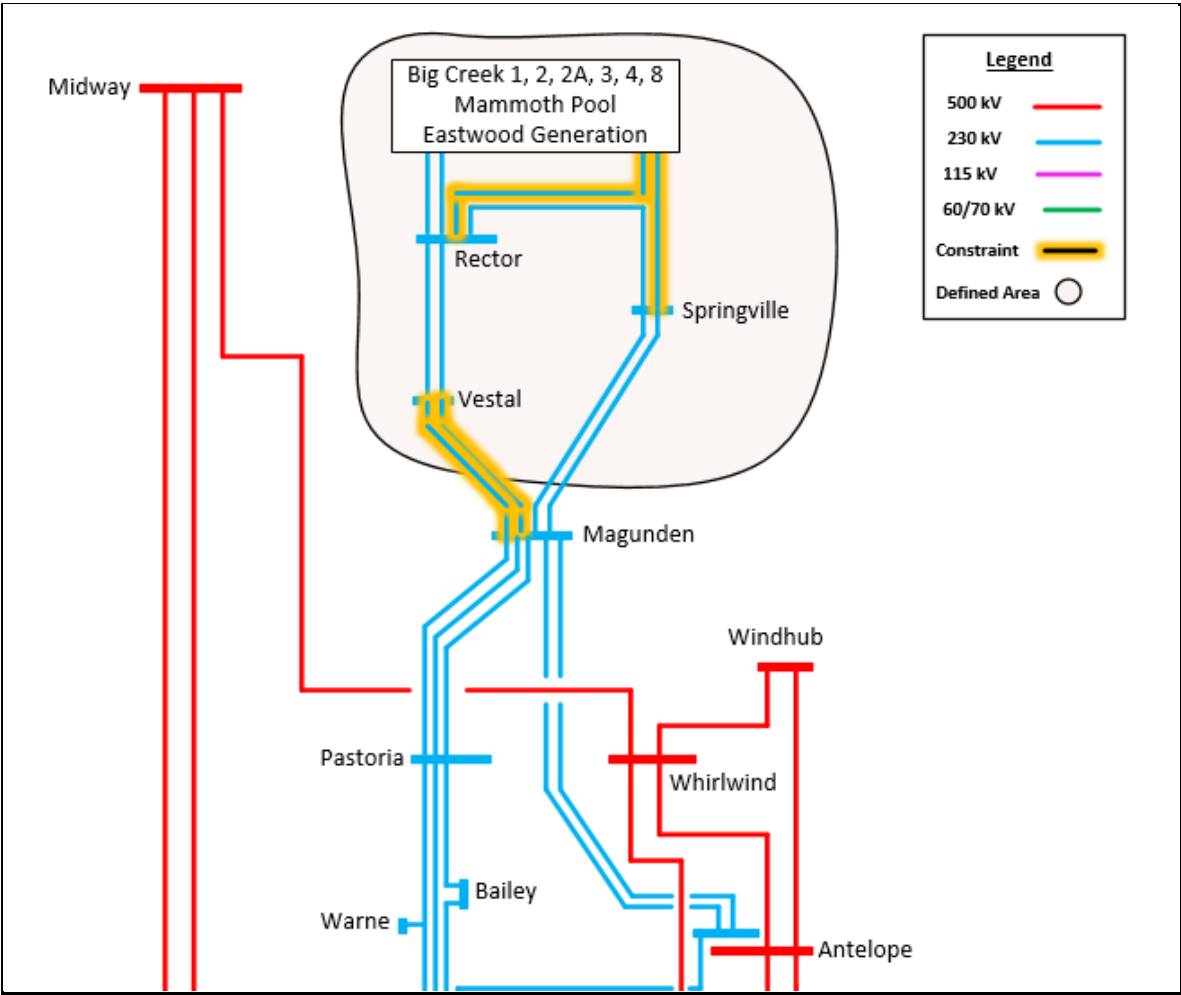
Table 3.7: North of Magunden Area Constraint

Overloaded Facility	Contingency	Overload
24304 BIG CRK4 230 24141 SPRINGVL 230 1 C	BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit	122%
24303 BIG CRK3 230 24235 RECTOR 230 2	BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	117%

Overloaded Facility	Contingency	Overload
MAGUNDEN 230.0 to VESTAL 230.0 Circuit 2 or 1	24153 VESTAL 230 24087 MAGUNDEN 230 1 or 2	110%
24303 BIG CRK3 230 24304 BIG CRK4 230 1	BIG CRK1 230.0 to RECTOR 230.0 Circuit 1 Line RECTOR 230.0 to BIG CRK3 230.0 Circuit 1	104%

The North of Magunden Area constraint limits the deliverability of generators connected to the Big Creek 230 kV system. The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.3: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the North of Magunden Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.8: Generation Projects Contributing to the North of Magunden Area Constraint

Queue	POI
1516	Vestal 230 kV
1789	Vestal 230 kV
1792	Vestal 230 kV
2058	Rector 230 kV
2068	Rector 230 kV
2081	Rector 230 kV
2085	Springville 230 kV
WDT1490	Vestal-Growers-Kern River No. 3 66 kV Line
WDT1580	Bliss 66 kV
WDT1639	Vestal 66 kV
WDT1650	Oakgrove – Riverway 66 kV Line
WDT1763	Octol 66 kV
WDT1773	Mascot 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.9 TPD Allocation for Generation behind the North of Magunden Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1014	876
Eligible TPD Candidate	575	565
TPD Allocated	0.0	0.0
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1014	795
TPD in 2030 (informational)	1014	795

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.1.4 South of Magunden Area Constraint

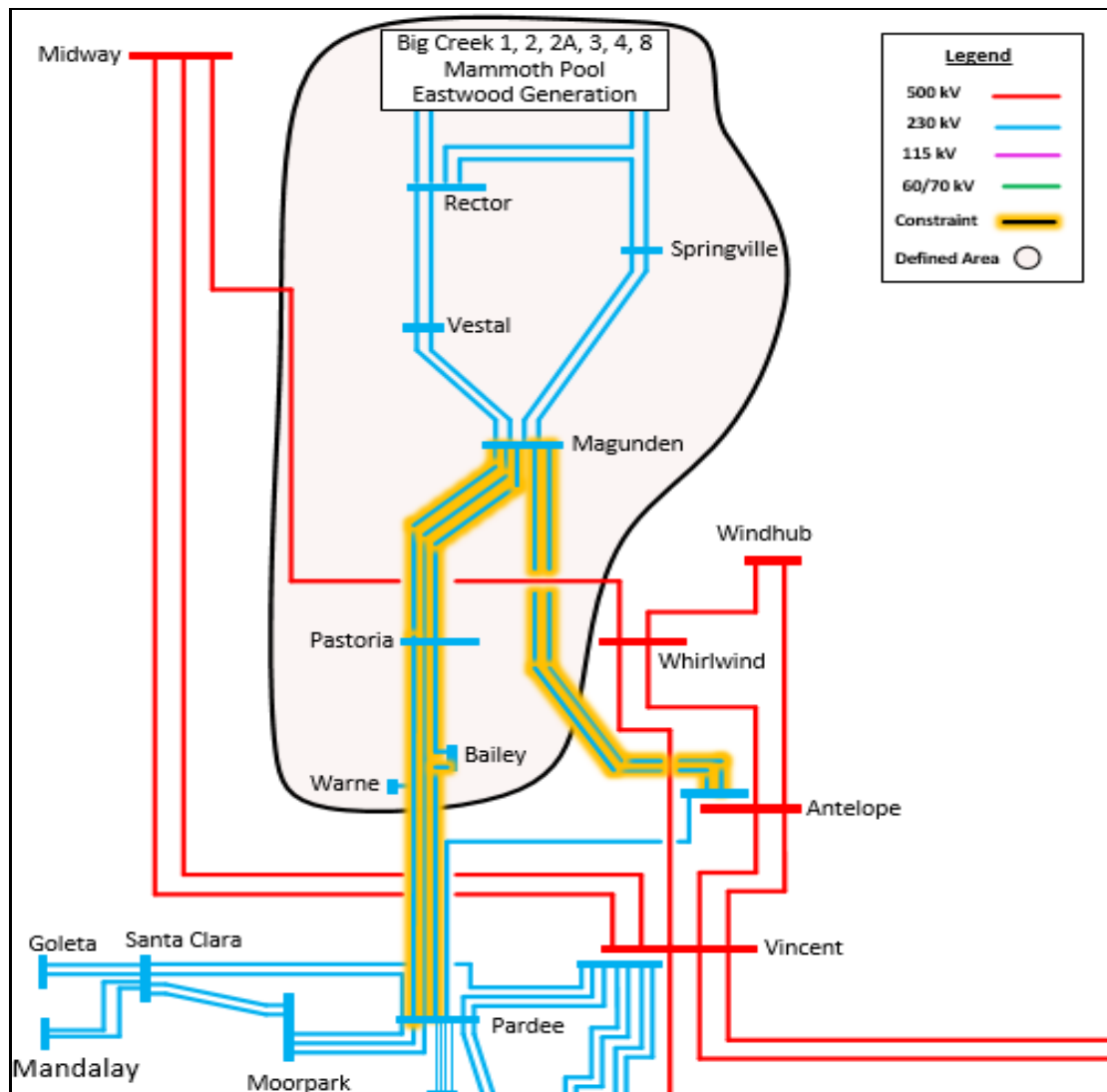
The study identified a constraint on the South of Magunden 220kV transmission lines.

Table 3.10: South of Magunden Area Constraint

Overloaded Facility	Contingency	Overload
24087 MAGUNDEN 230 24401 ANTELOPE 230 1	ANTELOPE-MAGUNDEN NO.2 220 KV LINE	149%
24087 MAGUNDEN 230 24401 ANTELOPE 230 1	PARDEE to SYLMAR S 230 ck 1 line PARDEE to SYLMAR S 230 ck 2	136%
24217 WARNETAP 230 24114 PARDEE 230 1 and 24115 PASTORIA 230 24217 WARNETAP 230 1	PARDEE 230.0 to BAILEY 230.0 Circuit 1 <u>or</u> BAILEY 230.0 to PASTORIA 230.0 Circuit 1 <u>or</u> ANTELOPE-MAGUNDEN NO.2 220 KV LINE	113%
24087 MAGUNDEN 230 101122 TOT1111_LOOP 230 1 and 101122 TOT1111_LOOP 230 24401 ANTELOPE 230 1	PARDEE to SYLMAR S 230 ck 1 line PARDEE to SYLMAR S 230 ck 2	111%
24217 WARNETAP 230 24114 PARDEE 230 1	PARDEE 230.0 to PASTORIA 230.0 Circuit 1	110%
24115 PASTORIA 230 24217 WARNETAP 230 1	PARDEE 230.0 to PASTORIA 230.0 Circuit 1 <u>or</u> PARDEE 230.0 to BAILEY 230.0 Circuit 1	106%
24403 BAILEY 230 24114 PARDEE 230 1 and 24115 PASTORIA 230 24403 BAILEY 230 1	PARDEE 230.0 to WARNETAP 230.0 Circuit 1	105%
24087 MAGUNDEN 230 24115 PASTORIA 230 2 and 1	ANTELOPE-MAGUNDEN NO.2 220 KV LINE	104%
24087 MAGUNDEN 230 24115 PASTORIA 230 3	MAGUNDEN-PASTORIA Circuit 2 230 KV Line	103%

The South of Magunden Area constraint limits the deliverability of generators connected to the 230 kV system as shown. The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.4: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the South of Magunden Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.11: Generation Projects Contributing to the South of Magunden Area Constraint

Queue	POI
297	Neenach- Bailey 66kV line
1335	Pastoria 230 kV
1516	Vestal 230 kV
1789	Vestal 230 kV
1792	Vestal 230 kV
2058	Rector 230 kV
2068	Rector 230 kV
2080	Antelope-Magunden #2 230 kV line



Queue	POI
2081	Rector 230 kV
2085	Springville 230 kV
WDT1490	Vestal-Growers-Kern River No. 3 66 kV Line
WDT1580	Bliss 66 kV
WDT1639	Vestal 66 kV
WDT1650	Oakgrove – Riverway 66 kV Line
WDT1763	Octol 66 kV
WDT1773	Mascot 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.12 TPD Allocation for Generation behind the South of Magunden Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1204	963
Eligible TPD Candidate	799	691
TPD Allocated	14	14
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1218	977
TPD in 2030 (informational)	1218	977

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.1.5 Windhub Area Constraint

The simultaneous or overlapping outage of the Antelope – Windhub 500kV and Whirlwind – Windhub 500kV lines without time for system adjustments is an extreme event for planning purposes. Under this extreme event there is potential voltage instability and widespread customer outages caused by the islanding of the Windhub substation and the consequential loss of generation. The total export from

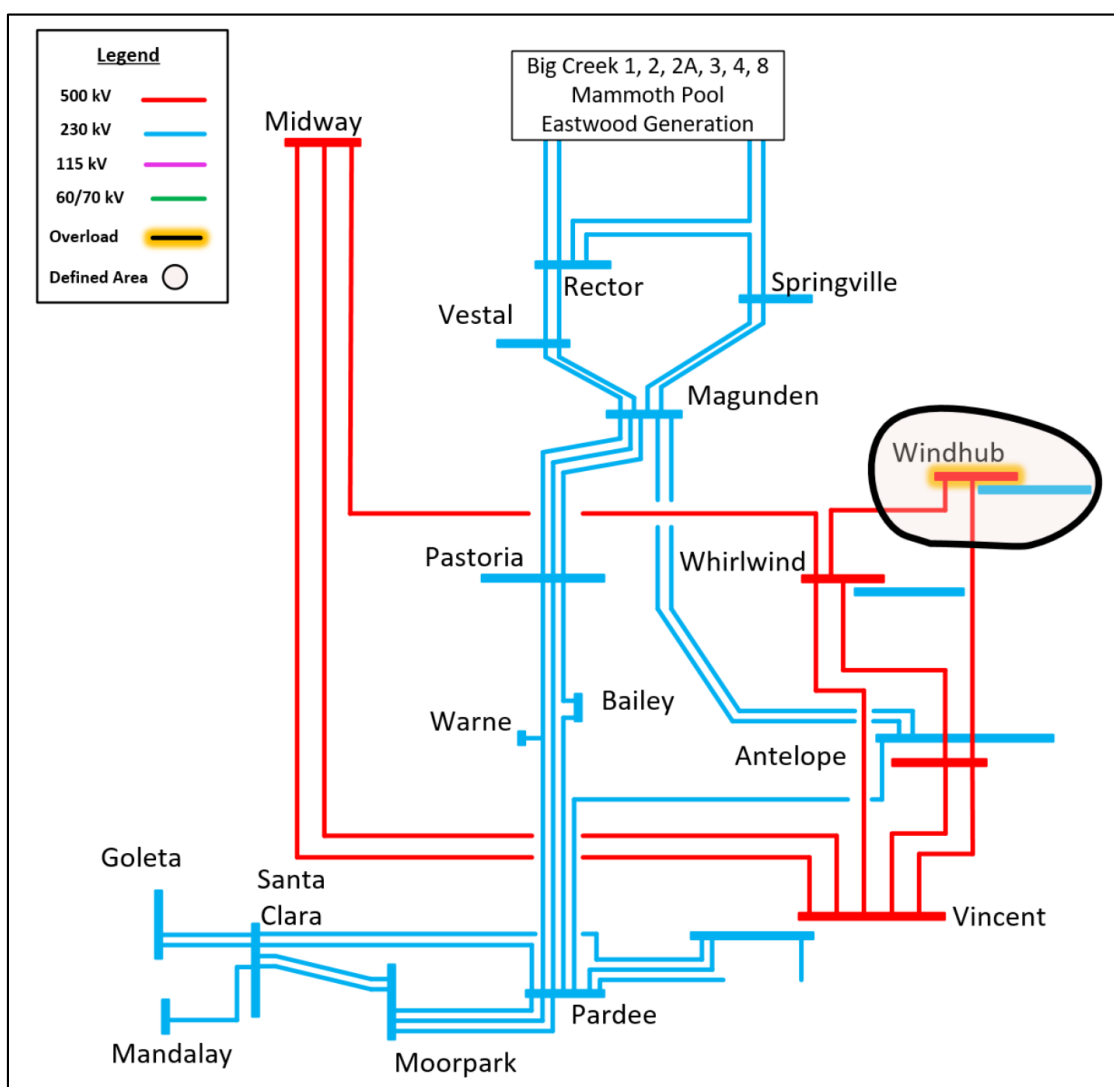
Windhub needs to be limited to maintain system security. This deliverability limit imposes a constraint for generators interconnecting to Windhub at all voltage levels and at Highwind 230kV substations.

Table 3.13: Windhub Area Constraint

Overloaded Facility	Contingency	Overload
Cascading outages	Antelope – Windhub 500kV line and Whirlwind – Windhub 500kV	N/A

The Windhub Area constraint limits the deliverability of generators connected to the Windhub 500 kV and 230 kV system. The following figure illustrates approximate electrical boundary of the 10% DFAX circle for the constraint.

Figure 3.5: Approximate electrical boundary of the projects within the 10% DFAX circle that contribute to the Windhub Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.14: Generation Projects Contributing to the Windhub Area Constraint

Queue	POI
96	Windhub 230 kV
1510	Windhub 230 kV
1631	Windhub 230 kV
1632	Windhub 500 kV
1779	Windhub 230 kV

TPD was preserved for the 2400 MW non-operational prior commitment as described in section 2.1. There was no TPD available for eligible candidates. The results are shown in the following table.

Table 3.15 TPD Allocation for Generation behind the Windhub Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	2400.0	1754.1
Eligible TPD Candidate	298.2	298.2
TPD Allocated	0.0	0.0
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	2400.0	1754.1
TPD in 2030 (informational)	2400.0	1754.1

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.1.6 Antelope – Vincent Area Constraint

The Antelope Vincent Area Constraint shown in the Cluster 13 Phase I and earlier reports was based on the WECC's common corridor 500 kV outage criterion. Due to a change in the WECC criteria, these outages are now considered extreme events, and are no longer required to meet the NERC performance criteria for a P7 outage. As a result this area constraint, based on a common corridor outage, was not binding.

### 3.1.7 SCE Northern Area Constraint Summary

The following table provides a summary showing all of the Deliverability Constraints described above and which non-operational generation projects are impacted by those constraints.

Table 3.16: SCE Northern Area Deliverability Constraint Mapping

Queue #	Pardee-Sylmar	Moorpark-Pardee	North of Magunden	South of Magunden	Windhub
96					X
297	X			X	
768	X				
1335	X			X	
1510					X
1516	X		X	X	
1631					X
1632					X
1779					X
1783	X	X			
1789	X		X	X	
1792	X		X	X	
2055					
2056	X				
2058	X		X	X	
2059	X				
2060					
2061					
2062	X				
2064	X				
2066	X	X			
2068	X		X	X	
2078					
2080	X			X	

Queue#	Pardee - Sylmar	Moorpark-Pardee	North of Magunden	South of Magunden	Windhub
2081	X		X	X	
2082	X				
2085	X		X	X	
2089					
2090	X	X			
2091					
2092	X	X			
2110					
2134	X				
WDT1187	X	X			
WDT1267	X				
WDT1268	X				
WDT1380	X				
WDT1454	X	X			
WDT1490	X		X	X	
WDT1517	X				
WDT1519	X	X			
WDT1532	X	X			
WDT1580	X		X	X	
WDT1639	X		X	X	
WDT1647	X	X			
WDT1649	X				
WDT1650	X		X	X	
WDT1701	X	X			
WDT1710	X				
WDT1749	X				
WDT1755	X				
WDT1763	X		X	X	
WDT1766	X	X			
WDT1773	X		X	X	
WDT1774	X				
WDT1780	X	X			
WDT1782	X				
WDT1788	X				
WDT1789	X				
WDT1808	X	X			

## 3.2 North of Lugo Area

### 3.2.1 South of Kramer Area Constraint

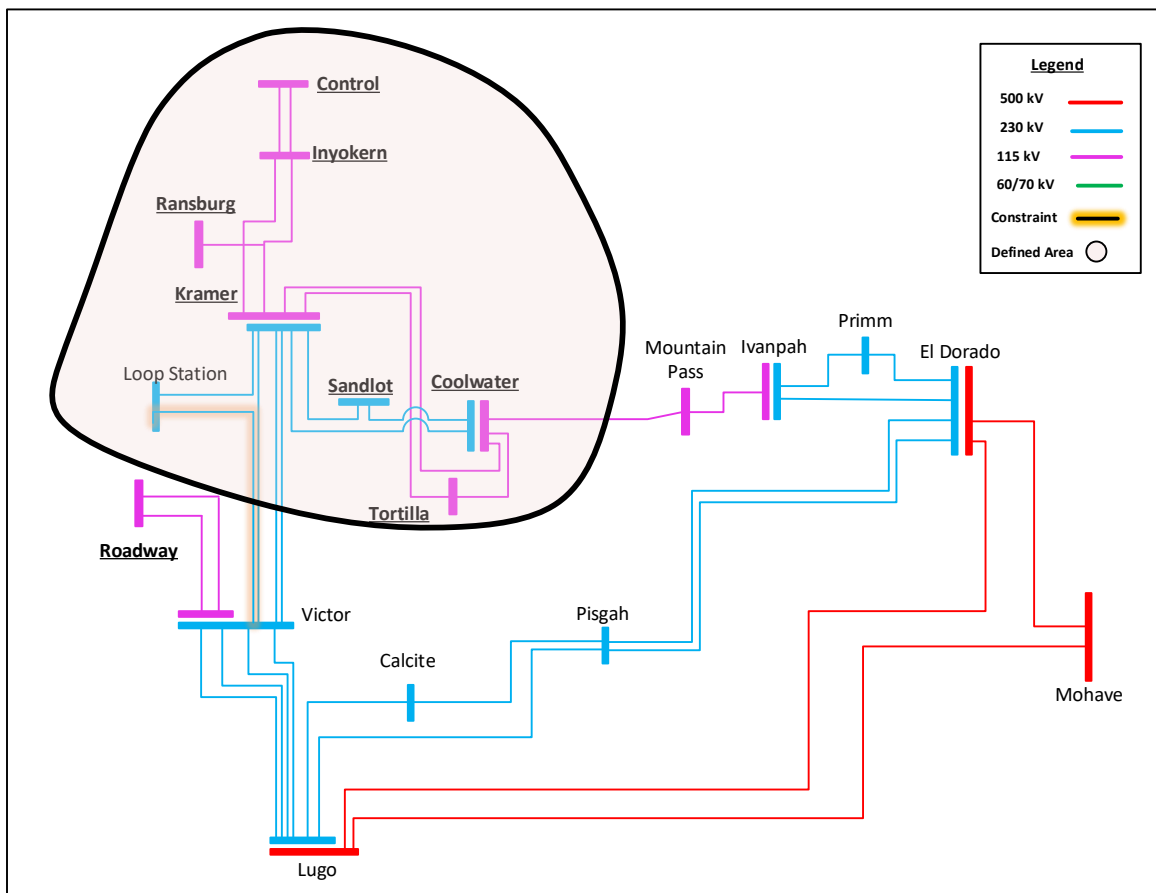
The deliverability assessment identified normal condition overloads on Loop Station – Victor 230 kV in SCE North of Lugo study area.

Table 3.17: South of Kramer Constraint in SCE North of Lugo study area

Overloaded Facility	Contingency	Overload (%)
101908 LOOP STATION 230 24601 VICTOR 230 1	Base Case	147.3
101908 LOOP STATION 230 24601 VICTOR 230 1	line_237 KRAMER 230.0 to VICTOR 230.0 Circuit 1	124.8
24875 KRAMER 2i 12.0 24701 KRAMER 230 2	tran_2692 KRAMER 230.00 to KRAMER 115.00 Circuit 1KRAMER 1T 12.00	151.2
24702 KRAMER 115 24875 KRAMER 2i 12.0 2	tran_2692 KRAMER 230.00 to KRAMER 115.00 Circuit 1KRAMER 1T 12.00	146.2
24873 KRAMER 1i 12.0 24701 KRAMER 230 1	tran_2693 KRAMER 230.00 to KRAMER 115.00 Circuit 2KRAMER 2T 12.00	151.2
24702 KRAMER 115 24873 KRAMER 1i 12.0 1	tran_2693 KRAMER 230.00 to KRAMER 115.00 Circuit 2KRAMER 2T 12.00	146.2
24701 KRAMER 230 24601 VICTOR 230 1	line_1659C KRAMER 230.0 to VICTOR 230.0 Circuit 3 and VICTOR 230.0 to LOOP STATION 230.0 Circuit 4	152.2
24701 KRAMER 230 101908 LOOP STATION 230 1	line_1659C KRAMER 230.0 to VICTOR 230.0 Circuit 3 and VICTOR 230.0 to LOOP STATION 230.0 Circuit 4	141.0
101908 LOOP STATION 230 24601 VICTOR 230 1	line_1663 KRAMER 230.0 to VICTOR 230.0 Circuit 1 and SANDLOT 230.0 to KRAMER 230.0 Circuit 1	125.4

This constraint limits deliverability of generators in the Inyokern-North of Victor transmission zone. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.6: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the South of Kramer Constraint



The following table shows the generation projects that are behind the Kramer-Victor Area constraint.

Table 3.18: Generation Projects Contributing to the Kramer-Victor Area Constraint

CAISO / SCE #	Point of Interconnection
Q2101/TOT1091	Kramer 230kV Bus
Q2096/TOT1064	Kramer-Lugo 220kV Line
Q1776/TOT993	COOLWATER 115kV Bus
Q1774/TOT981	Kramer 230kV Bus
0043CONV/1617/1775	Kramer 230kV Bus
WDT1726	Casa Diablo 115/33kV Bus
WDT1203	Inyokern 115kV Bus
WDT1723	Inyokern 115kV Bus
WDT1281	Inyokern 115kV Bus

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.19: TPD Allocation for Generation behind the Kramer-Victor Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	302	256
Eligible TPD Candidate	965	965
TPD Allocated	200	200
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	502	456
Total TPD in 2030 (informational)	302	256

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Rebuilding the double circuit Kramer–Victor 115 kV lines for 230 kV operation and looping the existing segment of Kramer–Victor 115 kV line into Roadway

### 3.2.2 Victor – Lugo Area Constraint

The deliverability assessment identified normal condition overloads on Victor - Lugo 230 kV No. 1 through No. 4 lines in SCE North of Lugo study area.

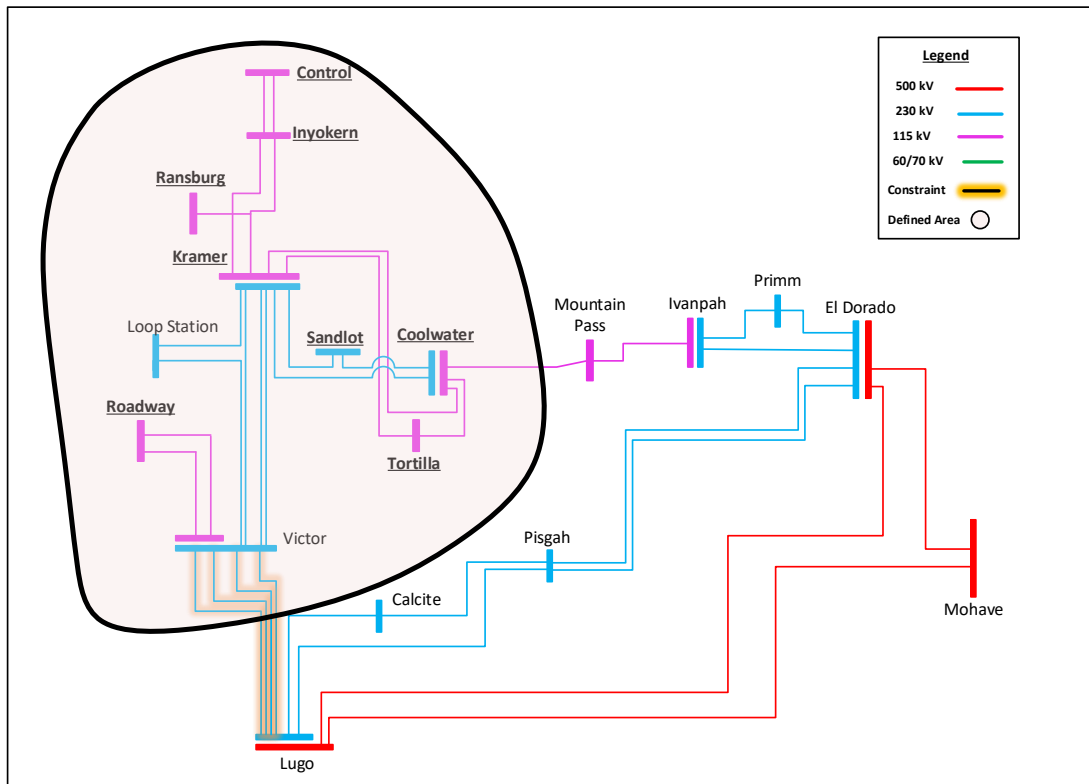
Table 3.20: South of Victor Constraint in SCE North of Lugo study area

Overloaded Facility	Contingency	Overload (%)
Victor – Lugo 230 kV No. 1 & 2 & 3 & 4	Base Case	119.9
Victor – Lugo 230 kV No. 1 & 2 or Victor – Lugo 230 kV No. 3 & 4	Victor – Lugo 230 kV No. 3 & 4 or Victor – Lugo 230 kV No. 1 & 2	177.4



This constraint limits deliverability of generators in the Victor - Lugo transmission zone. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.7: Approximate geographic boundary of the projects within the 5% DFAX circle that contribute to the Victor to Lugo Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.21: Generation Projects Contributing to the Victor-Lugo Area Constraint

CAISO / SCE #	Point of Interconnection
Q2104/TOT1109	Victor 230kV Bus
Q2101/TOT1091	Kramer 230kV Bus
Q2096/TOT1064	Kramer-Lugo 220kV Line
Q1776/TOT993	COOLWATER 115kV Bus
Q1774/TOT981	Kramer 230kV Bus
0043CONV/1617/1775	Kramer 230kV Bus
WDT1726	Casa Diablo 115/33kV Bus
WDT1203	Inyokern 115kV Bus
WDT1723	Inyokern 115kV Bus
WDT1281	Inyokern 115kV Bus

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.22: TPD Allocation for Generation behind the Victor-Lugo Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	302	256
Eligible TPD Candidate	1365	1365
TPD Allocated	778	778
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1080	1034
Total TPD in 2030 (informational)	1080	1034

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Reconductoring the four Lugo–Victor 230 kV lines and

### 3.2.3 Lugo – Calcite Area Constraint

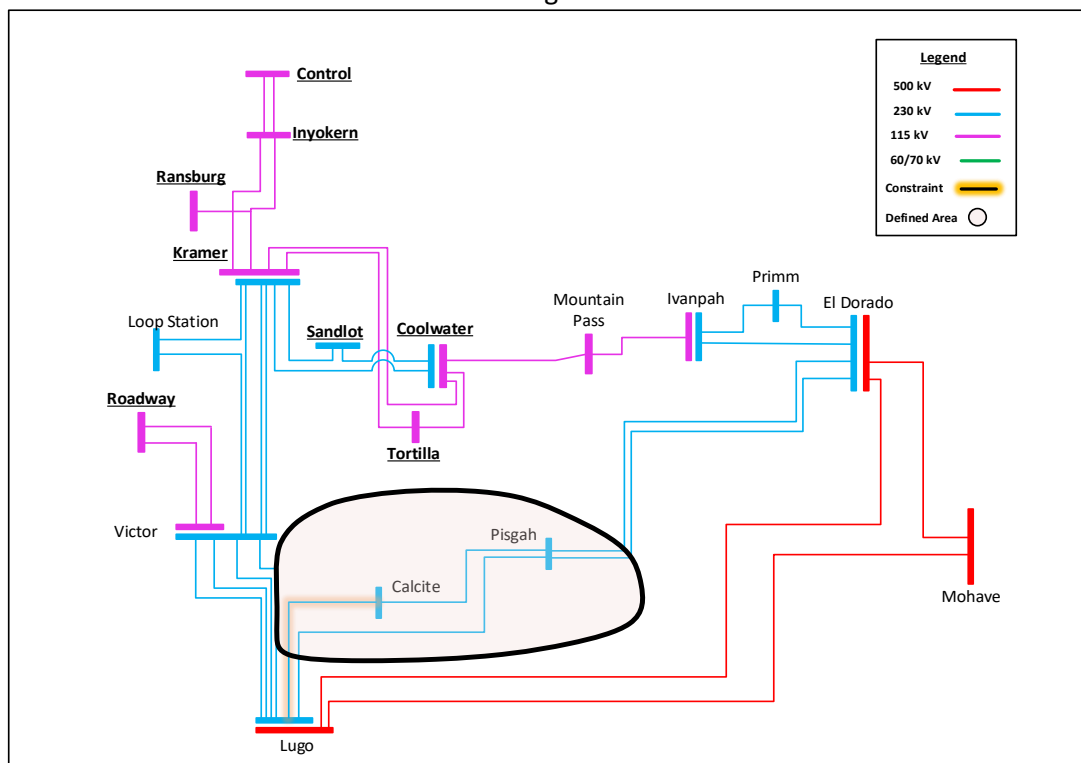
The deliverability assessment identified normal condition overloads on Lugo – Calcite 230 kV line in the SCE North of Lugo study area.

Table 3.23: Calcite - Lugo Area Constraint in SCE North of Lugo study area

Overloaded Facility	Contingency	Overload (%)
25500 CALCITE - 24085 LUGO 230 1	Base Case	110.22
100887 Loop-Sta - 24085 LUGO 230 1	line_1607a CALCITE 230.0 to LUGO 230.0 Circuit 1	113.69

This constraint limits deliverability of generators behind the Calcite - Lugo Area Constraint. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.8: Approximate geographic boundary of the projects within the 5% DFAX circle that contribute to the Calcite - Lugo Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.24: Generation Projects Contributing to the Calcite - Lugo Area Constraint

CAISO / SCE #	Point of Interconnection
Q2103/TOT1106	Pisgah 230kV Bus
Q2098/TOT1080	Lugo-Pisgah 230kV Line
Q2097/TOT1046	Calcite 230kV Bus

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.25: TPD Allocation for Generation behind the Calcite - Lugo Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	0	0
Eligible TPD Candidate	505	439
TPD Allocated	297	297
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	297	297
Total TPD in 2030 (informational)	297	297

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

### 3.2.4 Lugo AA Bank Area Constraint

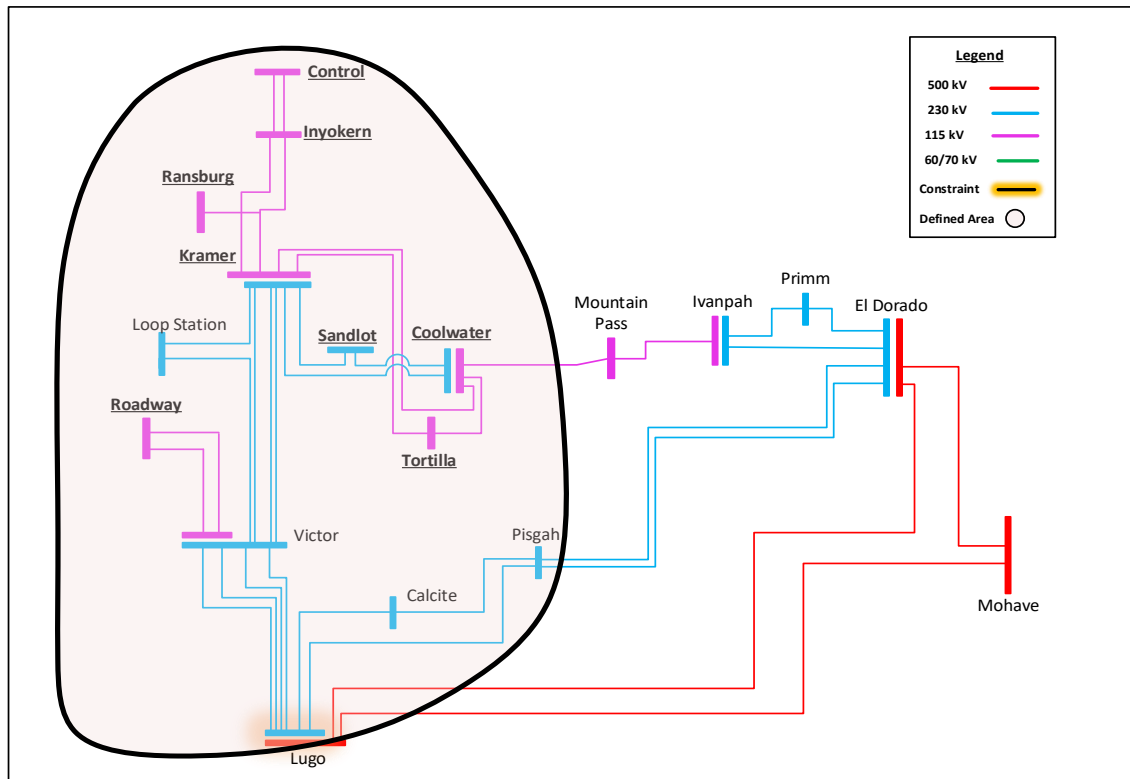
The deliverability assessment identified normal condition overloads on Lugo 500/230 kV AA banks #1, #2, and #3 in the SCE North of Lugo study area.

Table 3.26: Lugo AA Bank Constraint in SCE North of Lugo study area

Overloaded Facility	Contingency	Overload (%)
Lugo 500/230 kV AA Banks #1 & #2 & #3	Base Case	117.9
Lugo 500/230 kV AA Banks & #2 & #3, or #1 & #3, or #1 & #2	Lugo 500/230 kV AA Bank #1 or #2 or #3	147.1

This constraint limits deliverability of generators behind the Lugo AA Bank area Constraint. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.9: Approximate geographic boundary of the projects within the 5% DFAX circle that contribute to the Lugo AA Bank Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.27: Generation Projects Contributing to the Lugo Bank Constraint

CAISO / SCE #	Point of Interconnection
Q2104/TOT1109	Victor 230kV Bus
Q2103/TOT1106	Pismo 230kV Bus
Q2101/TOT1091	Kramer 230kV Bus
Q2098/TOT1080	Lugo-Pismo 230kV Line
Q2097/TOT1046	Calcite 230kV Bus
Q2096/TOT1064	Kramer-Lugo 220kV Line
Q1776/TOT993	COOLWATER 115kV Bus
Q1774/TOT981	Kramer 230kV Bus
0043CONV/1617/1775	Kramer 230kV Bus
WDT1726	Casa Diablo 115/33kV Bus
WDT1203	Inyokern 115kV Bus
WDT1723	Inyokern 115kV Bus
WDT1281	Inyokern 115kV Bus

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.28: TPD Allocation for Generation behind the Lugo Bank Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	302	256
Eligible TPD Candidate	1870	1803
TPD Allocated	1072	1072
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1374	1328
Total TPD in 2030 (informational)	1374	1328

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Adding a 3rd 500/230 kV transformer at Lugo Substation

### 3.2.5 North of Lugo Area Constraint Summary

The following table provides a summary showing all of the Deliverability Constraints described above and which non-operational generation projects are impacted by those constraints.

Table 3.4-29: East of Pisgah Area Deliverability Constraint Mapping

CAISO / SCE #	Point of Interconnection	Kramer-Victor (South Of Kramer)	Victor - Lugo (South Of Victor)	Calcite - Lugo	Lugo Bank
Q2105/TOT1125	Lugo 500kV Bus				
Q2104/TOT1109	Victor 230kV Bus		X		X
Q2103/TOT1106	Pisgah 230kV Bus			X	X
Q2101/TOT1091	Kramer 230kV Bus	X	X		X

CAISO / SCE #	Point of Interconnection	Kramer-Victor (South Of Kramer)	Victor - Lugo (South Of Victor)	Calcite - Lugo	Lugo Bank
Q2098/TOT1080	Lugo-Pisgah 230kV Line			X	X
Q2097/TOT1046	Calcite 230kV Bus			X	X
Q2096/TOT1064	Kramer-Lugo 220kV Line	X	X		X
Q1776/TOT993	COOLWATER 115kV Bus	X	X		X
Q1774/TOT981	Kramer 230kV Bus	X	X		X
0043CONV/1617/1775	Kramer 230kV Bus	X	X		X
WDT1726	Casa Diablo 115/33kV Bus	X	X		X
WDT1203	Inyokern 115kV Bus	X	X		X
WDT1723	Inyokern 115kV Bus	X	X		X
WDT1281	Inyokern 115kV Bus	X	X		X

### 3.3 SCE Metro Area

The deliverability assessment study did not identify any transmission deliverability constraints in the SCE Metro study area. In addition, there were no network upgrades approved in the TPP required for the TPD allocations in the cycle, in this area.

### 3.4 East of Pisgah Area

#### 3.4.1 GLW Area Constraint

The deliverability assessment identified the Category P7 and P1 contingency overloads on transmission lines and transformers shown in Table 3.4-1.

Table 3.4-1: GLW Area Constraint in East of Pisgah study area

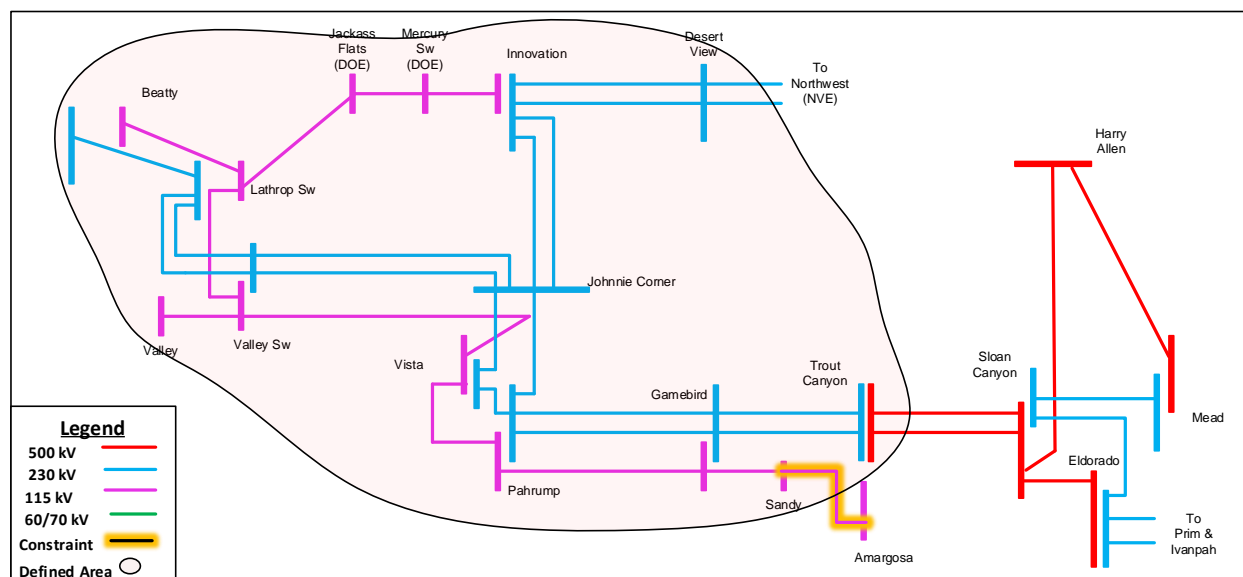
Overloaded Facility	Contingency	Overload
Sandy – Amargosa 138kV Line	Trout Canyon – Sloan Canyon 500kV Nos. 1&2 lines	244.85
Gamebird – Sandy 138kV Line	Trout Canyon – Sloan Canyon 500kV Nos. 1&2 lines	209.29
Amargosa 230/138kV Transformer	Trout Canyon – Sloan Canyon 500kV Nos. 1&2 lines	185.28
Gamebird 230/138kV Transformer	Trout Canyon – Sloan Canyon 500kV Nos. 1&2 lines	163.27

Overloaded Facility	Contingency	Overload
IS Tap – Northwest 138kV Line	Northwest – Desert View 230kV Nos. 1&2 lines	184.3
Innovation 230/138kV Transformer	Northwest – Desert View 230kV Nos. 1&2 lines	127.01
Innovation 138kV PST	Northwest – Desert View 230kV Nos. 1&2 lines	106.04
IS Tap – Northwest 138kV Line	Innovation – Desert View 230kV Nos. 1&2 lines	131.92
Northwest – Desert View 230kV No.2 Line	Northwest – Desert View 230kV No.1 Line	101.35
Northwest – Desert View 230kV No.1 Line	Northwest – Desert View 230kV No.2 Line	101.25

The most limiting element is Sandy – Amargosa 138kV line following Category P7 contingency of Trout Canyon - Sloan Canyon 500kV Nos. 1&2 lines. Trout Canyon RAS and Desert View RAS identified in Cluster 14 study is required for some projects to receive deliverability. However, other projects will not be able to allocate TPD even after taking into account RAS.

The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.4-1: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the GLW Area Constraint



The following table lists generation projects that are behind the constraint.

Table 3.4-2: Generation Projects behind GLW Area Constraint

Queue	POI/POD
993/994	Valley Substation 138kV
1341	Trout Canyon Substation 230kV
1649	Innovation Substation 230kV



Queue	POI/POD
1650	Trout Canyon Substation 230kV
1654	Trout Canyon Substation 230kV
1655	Trout Canyon Substation 230kV
1798	Trout Canyon Substation 230kV
1799	Trout Canyon Substation 230kV
1800	Trout Canyon Substation 230kV
1801	Gamebird Substation 230kV
2142	Lathrop Wells Substation 230kV
2144	Beatty Substation 230kV
2145	Vista Substation 230kV
2146	Gamebird Substation 230kV
2147	Innovation – Desert View 230kV Line
2148	Trout Canyon Substation 230kV
2149	Trout Canyon Substation 230kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. The results are shown in the following table.

Table 3.4-3: TPD Allocation for Generation behind the GLW Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	2,231	2,022
Eligible TPD Candidate	3,070	2,984
TPD Allocated	850	850
Remaining TPD available	500	500
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	3,581	3,372
TPD in 2030 (informational)	3,581	3,372

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades identified for the Projects:

- GLW Core Upgrade

### 3.4.2 Sloan Canyon – Eldorado Area Constraint

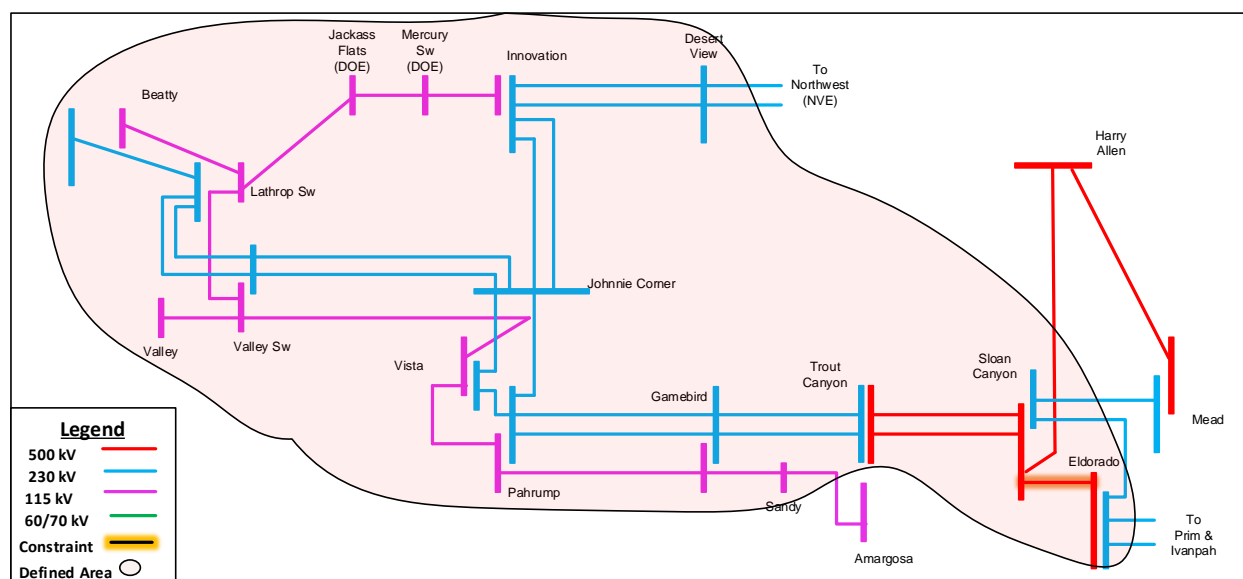
The deliverability assessment identified base case and contingency overloads on Sloan Canyon – Eldorado 500kV Line as summarized in Table 3.4-4.

Table 3.4-4: Sloan Canyon – Eldorado Area Constraint in East of Pisgah study area

Overloaded Facility	Contingency	Overload
Sloan Canyon – Eldorado 500kV Line	Base Case	137.13
	Northwest – Desert View 230kV Nos. 1&2 lines	119.85
	Innovation – Desert View 230kV Nos. 1&2 lines	116.71
	Harry Allen – Mead 500kV line	116.5

The following figure illustrates approximate electrical boundary of the 10% DFAX circle for the constraint.

Figure 3.4-2: Approximate electrical boundary of the projects within the 10% DFAX circle that contribute to the Sloan Canyon – Eldorado Area Constraint



The following table lists generation projects that are behind the constraint.

Table 3.4-5: Generation Projects behind Sloan Canyon – Eldorado Area Constraint

Queue	POI/POD
993/994	Valley Substation 138kV
1339	SCE owned Eldorado Bus 230 kV
1341	Trout Canyon Substation 230kV
1347	Sloan Canyon Substation 230kV

Queue	POI/POD
1649	Innovation Substation 230kV
1650	Trout Canyon Substation 230kV
1654	Trout Canyon Substation 230kV
1655	Trout Canyon Substation 230kV
1796	SCE owned Eldorado Bus 230 kV
1798	Trout Canyon Substation 230kV
1799	Trout Canyon Substation 230kV
1800	Trout Canyon Substation 230kV
1801	Gamebird Substation 230kV
2141	SCE owned Eldorado Bus 230 kV
2142	Lathrop Wells Substation 230kV
2144	Beatty Substation 230kV
2145	Vista Substation 230kV
2146	Gamebird Substation 230kV
2147	Innovation – Desert View 230kV Line
2148	Trout Canyon Substation 230kV
2149	Trout Canyon Substation 230kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. The results are shown in the following table.

Table 3.4-5: TPD Allocation for Generation behind the Sloan Canyon – Eldorado Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	3,087	2,878
Eligible TPD Candidate	3,320	3,234
TPD Allocated	850	850
Remaining TPD available	338	304
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	4,275	4,032
TPD in 2030 (informational)	4,027	3,818

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.4.3 Lugo – Victorville Area Constraint

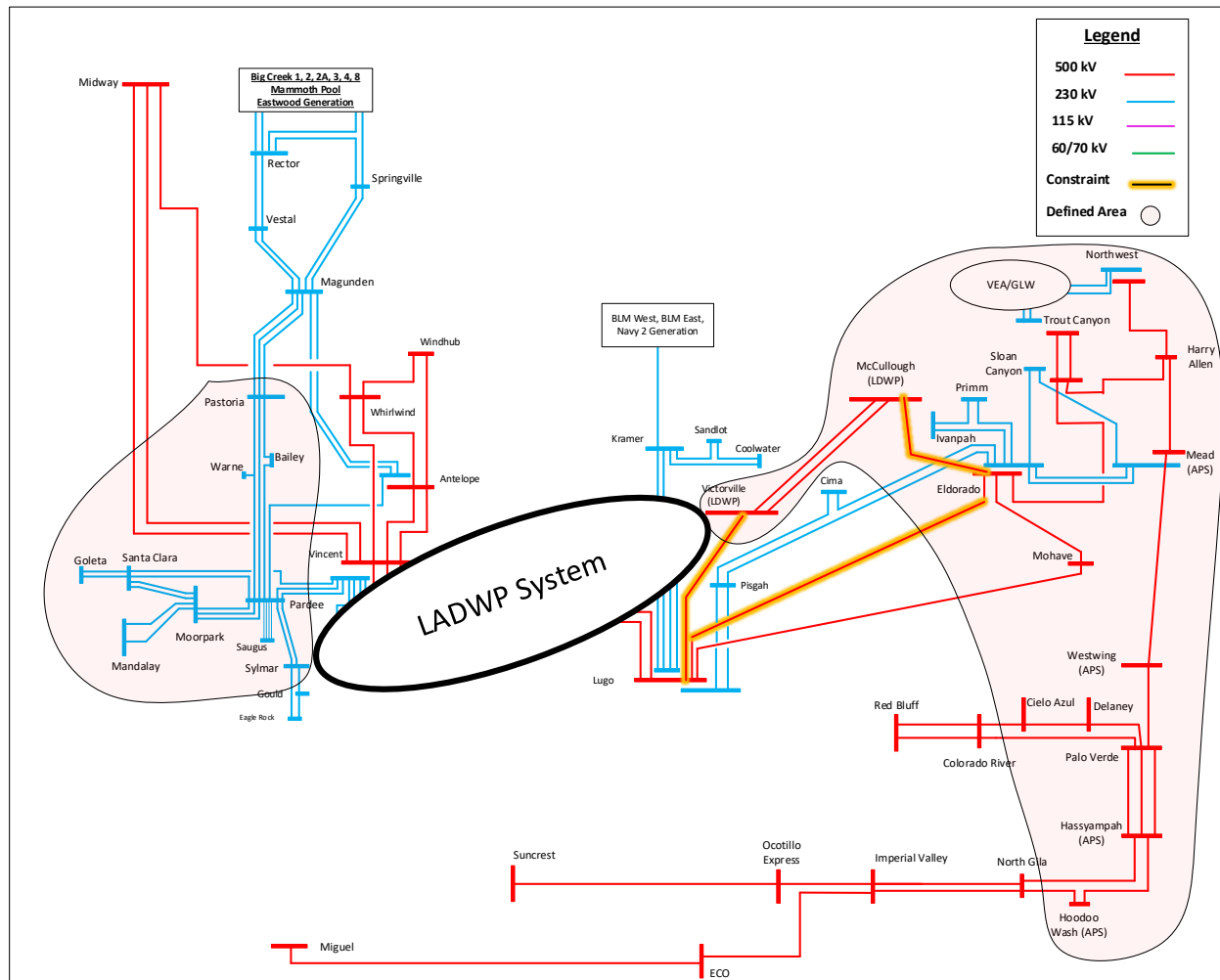
The deliverability assessment identified base case and contingency overloads on multiple 500kV lines in the Lugo – Victorville area as listed below.

Table 3.4-6: Lugo – Victorville Area Constraint in East of Pisgah study area

Overloaded Facility	Contingency	Overload
Lugo – Victorville 500kV Line	Base Case	115.21
	Eldorado – Lugo 500kV line	130.64
	Lugo – Mohave 500kV line	118.27
Eldorado – McCullough kV Line	Eldorado – Lugo 500kV line	145.46
	Lugo – Mohave 500kV line	133.82
Eldorado – Lugo 500 kV Line	Lugo – Victorville 500kV line	109.59

This constraint could potentially limit deliverability of generators in East of Pisgah, SDG&E, SCE Eastern, Northern and Metro study areas. The following figure illustrates approximate electrical boundary of the 10% DFAX circle for the constraint.

Figure 3.4-3: Approximate electrical boundary of the projects within the 10% DFAX circle that contribute to the Lugo-Victorville Area Constraint



The following table lists generation projects that are behind the constraint.

Table 3.4-7: Generation Projects behind Lugo – Victorville Area Constraint

Queue	POI/POD
993/994	Valley Substation 138kV
1171	Hoodoo Wash Switchyard 500 kV
1291	Hassayampa Common Bus 500 kV
1335	Pastoria Substation 230 kV
1339	SCE owned Eldorado Bus 230 kV
1341	Trout Canyon Substation 230 kV
1347	Sloan Canyon Substation 230 kV
1402	Delaney-Colorado River 500 kV
1522	Mohave Substation 500 kV
1529	Delaney-Colorado River 500 kV line

Queue	POI/POD
1534	Hassayampa Common Bus 500 kV
1647	Mohave Substation 500 kV
1649	Innovation Substation 230 kV
1650	Trout Canyon Substation 230 kV
1654	Trout Canyon Substation 230 kV
1655	Trout Canyon Substation 230 kV
1783	Mandalay Switchyard 220 kV
1795	Mohave Substation 500 kV
1796	Eldorado Substation 230 kV
1798	Trout Canyon Substation 230 kV
1799	Trout Canyon Substation 230 kV
1800	Trout Canyon Substation 230 kV
1801	Gamebird Substation 230 kV
1812	Hoodoo Wash Switchyard 500 kV
1818	Hassayampa Common Bus 500 kV
1823	Hassayampa Common Bus 500 kV
2022	Cielo Azul Substation 500 kV
2023	Cielo Azul Substation 500 kV
2025	Colorado River-Delaney 500 kV line
2027	Delaney Substation 500 kV
2029	Delaney Substation 500 kV
2052	Colorado River - Palo Verde 500kV
2066	Moorpark Substation 230 kV
2090	Moorpark Substation 230 kV
2092	Moorpark Substation 230 kV
2134	Sylmar-Gould line 230 kV
2140	Mohave Substation 500 kV
2141	SCE portion of Eldorado Substation 230 kV
2142	Lathrop Wells Substation 230kV
2144	Beatty Substation 230kV
2145	Vista Substation 230kV
2146	Gamebird Substation 230kV
2147	Innovation – Desert View 230kV Line
2148	Trout Canyon Substation 230kV
2149	Trout Canyon Substation 230kV
2161	Hoodoo Wash - North Gila 500 kV
2172	Hoodoo Wash - Hassayampa 500 kV Line
WDT 1187	Capitan 66 kV

Queue	POI/POD
WDT 1454	Isla Vista 66 kV
WDT 1519	Santa Clara – Gonzales 66 kV Line
WDT 1532	Wakefield 66 kV
WDT 1647	Moorpark 66 kV
WDT 1649	North Oaks 66 kV
WDT 1701	Wakefield 66 kV
WDT 1710	Elizabeth Lake 66 kV
WDT 1766	Royal 66 kV
WDT 1780	Carpinteria 66 kV
WDT 1774	Elizabeth Lake 66 kV
WDT 1808	San Miguel 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. The results are shown in the following table.

Table 3.4-8: TPD Allocation for Generation behind the Lugo – Victorville Area Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	9,040	7,733
Eligible TPD Candidate	12,895	10,755
TPD Allocated	3,342	2,372
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	12,382	10,105
TPD in 2030 (informational)	9,106	8,462

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades identified for the Projects:

- Southern area reinforcement project

### 3.4.4 East of Pisgah Area Constraint Summary

The following table provides a summary showing all of the Deliverability Constraints described above and which non-operational generation projects are impacted by those constraints.





**Table 3.4-9: East of Pisgah Area Deliverability Constraint Mapping**

Queue	GLW Area Constraint	Sloan Canyon – Eldorado 500kV Constraint	Lugo-Victorville Constraint
993/994	x	x	x
1339		x	x
1341	x	x	x
1347		x	x
1649	x	x	x
1650	x	x	x
1654	x	x	x
1655	x	x	x
1796		x	x
1798	x	x	x
1799	x	x	x
1800	x	x	x
1801	x	x	x
2140			x
2141		x	x
2142	x	x	x
2144	x	x	x
2145	x	x	x
2146	x	x	x
2147	x	x	x
2148	x	x	x
2149	x	x	x

## 3.5 Eastern Area

### 3.5.1 Colorado River 500/230 kV Area Constraint

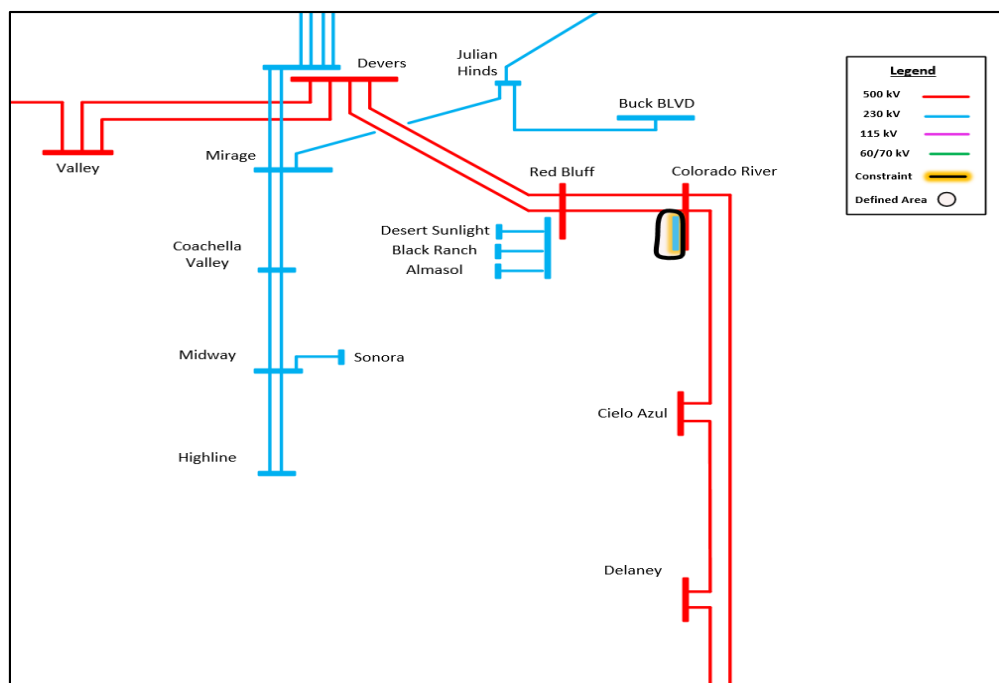
The deliverability assessment identified the following overloads.

Table 3.5-1: Colorado River 500/230 kV Constraint

Overloaded Facility	Contingency	Overload
Colorado River 500/230 kV Transformer No.1	Colorado River 500/230 kV Transformer No.2	180.56%
Colorado River 500/230 kV Transformer No.2	Colorado River 500/230 kV Transformer No.1	180.56%
Colorado River 500/230 kV Transformer No.1	Base Case	107.13%
Colorado River 500/230 kV Transformer No.2	Base Case	107.13%

The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.5-1: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Colorado River 500/230 kV Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-2: Generation Projects Contributing to the Colorado River 500/230 kV Constraint

Queue	POI
294	Colorado River Substation 230 kV
1192	
1196	
1198	
1526	
1761	
2033	
2045	
2048	

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-3: TPD Allocation for Generation behind the Colorado River 500/230 kV Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1388	828
Eligible TPD Candidate	1460	745
TPD Allocated	520	332
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1908	1160
TPD in 2030 (informational)	1908	1160

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.5.2 Colorado River-Red Bluff Area Constraint

Overloads on the Colorado River-Red Bluff 500 kV No.1 and No.2 lines were not identified in the deliverability assessment, so Colorado River-Red Bluff is not considered a binding area constraint. However, the deliverability of SCE Eastern area generation projects is dependent on the following TPP upgrades pertinent to the Colorado River-Red Bluff area:

- Colorado River-Red Bluff 500 kV 1 Line Upgrade
- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash-North Gila and Hassayampa-North Gila Transmission Lines

### 3.5.3 Devers-Red Bluff Area Constraint

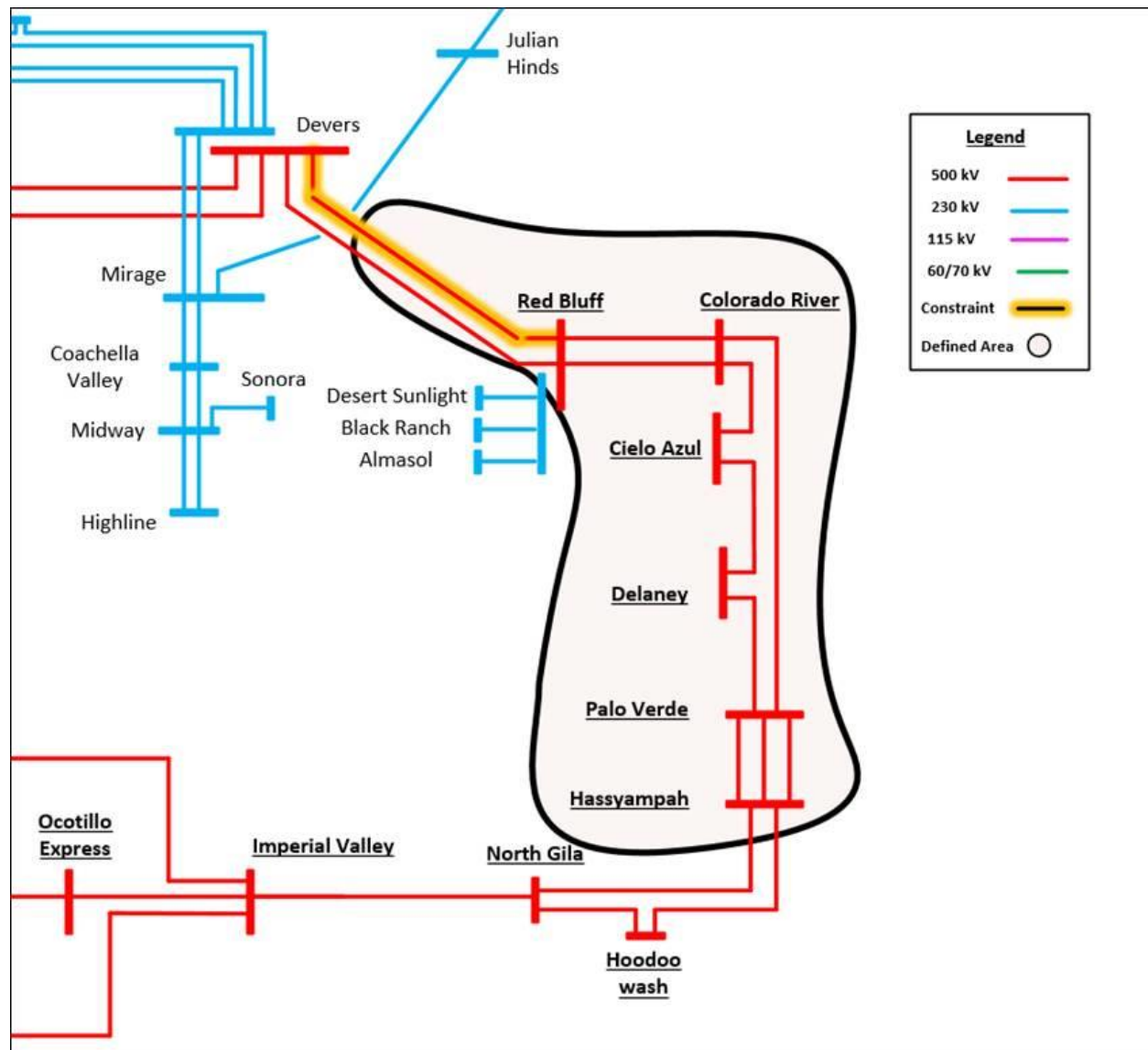
The deliverability assessment identified the following overloads.

Table 3.5-4: Devers-Red Bluff Area Constraint

Overloaded Facility	Contingency	Overload
Devers-Red Bluff 500 kV No.1	Devers-Red Bluff 500 kV No.2	126.36%
Devers-Red Bluff 500 kV No.2	Devers-Red Bluff 500 kV No.1	126.36%

The following figure illustrates the approximate electrical boundary of the 10% DFAX circle for the constraint.

Figure 3.5-2: Approximate electrical boundary of the projects within the 10% DFAX circle that contribute to the Devers-Red Bluff Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-5: Generation Projects Contributing to the Devers-Red Bluff Constraint

Queue	POI
146	Red Bluff Substation 230kV
147	Red Bluff Substation 230kV
294	Colorado River Substation 220kV
421	Red Bluff Substation 220kV
1192	Colorado River Substation 230kV
1196	Colorado River Substation 230kV
1198	Colorado River Substation 220kV

Queue	POI
1200	Red Bluff Substation 230kV
1302	Red Bluff 220 kV
1291	Hassayampa Common Bus 500 kV
1402	Delaney-Colorado River 500kV
1405	Red Bluff Substation 230kV
1526	Colorado River Substation 230kV
1529	Delaney-Colorado River 500kV line
1534	Hassayampa Common Bus 500 kV
1642	Red Bluff Substation 500kV
1643	Red Bluff Substation 500kV
1678	Delaney Substation 500 kV
1761	Colorado River Substation 230kV
1764	Red Bluff Substation 230kV
1818	Hassayampa Common Bus 500 kV
1823	Hassayampa Common Bus 500 kV
2022	Cielo Azul Substation 500 kV
2023	Cielo Azul Substation 500 kV
2025	Colorado River-Delaney 500 kV line
2027	Delaney Substation 500 kV
2029	Delaney Substation 500 kV
2033	Colorado River Substation 230 kV
2036*	Red Bluff Substation 220kV
2039*	Red Bluff Substation 230kV
2041*	Red Bluff Substation 230kV
2042	Red Bluff Substation 500kV
2045	Colorado River Substation 230 kV
2048*	Colorado River Substation 230 kV
2050	Red Bluff Substation 500kV
2052	Colorado River - Palo Verde 500kV

\* The Southern Area Reinforcement transmission project is not required for this generator project to receive FCDS or PCDS.

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-6: TPD Allocation for Generation behind the Devers-Red Bluff Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	4824	3318
Eligible TPD Candidate	11,204	8973
TPD Allocated	3981	3347
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	8805	6665
TPD in 2030 (informational)	8102	6133

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects (The Southern Area Reinforcement transmission project is not required for generator projects denoted with an asterisk in Table 3.5-5 to receive FCDS or PCDS):

- Devers-Red Bluff 500 kV 1 and 2 Line Upgrade
- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash–North Gila and Hassayampa–North Gila Transmission Lines

### 3.5.4 Eagle Mountain Area Constraint

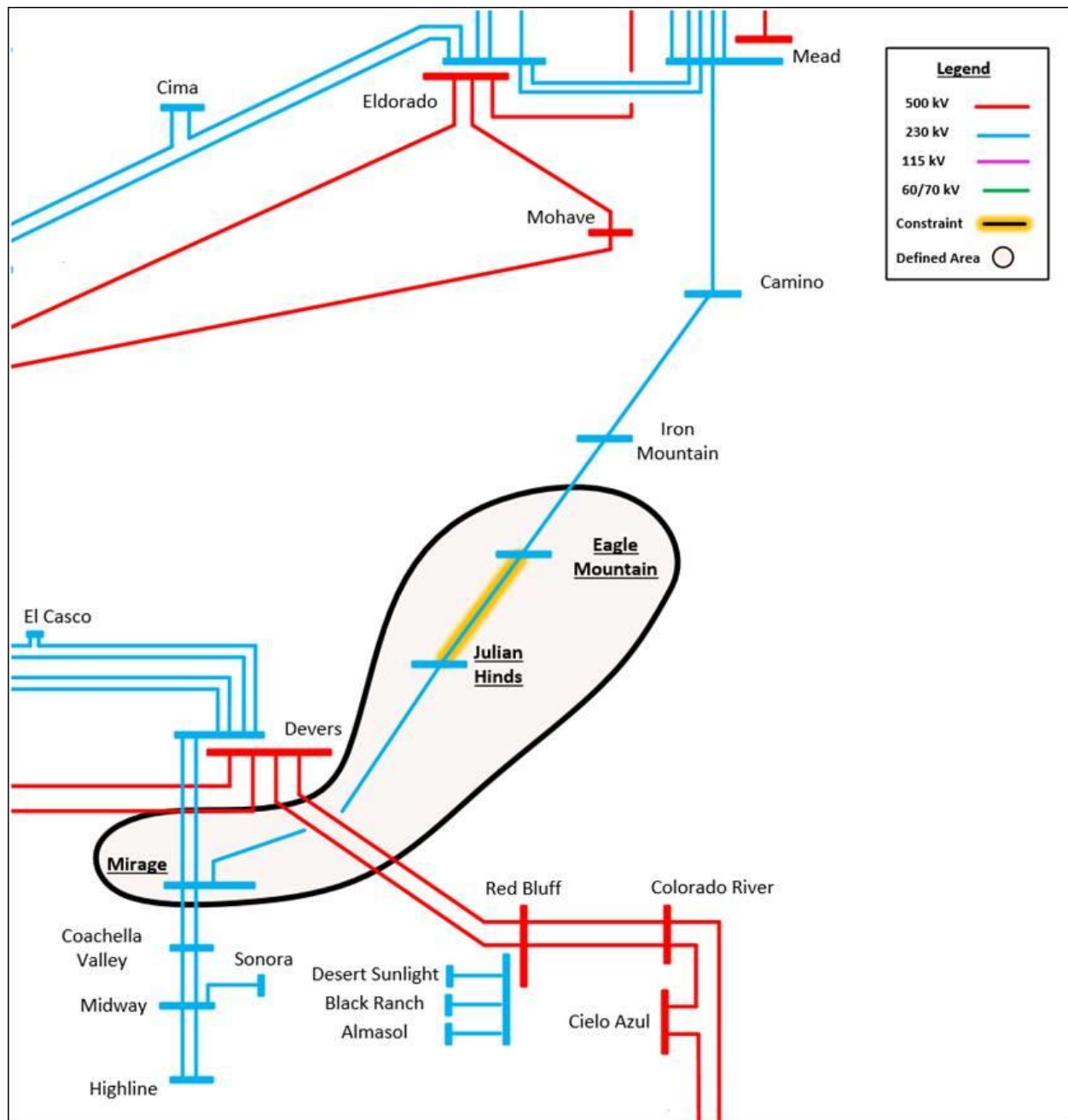
The deliverability assessment identified the following overloads.

Table 3.5-7: Eagle Mountain Constraint

Overloaded Facility	Contingency	Overload
Julian Hinds-Eagle Mountain 220 kV	Base Case	124.15%

The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.5-3: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Eagle Mountain Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-8: Generation Projects Contributing to the Eagle Mountain Constraint

Queue	POI
2051	Mirage Substation 220 kV
WDT1796	Mirage 115 kV



TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-9: TPD Allocation for Generation behind the Eagle Mountain Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	0	0
Eligible TPD Candidate	600	600
TPD Allocated	0	0
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	0	0
TPD in 2030 (informational)	0	0

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.5.5 Etiwanda-Rancho Vista Area Constraint

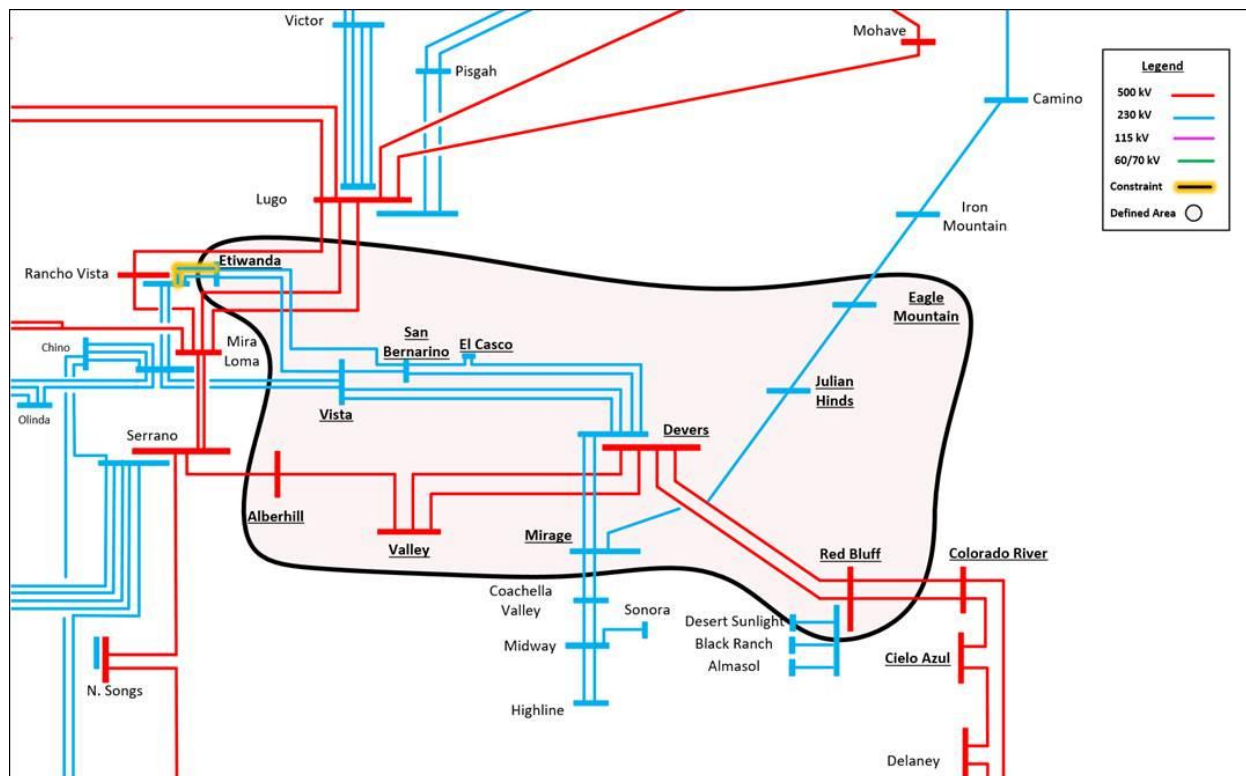
The deliverability assessment identified the following overloads.

Table 3.5-10: Etiwanda-Rancho Vista Constraint

Overloaded Facility	Contingency	Overload
Etiwanda-Rancho Vista 230 kV No.1	Etiwanda-Rancho Vista 230 kV No.2	170.22%
Etiwanda-Rancho Vista 230 kV No.2	Etiwanda-Rancho Vista 230 kV No.1	170.22%
Etiwanda-Rancho Vista 230 kV No.1	Base Case	119.97%
Etiwanda-Rancho Vista 230 kV No.2	Base Case	119.97%

The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.5-4: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Etiwanda-Rancho Vista Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-11: Generation Projects Contributing to the Etiwanda-Rancho Vista Constraint

Queue	POI
138	Devers Substation 220 kV
146	Red Bluff Substation 230kV
147	Red Bluff Substation 230kV
421	Red Bluff Substation 220kV
1200	Red Bluff Substation 230kV
1295	Devers Substation 230kV
1302	Red Bluff 220 kV
1405	Red Bluff Substation 230kV
1641	Etiwanda Substation 230kV
1642	Red Bluff Substation 500kV
1643	Red Bluff Substation 500kV
1645	Valley Substation 500kV
1646	Valley Substation 500 kV

Queue	POI
1758	Devers Substation 230kV
1763	Devers Substation 220kV
1764	Red Bluff Substation 230kV
2031	Wildlife Substation 230 kV
2032	Etiwanda Substation 230kV
2034	Devers-San Bernardino line 230 kV
2036	Red Bluff Substation 220kV
2037	San Bernardino 230 kV
2039	Red Bluff Substation 230kV
2041	Red Bluff Substation 230kV
2042	Red Bluff Substation 500kV
2043	Etiwanda Substation 230 kV
2049	Devers Substation 230kV
2050	Red Bluff Substation 500kV
2051	Mirage Substation 220 kV
WDT1551	Eisenhower: Vella 33 kV line
WDT1559	Valley 115 kV
WDT1635	Tenaja 115 kV
WDT1648	Dylan 115 kV
WDT1659	Highgrove 115 kV
WDT1669	Alder-Falcon Ridge 66 kV Line
WDT1704	Carodean 115 kV
WDT1751	Skylark 115kV
WDT1752	Etiwanda - Randall 66 kV line
WDT1753	Etiwanda-Declez #2 66 kV line
WDT1757	Highgrove 115 kV
WDT1770	El Casco 115 kV
WDT1771	Alberhill 115kV
WDT1772	Cardiff-Del Rosa 66 kV Line
WDT1775	Valley 115 kV
WDT1783	Archline 66 kV
WDT1796	Mirage 115 kV
WDT1797	Bloomington 66 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-12: TPD Allocation for Generation behind the Etiwanda-Rancho Vista Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	2292	1748
Eligible TPD Candidate	7037	7003
TPD Allocated	3076	3076
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	5368	4824
TPD in 2030 (informational)	5368	4824

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.5.6 Red Bluff 500/230 kV Area Constraint

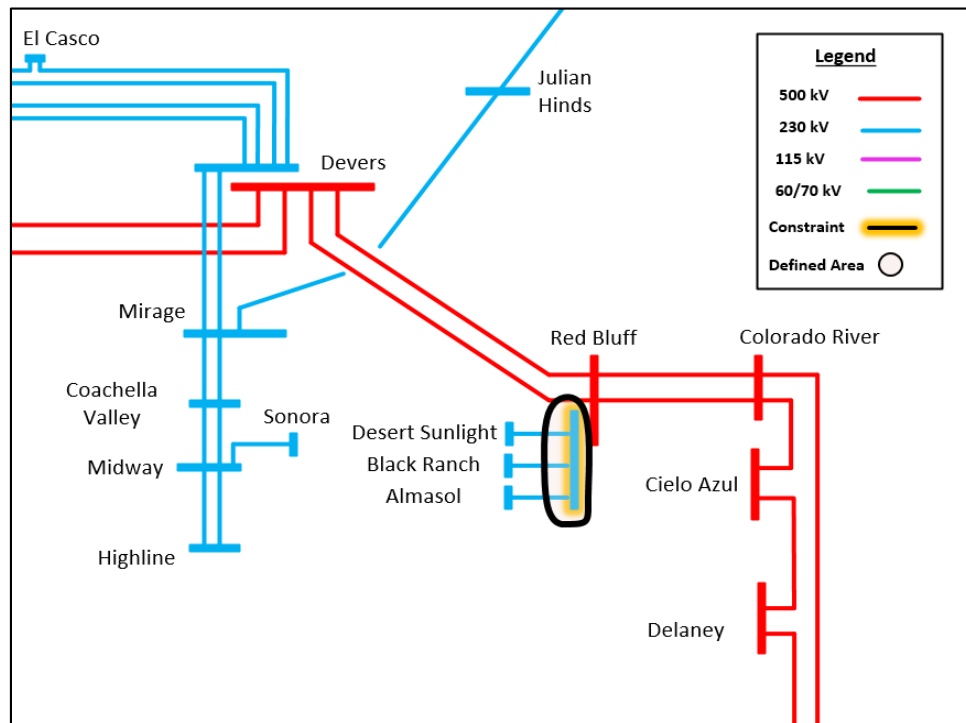
The deliverability assessment identified the following overloads.

Table 3.5-13: Red Bluff 500/230 kV Constraint

Overloaded Facility	Contingency	Overload
Red Bluff 500/230 kV Transformer No.1	Red Bluff 500/230 kV Transformer No.2	163.63%
Red Bluff 500/230 kV Transformer No.2	Red Bluff 500/230 kV Transformer No.1	163.63%

The following figure illustrates the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 3.5-5: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Red Bluff 500/230 kV Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-14: Generation Projects Contributing to the Red Bluff 500/230 kV Constraint

Queue	POI
146	Red Bluff Substation 230 kV
147	
421	
1200	
1302	
1405	
1764	
2036	
2039	
2041	

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-15: TPD Allocation for Generation behind the Red Bluff 500/230 kV Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	648	239
Eligible TPD Candidate	1269	1269
TPD Allocated	1211	1211
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1859	1450
TPD in 2030 (informational)	1859	1450

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 3.5.7 Serrano-Alberhill-Valley Area Constraint

The deliverability assessment identified the following overloads.

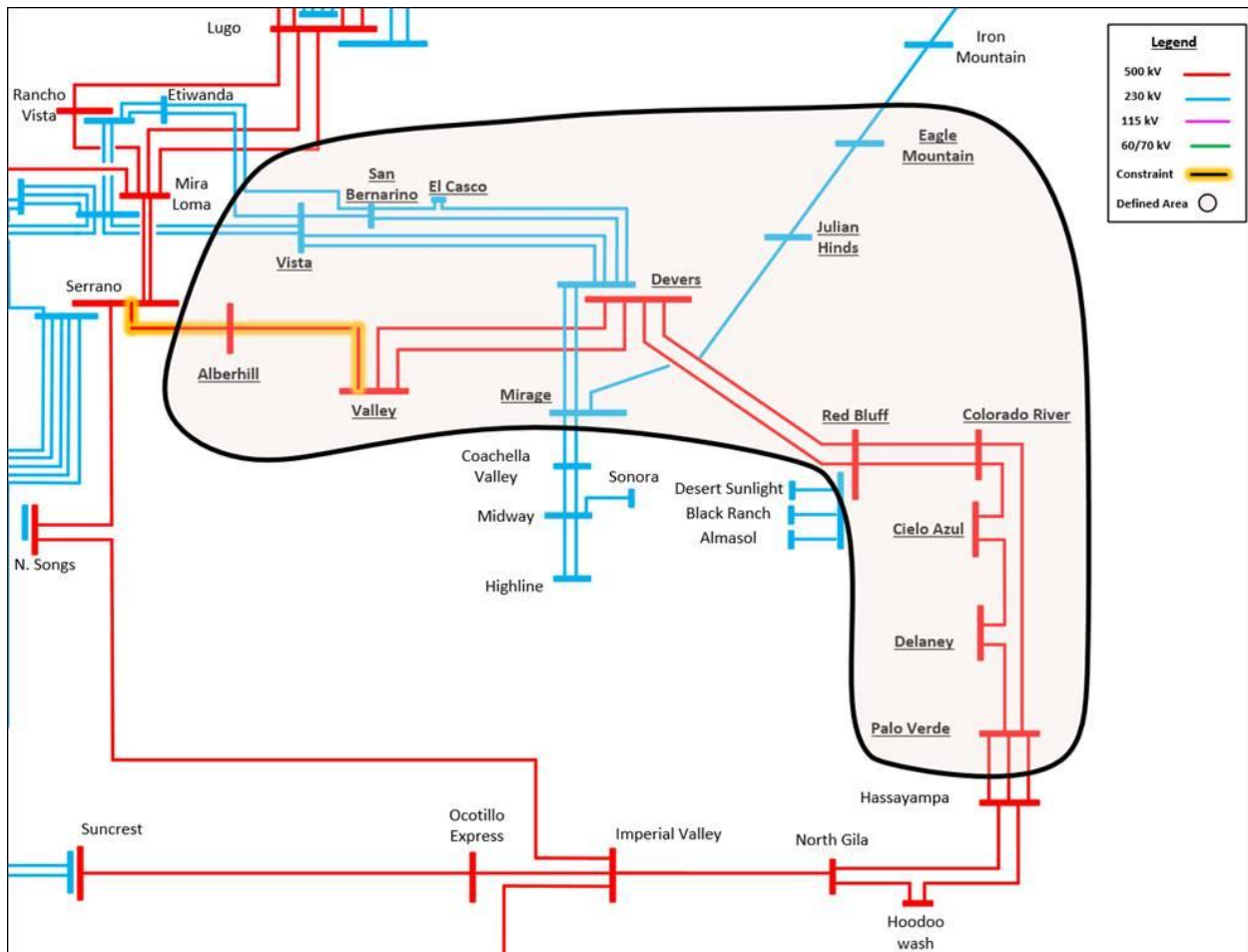
Table 3.5-16: Serrano-Alberhill-Valley Constraint

Overloaded Facility	Contingency	Overload
Vista-Mira Loma 230 kV No.2	Etiwanda-San Bernardino 230 kV and Etiwanda-Vista 230 kV	142.31%
Valley – Alberhill 500kV	Base Case	124.23%
Vista-Etiwanda 230 kV	Vista-Mira Loma 230 kV 230 kV No.2 and Mira Loma-Wildlife 230 kV	121.59%
Alberhill – Serrano 500kV	Base Case	118.96%
San Bernardino-Vista 230 kV	Etiwanda-San Bernardino 230 kV	114%
Devers 500/230 kV Transformer No.1	Valley – Alberhill 500kV	111.15%

Overloaded Facility	Contingency	Overload
Devers 500/230 kV Transformer No.2	Valley – Alberhill 500kV	103.74%

The following figure illustrates the approximate electrical boundary of the 10% DFAX circle for the constraint.

Figure 3.5-6: Approximate electrical boundary of the projects within the 10% DFAX circle that contribute to the Serrano-Alberhill-Valley Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 3.5-17: Generation Projects Contributing to the Serrano-Alberhill-Valley Constraint

Queue	POI
138	Devers Substation 220 kV
146	Red Bluff Substation 230kV
147	Red Bluff Substation 230kV
294	Colorado River Substation 220kV

Queue	POI
421	Red Bluff Substation 220kV
1192	Colorado River Substation 230kV
1196	Colorado River Substation 230kV
1198	Colorado River Substation 220kV
1200	Red Bluff Substation 230kV
1295	Devers Substation 230kV
1302	Red Bluff 220 kV
1402	Delaney-Colorado River 500kV
1405	Red Bluff Substation 230kV
1526	Colorado River Substation 230kV
1529	Delaney-Colorado River 500kV line
1642	Red Bluff Substation 500kV
1643	Red Bluff Substation 500kV
1645	Valley Substation 500kV
1646*	Valley Substation 500 kV
1678	Delaney Substation 500 kV
1758	Devers Substation 230kV
1761	Colorado River Substation 230kV
1763	Devers Substation 220kV
1764	Red Bluff Substation 230kV
2022	Cielo Azul Substation 500 kV
2023	Cielo Azul Substation 500 kV
2025	Colorado River-Delaney 500 kV line
2027	Delaney Substation 500 kV
2029	Delaney Substation 500 kV
2031	Wildlife Substation 230 kV
2033	Colorado River Substation 230 kV
2034	Devers-San Bernardino line 230 kV
2036*	Red Bluff Substation 220 kV
2037	San Bernardino 230 kV
2039*	Red Bluff Substation 230 kV
2041*	Red Bluff Substation 230 kV
2042	Red Bluff Substation 500 kV
2045	Colorado River Substation 230 kV
2048*	Colorado River Substation 230 kV
2049	Devers Substation 230kV
2050	Red Bluff Substation 500 kV
2051	Mirage Substation 220 kV
2052	Colorado River - Palo Verde 500kV
WDT1551	Eisenhower: Vella 33 kV line
WDT1559	Valley 115 kV
WDT1635*	Tenaja 115 kV



Queue	POI
WDT1648	Dylan 115 kV
WDT1659	Highgrove 115 kV
WDT1704	Carodean 115 kV
WDT1751	Skylark 115kV
WDT1757	Highgrove 115 kV
WDT1770	El Casco 115 kV
WDT1771	Alberhill 115kV
WDT1772	Cardiff-Del Rosa 66 kV Line
WDT1775*	Valley 115 kV
WDT1796	Mirage 115 kV
WDT1797	Bloomington 66 kV

\* The Southern Area Reinforcement transmission project is not required for this generator project to receive FCDS or PCDS.

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 3.5-18: TPD Allocation for Generation behind the Serrano-Alberhill-Valley Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	5415	4046
Eligible TPD Candidate	12,947	10,857
TPD Allocated	4761	4127
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	10,176	8173
TPD in 2030 (informational)	8467	6651

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects (The Southern Area Reinforcement transmission project is not required for generator projects denoted with an asterisk in Table 3.5-17 to receive FCDS or PCDS):

- Devers-Valley 500 kV 1 Line Upgrade
- Serrano-Alberhill-Valley 500 kV 1 Line Upgrade
- San Bernardino-Etiwanda 230 kV 1 Line Upgrade
- San Bernardino-Vista 230 kV 1 Line Upgrade
- Vista-Etiwanda 230 kV 1 Line Upgrade
- Mira Loma-Mesa 500 kV Underground Third Cable
- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash-North Gila and Hassayampa-North Gila Transmission Lines

### 3.5.8 SCE Eastern Area Constraint Summary

The following table provides a summary showing all of the Deliverability Constraints described above and which non-operational generation projects are impacted by those constraints.

Table 3.5-19: SCE Eastern Area Deliverability Constraint Mapping

Queue No.	Colorado River 500/230 kV	Devers-Red Bluff	Eagle Mountain	Etiwanda- Rancho Vista	Red Bluff 500/230 kV	Serrano- Alberhill-Valley	Lugo-Victorville
<b>SCE Eastern Area Projects</b>							
138				x		x	
146		x		x	x	x	
147		x		x	x	x	
294	x	x				x	
421		x		x	x	x	
1192	x	x				x	
1196	x	x				x	
1198	x	x				x	
1200		x		x	x	x	
1295				x		x	
1302		x		x	x	x	
1402		x				x	x
1405		x		x	x	x	
1526	x	x				x	
1529		x				x	x
1641				x			
1642		x		x		x	
1643		x		x		x	
1645				x		x	

Queue No.	Colorado River 500/230 kV	Devers-Red Bluff	Eagle Mountain	Etiwanda- Rancho Vista	Red Bluff 500/230 kV	Serrano- Alberhill-Valley	Lugo-Victorville
1646				x		x	
1678		x				x	x
1758				x		x	
1761	x	x				x	
1763				x		x	
1764		x		x	x	x	
2022		x				x	x
2023		x				x	x
2025		x				x	x
2027		x				x	x
2029		x				x	x
2031				x		x	
2032				x			
2033	x	x				x	
2034				x		x	
2036		x		x	x	x	
2037				x		x	
2039		x		x	x	x	
2041		x		x	x	x	
2042		x		x		x	
2043				x			
2045	x	x				x	
2048	x	x				x	
2049				x		x	
2050		x		x		x	
2051			x	x		x	
2052		x				x	x
WDT1551				x		x	
WDT1559				x		x	
WDT1635				x		x	
WDT1648				x		x	
WDT1659				x		x	
WDT1669				x			
WDT1704				x		x	
WDT1751				x		x	
WDT1752				x			
WDT1753				x			

Queue No.	Colorado River 500/230 kV	Devers-Red Bluff	Eagle Mountain	Etiwanda- Rancho Vista	Red Bluff 500/230 kV	Serrano- Alberhill-Valley	Lugo-Victorville
WDT1757				x		x	
WDT1770				x		x	
WDT1771				x		x	
WDT1772				x		x	
WDT1775				x		x	
WDT1783				x			
WDT1796			x	x		x	
WDT1797				x		x	
<b>SDGE Area Projects</b>							
1291		x					Out of scope as Section 3.5 focuses on constraints and generation projects in the Eastern Area
1534		x					
1818		x					
1823		x					

## 4. TPD Allocation Results – SDGE Area

### 4.1.1 San Luis Rey-San Onofre Area Constraint

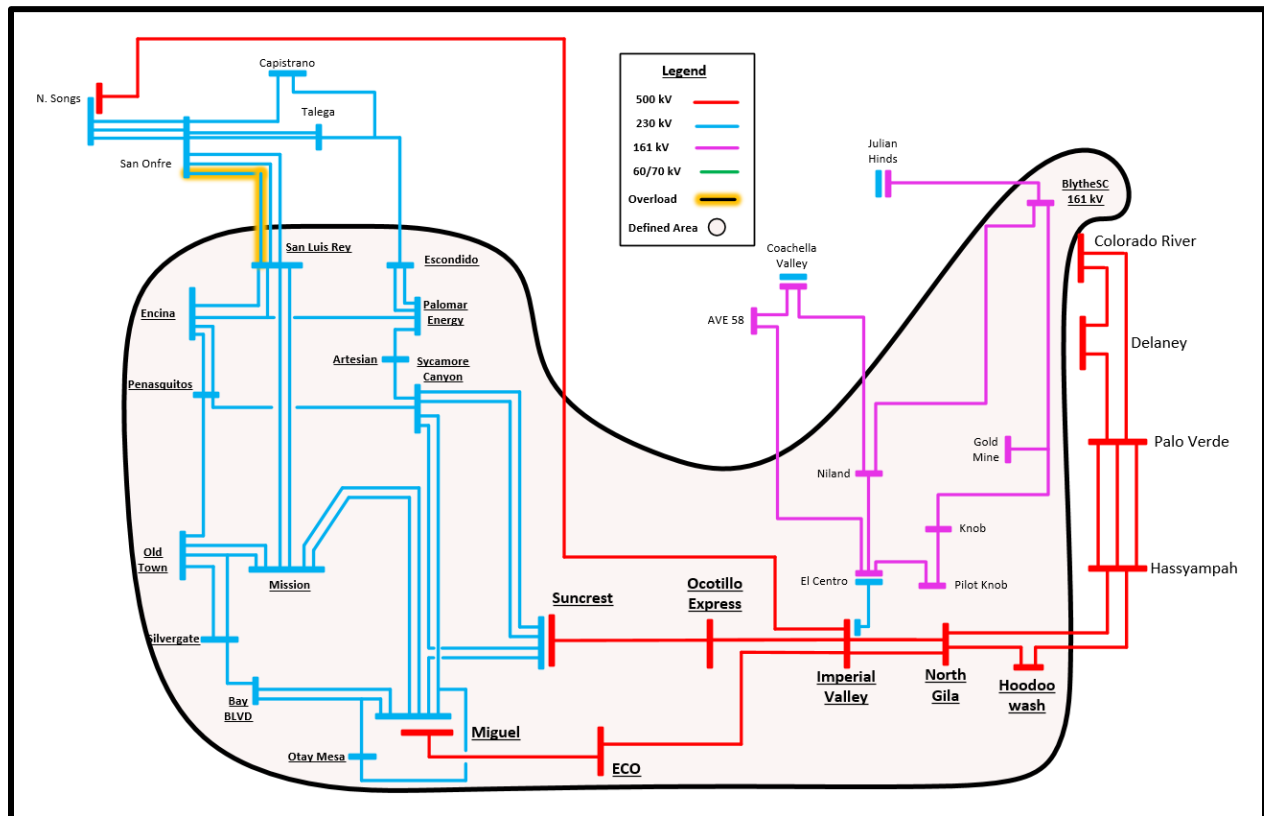
The deliverability assessment identified the following overloads.

Table 4.1: San Luis Rey-San Onofre Constraint

Overloaded Facility	Contingency	Overload
San Luis Rey-San Onofre 230 kV #1	San Luis Rey-San Onofre 230 kV #2 and #3	206%
San Luis Rey-San Onofre 230 kV #1	IV-NSONGS 500 kV	150%

The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.1: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the San Luis Rey-San Onofre Area Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.2: Generation Projects Contributing to the San Luis Rey-San Onofre Constraint

Queue	POI
1045	Otay Substation 69 kV
1047	El Cajon Substation 69 kV
1048	Escondido Substation 69 kV
1166	Imperial Valley Substation 230 kV
1171	Hoodoo Wash Switchyard 500 kV
1175	Imperial Valley Substation 230 kV
1432	Boulevard East Substation 69 kV
1435	Hoodoo Wash Switchyard 500 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV
1660	East County Substation 230 kV
1662	El Cajon Substation 69 kV
1663	Hoodoo Wash Switchyard 500 kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1667	Imperial Valley Substation 230 kV
1669	Pomero do Substation 69 kV
1670	Silvergate Substation 230 kV
1671	Point Loma Substation 69 kV
1673	Sycamore Canyon Substation 138 kV
1810	Otay Mesa Switchyard 230 kV
1812	Hoodoo Wash Switchyard 500 kV
1814	Encina Substation 138 kV
1820	Creelman Substation 69 kV
1821	Escondido Substation 230 kV
1824	East County Substation 500 kV
1832	Escondido Substation 69 kV
2153	Silvergate Substation 230 kV
2154	Hoodoo Wash Switchyard 500 kV
2157	Encina Substation 138 kV
2161	Hoodoo Wash - North Gila 500 kV
2162	Imperial Valley Substation 230 kV
2165	Ocean Ranch Substation 69 kV
2166	North Gila - Imperial Valley 500 kV Line
2167	Scripps Substation 69 kV
2172	Hoodoo Wash - Hassayampa 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2177	Suncrest - Ocotillo 500 kV Line
2178	Suncrest Substation 230 kV

Queue	POI
2180	Otay Mesa Switchyard 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2182	Chicarita Substation 138 kV
2184	Loveland - Alpine 69 kV Line
2185	Otay Mesa Switchyard 230 kV
2186	San Luis Rey Substation 230 kV
2187	East County Substation 500 kV
2188	Miguel Substation 69 kV
2192	Salt Creek Substation 69 kV
Rule 21	Alpine Substation 69 kV
W122	Melrose Substation 69 kV
W123	Melrose Substation 69 kV
W127	Boulevard East Substation 138 kV
W128	Clairemont 69 kV
W129	Elliot 69 kV
W130	Paradise 69 kV
W131	Santee 138 kV
W162	Mesa Heights Substation 69 kV
W164	Pendleton Substation 69 kV
W165	Pendleton Substation 69 kV
W166	Murray Substation 69 kV
W183	Murray Substation 69 kV
W184	Murray Substation 69 kV
W186	Murray Substation 69 kV
W187	Murray Substation 69 kV
W188	Pala 69 kV Substation
W227	Murray Substation 69 kV
W260	Borrego Springs Substation 69 kV
W82	Avocado Substation 69 kV
W83	Creelman Substation 69 kV
W84	Lilac 69 kV
W87	Monserate Substation 69 kV
W88	Melrose Substation 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.3: TPD Allocation for Generation behind the San Luis Rey-San Onofre Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1927.4	1697.4
Eligible TPD Candidate	7874.6	6900.45
TPD Allocated	2487.5	2208.6
Remaining TPD available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	4414.9	3906.0
TPD in 2030 (informational)	1927.4	1697.4

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash–North Gila and Hassayampa–North Gila Transmission Lines
- Use 30 minute rating for San Luis Rey–San Onofre 230 kV #1 line

## 4.1.2 Encina-San Luis Rey Area Constraint

The deliverability assessment identified the following overloads.

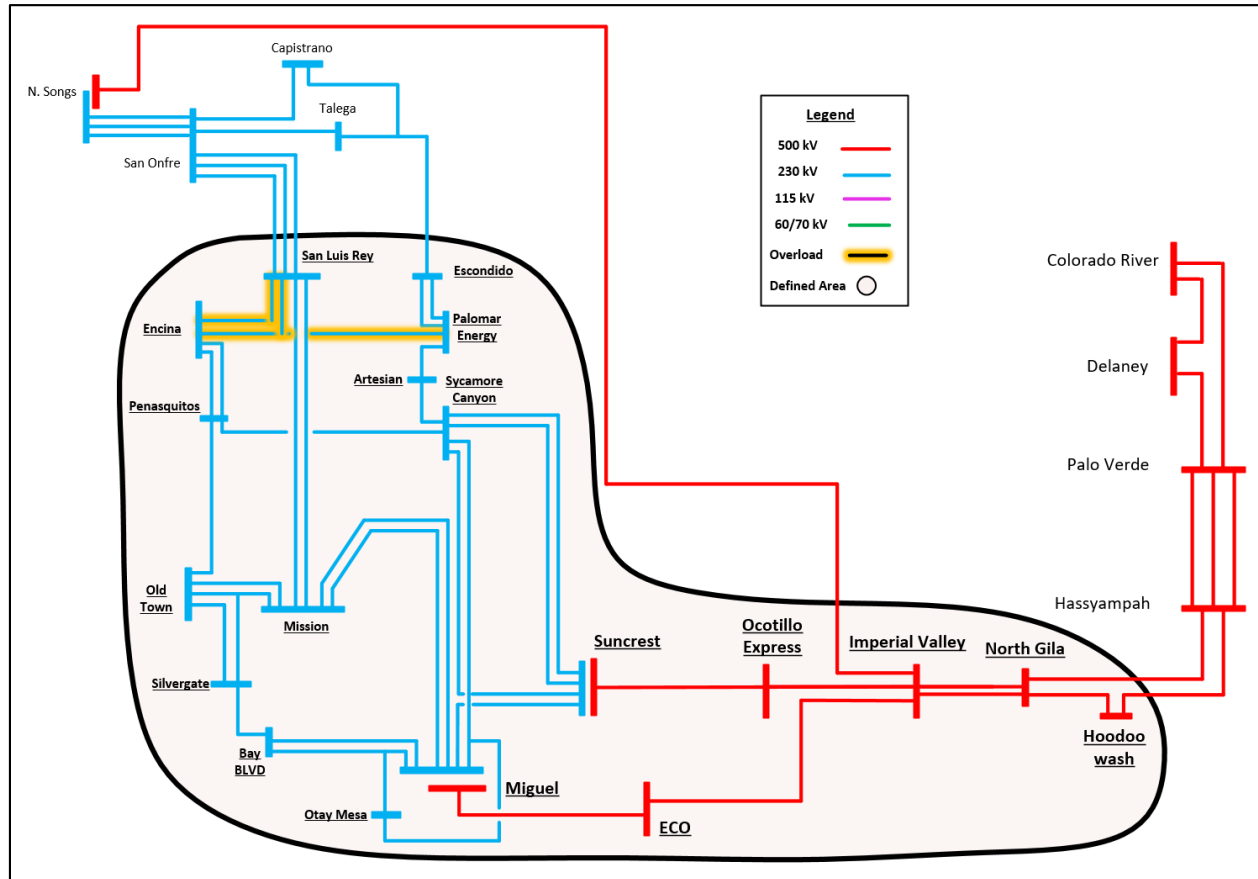
Table 4.4: Encina-San Luis Rey Constraint

Overloaded Facility	Contingency	Overload
Encina-Encina Tap 230 kV	San Luis Rey-Encina 230 kV	119%
Encina Tap-San Luis Rey 230 kV	San Luis Rey-Encina 230 kV	174%
Encina Tap-San Luis Rey 230 kV	IV-NSONGS 500 kV	151%
Encina-San Luis Rey 230 kV	IV-NSONGS 500 kV	136%



The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.2: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Encina-San Luis Rey Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.5: Generation Projects Contributing to the Encina-San Luis Rey Constraint

Queue	POI
1045	Otay Substation 69 kV
1047	El Cajon Substation 69 kV
1048	Escondido Substation 69 kV
1166	Imperial Valley Substation 230 kV
1171	Hoodoo Wash Switchyard 500 kV
1175	Imperial Valley Substation 230 kV
1432	Boulevard East Substation 69 kV
1435	Hoodoo Wash Switchyard 500 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV

Queue	POI
1660	East County Substation 230kV
1662	El Cajon Substation 69 kV
1663	Hoodoo Wash Switchyard 500kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1667	Imperial Valley Substation 230 kV
1669	Pomera do Substation 69 kV
1670	Silvergate Substation 230 kV
1671	Point Loma Substation 69 kV
1673	Sycamore Canyon Substation 138 kV
1810	Otay Mesa Switchyard 230 kV
1812	Hoodoo Wash Switchyard 500 kV
1814	Encina Substation 138 kV
1820	Creel man Substation 69 kV
1821	Escondido Substation 230 kV
1824	East County Substation 500 kV
1832	Escondido Substation 69 kV
2153	Silvergate Substation 230 kV
2154	Hoodoo Wash Switchyard 500 kV
2157	Encina Substation 138 kV
2161	Hoodoo Wash - North Gila 500 kV
2162	Imperial Valley Substation 230 kV
2166	North Gila - Imperial Valley 500 kV Line
2167	Scripps Substation 69 kV
2172	Hoodoo Wash - Hassayampa 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2177	Suncrest - Ocotillo 500 kV Line
2178	Suncrest Substation 230 kV
2180	Otay Mesa Switchyard 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2182	Chicarita Substation 138 kV
2184	Loveland - Alpine 69 kV Line
2185	Otay Mesa Switchyard 230 kV
2187	East County Substation 500 kV
2188	Miguel Substation 69 kV
2192	Salt Creek Substation 69 kV
Rule 21	Alpine Substation 69 kV
W127	Boulevard East Substation 138 kV
W128	Clairemont 69kV
W129	Elliot 69kV
W130	Paradise 69kV

Queue	POI
W131	Santee 138kV
W162	Mesa Heights Substation 69 kV
W166	Murray Substation 69 kV
W183	Murray Substation 69 kV
W184	Murray Substation 69 kV
W186	Murray Substation 69 kV
W187	Murray Substation 69 kV
W188	Pala 69kV Substation
W227	Murray Substation 69 kV
W260	Borrego Springs Substation 69 kV
W83	Creelman Substation 69 kV
W84	Lilac 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.6: TPD Allocation for Generation behind the Encina-San Luis Rey Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1901.4	1671.4
Eligible TPD Candidate	6674.6	5700.5
TPD Allocated	2487.5	2208.6
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	4388.9	3880.0
TPD in 2030 (informational)	2062.4	1832.4

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line

- North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash-North Gila and Hassayampa-North Gila Transmission Lines
- 30 minute emergency rating on Encina Tap-San Luis Rey 230 kV Line

### 4.1.3 Silvergate-Old Town Area Constraint

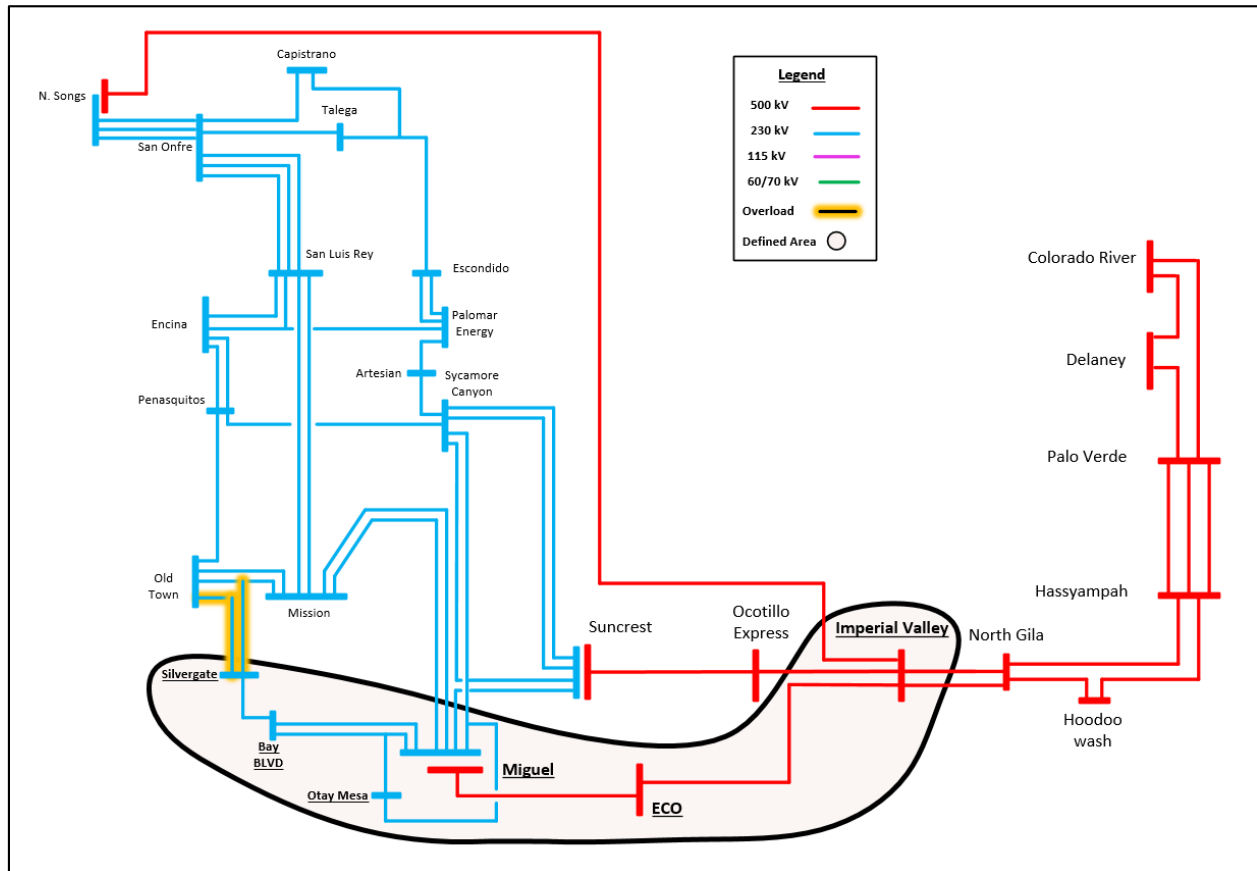
The deliverability assessment identified the following overloads.

Table 4.7: Silvergate-Old Town Constraint

Overloaded Facility	Contingency	Overload
Silvergate-Old Town 230 kV	Silvergate-Old Town-Mission 230 kV	193%
Silvergate-Old Town Tap 230 kV	Silvergate-Old Town 230 kV	191%
Silvergate-Old Town 230 kV	IV-NSONGS 500 kV	152%
Silvergate-Old Town Tap 230 kV	IV-NSONGS 500 kV	146%

The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.3: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Silvergate-Old Town Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.8: Generation Projects Contributing to the Silvergate-Old Town Constraint

Queue	POI
1045	Otay Substation 69 kV
1166	Imperial Valley Substation 230 kV
1175	Imperial Valley Substation 230 kV
1432	Boulevard East Substation 69 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV
1660	East County Substation 230 kV
1664	Imperial Valley Substation 230 kV
1670	Silvergate Substation 230 kV
1810	Otay Mesa Switchyard 230 kV
1824	East County Substation 500 kV

Queue	POI
2153	Silvergate Substation 230 kV
2162	Imperial Valley Substation 230 kV
2166	North Gila - Imperial Valley 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2180	Otay Mesa Switchyard 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2184	Loveland - Alpine 69 kV Line
2185	Otay Mesa Switchyard 230 kV
2187	East County Substation 500 kV
2188	Miguel Substation 69 kV
2192	Salt Creek Substation 69 kV
Rule 21	Alpine Substation 69 kV
W127	Boulevard East Substation 138 kV
W130	Paradise 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.9: TPD Allocation for Generation behind the Silvergate-Old Town Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	632.4	632.4
Eligible TPD Candidate	5018.1	4174.2
TPD Allocated	1935.7	1736.8
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	2568.1	2369.2
TPD in 2030 (informational)	682.4	682.4

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash-North Gila and Hassayampa-North Gila Transmission Lines
- Use 30 min emergency rating for Silvergate-Old Town and Silvergate-Old Town Tap 230 kV lines

**4.1.4 Silvergate-Boulevard Area Constraint**

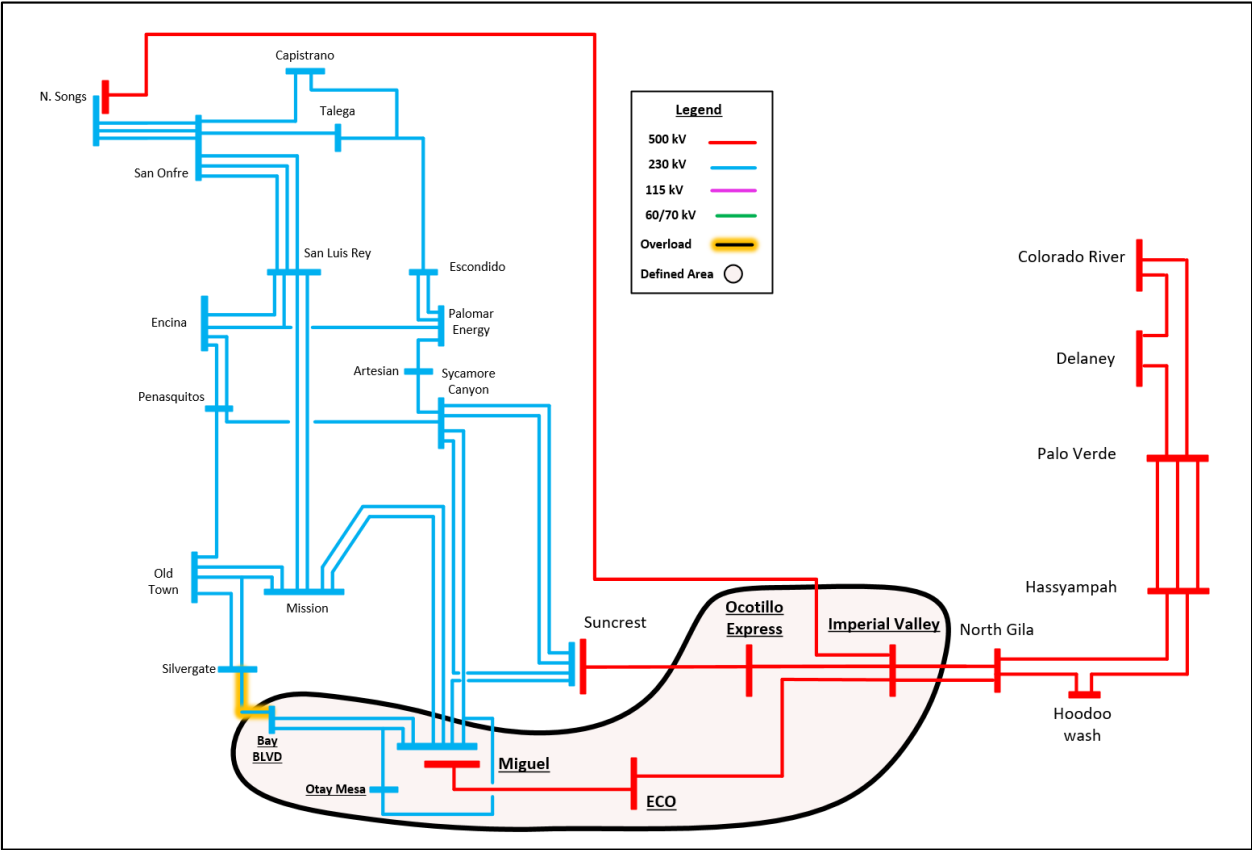
The deliverability assessment identified the following overloads.

Table 4.10: Silvergate-Bay Boulevard Constraint

Overloaded Facility	Contingency	Overload
Silvergate-Bay Boulevard 230 kV	Miguel-Mission 230 kV #1 and #2	149%
Silvergate-Bay Boulevard 230 kV	IV-NSONGS 500 kV	152%

The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.4: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Silvergate-Bay Boulevard Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.11: Generation Projects Contributing to the Silvergate-Bay Boulevard Constraint

Queue	POI
1045	Otay Substation 69 kV
1166	Imperial Valley Substation 230 kV
1171	Hoodoo Wash Switchyard 500 kV
1175	Imperial Valley Substation 230 kV
1432	Boulevard East Substation 69 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV
1660	East County Substation 230 kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1667	Imperial Valley Substation 230 kV
1810	Otay Mesa Switchyard 230 kV
1812	Hoodoo Wash Switchyard 500 kV



Queue	POI
1824	East County Substation 500 kV
2161	Hoodoo Wash - North Gila 500 kV
2162	Imperial Valley Substation 230 kV
2166	North Gila - Imperial Valley 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2177	Suncrest - Ocotillo 500 kV Line
2178	Suncrest Substation 230 kV
2180	Otay Mesa Switchyard 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2184	Loveland - Alpine 69 kV Line
2185	Otay Mesa Switchyard 230 kV
2187	East County Substation 500 kV
2188	Miguel Substation 69 kV
2192	Salt Creek Substation 69 kV
W127	Boulevard East Substation 138 kV
W130	Paradise 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There isn't sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.12: TPD Allocation for Generation behind the Silvergate-Bay Boulevard Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	1217.4	987.4
Eligible TPD Candidate	5811.1	4917.0
TPD Allocated	1928.7	1729.8
Remaining TPD available	0.0	0.0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	3146.1	2717.2
TPD in 2030 (informational)	2368.1	2169.2

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line
  - North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash–North Gila and Hassayampa–North Gila Transmission Lines
- 2 hour emergency rating on Silvergate–Bay Boulevard 230 kV line

#### **4.1.5 East of Miguel Area Constraint**

This constraint was evaluated after removing TPD candidates that did not receive an allocation for the San Luis Rey–San Onofre constraint. With all approved TPP upgrades modeled, this constraint was not binding in this study. These results are presented to identify the TPP upgrades that are needed for Projects behind this constraint.

The following figure and table show the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.5: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the East of Miguel Constraint

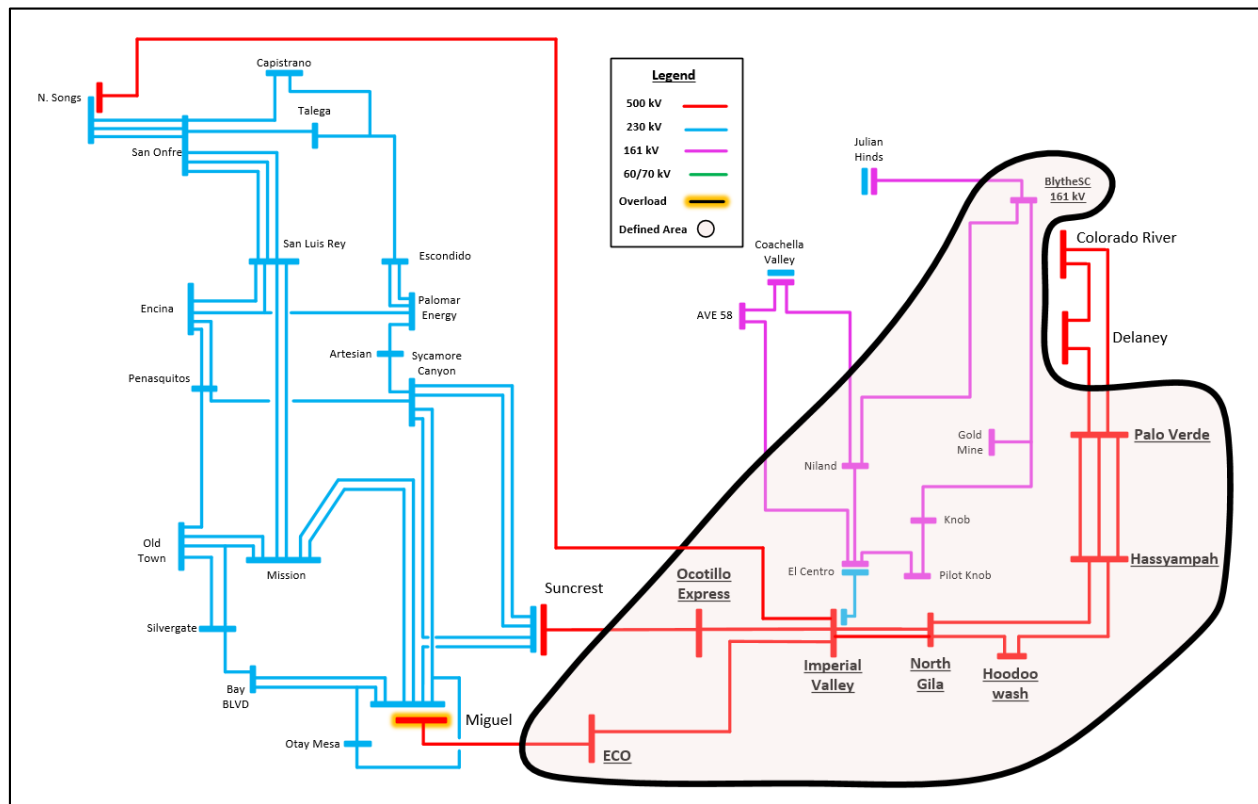


Table 4.13: Generation Projects Contributing to the East of Miguel Deliverability Constraint

Queue	POI
1166	Imperial Valley Substation 230 kV
1171	Hoodoo Wash Switchyard 500 kV
1291	Hassayampa Common Bus 500 kV
1432	Boulevard East Substation 69 kV
1435	Hoodoo Wash Switchyard 500 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV
1534	Hassayampa Common Bus 500 kV
1660	East County Substation 230 kV
1663	Hoodoo Wash Switchyard 500 kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1667	Imperial Valley Substation 230 kV
1812	Hoodoo Wash Switchyard 500 kV
1818	Hassayampa Common Bus 500 kV
1823	Hassayampa Common Bus 500 kV

Queue	POI
1824	East County Substation 500 kV
2023	Cielo Azul Substation 500 kV
2154	Hoodoo Wash Switchyard 500 kV
2161	Hoodoo Wash - North Gila 500 kV
2162	Imperial Valley Substation 230 kV
2166	North Gila - Imperial Valley 500 kV Line
2172	Hoodoo Wash - Hassayampa 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2187	East County Substation 500 kV
W127	Boulevard East Substation 138 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There is sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.14: TPD Allocation for Generation behind the East of Miguel Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	N/A, constraint not binding	
Eligible TPD Candidate		
TPD Allocated		
Remaining TPD available		
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)		
TPD in 2030 (informational)	1507.4	991.4

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Southern area reinforcement project
  - Imperial Valley–North of SONGS 500 kV Line and Substation
  - North of SONGS–Serrano 500 kV line

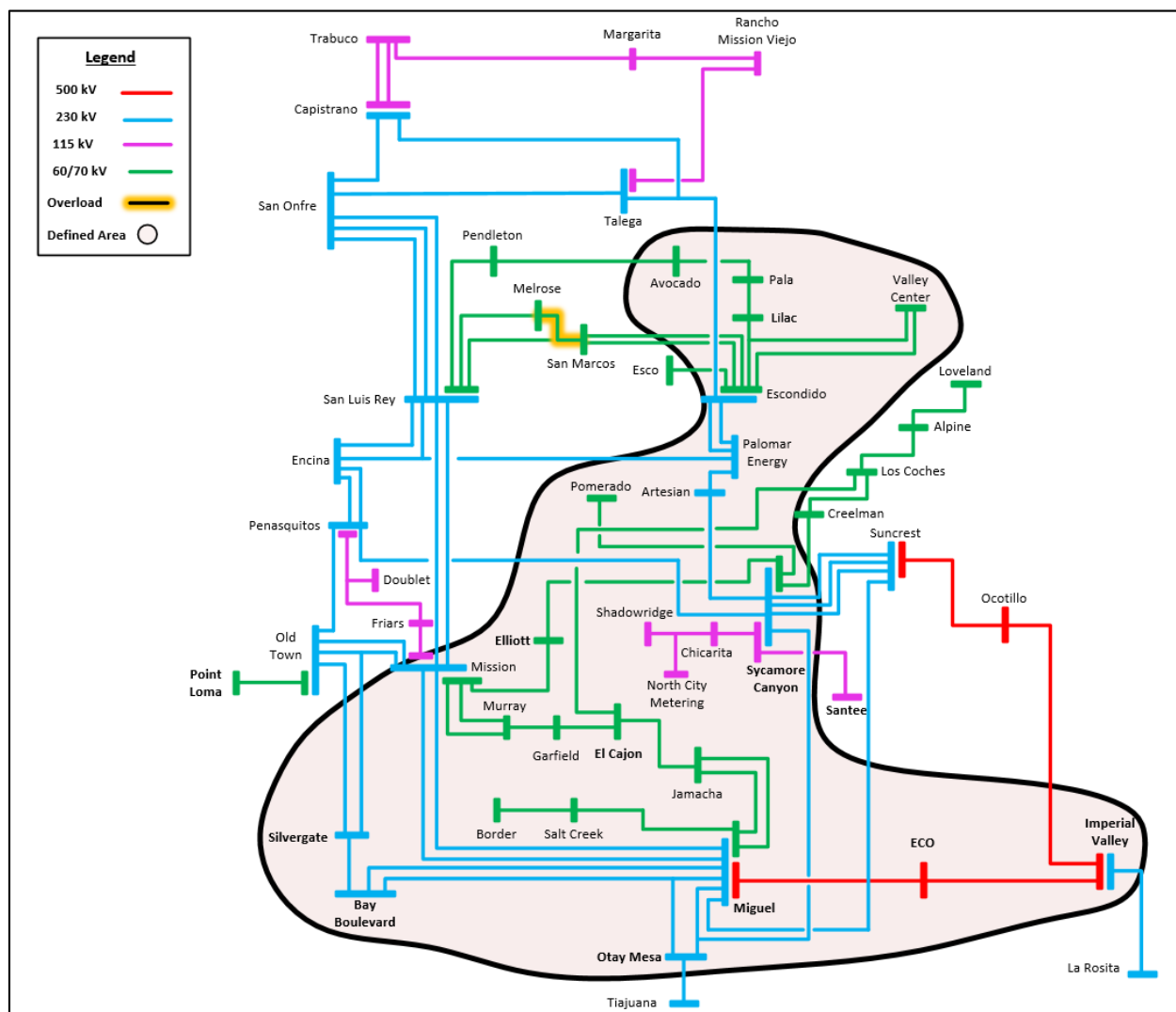
- North Gila–Imperial Valley 500 kV line
  - Upgrade on Hoodoo Wash-North Gila and Hassayampa-North Gila Transmission Lines
- Miguel-Sycamore Canyon (TL23021) 230 kV line Loop-in to Suncrest
  - A 16-mile double circuit 230 kV transmission line that will loop-in the existing TL23021 Miguel – Sycamore Canyon into Suncrest substation; and
  - Install two new 500/230 kV banks at Suncrest and Miguel substations (one at each substation)

#### **4.1.6 Internal San Diego Area (Melrose Tap-San Marcos) Constraint**

This constraint was evaluated after removing TPD candidates that did not receive an allocation for the San Luis Rey-San Onofre constraint. With all approved TPP upgrades modeled, this constraint was not binding in this study. These results are presented to identify the TPP upgrades that are needed for Projects behind this constraint.

The following figure and table show the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.6: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Internal San Diego Area (Melrose Tap-San Marcos) Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.15: Generation Projects Contributing to the Internal San Diego Area (Melrose Tap-San Marcos) Constraint

Queue	POI
1048	Escondido Substation 69 kV
1669	Pomera do Substation 69 kV
1670	Silvergate Substation 230 kV
1673	Sycamore Canyon Substation 138 kV
1821	Escondido Substation 230 kV
1832	Escondido Substation 69 kV
W260	Borrego Springs Substation 69 kV

Queue	POI
W84	Lilac 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There is sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.16: TPD Allocation for Generation behind the Internal San Diego Area (Melrose Tap-San Marcos) Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	N/A, constraint not binding	
Eligible TPD Candidate		
TPD Allocated		
Remaining TPD available		
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)		
TPD in 2030 (informational)	602.0	602.0

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

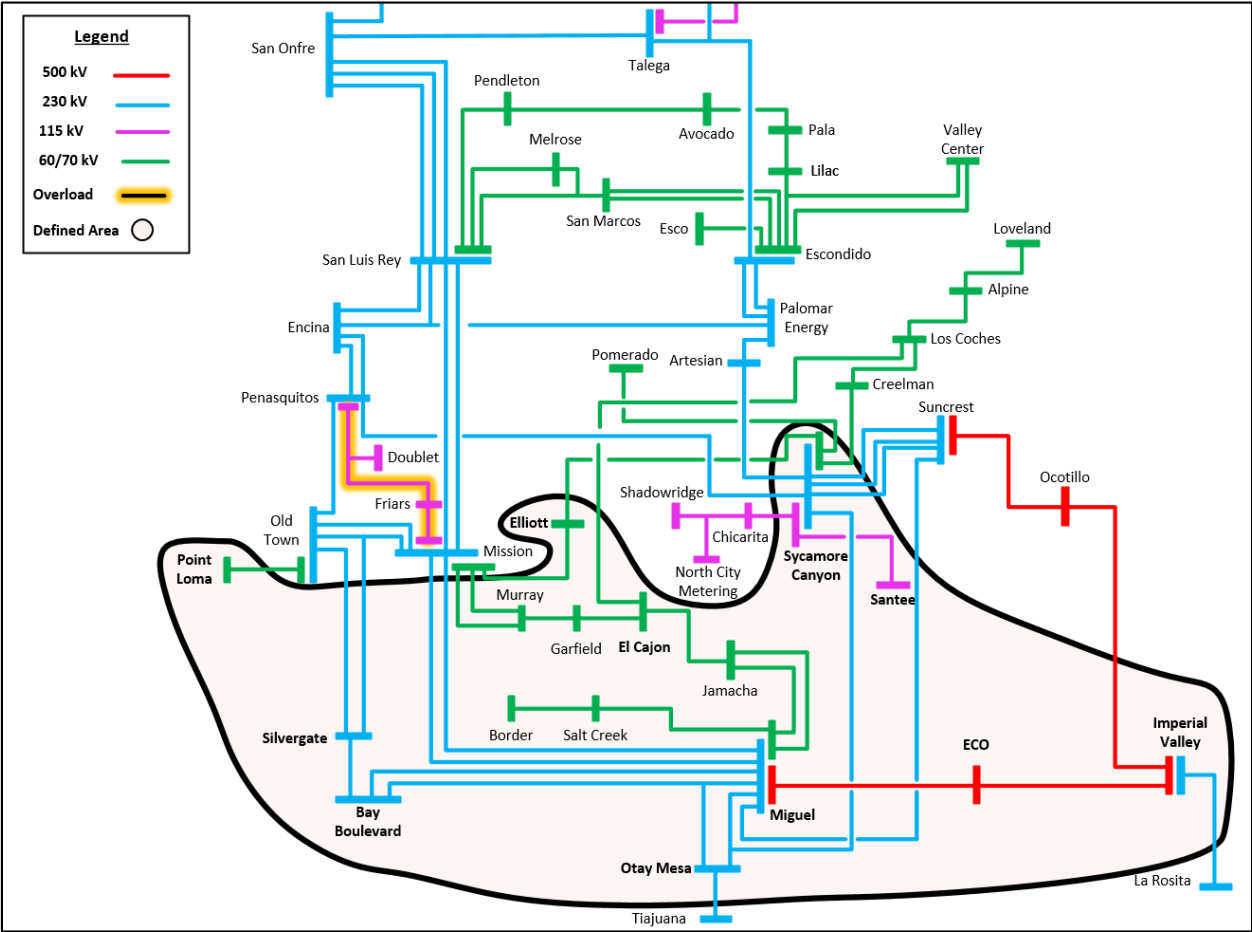
- Reconductor TL680C San Marcos -Melrose Tap

#### 4.1.7 Internal San Diego Area (Doublet Tap-Friars) Constraint

This constraint was evaluated after removing TPD candidates that did not receive an allocation for the San Luis Rey-San Onofre constraint. With all approved TPP upgrades modeled, this constraint was not binding in this study. These results are presented to identify the TPP upgrades that are needed for Projects behind this constraint.

The following figure and table show the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.7: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Internal San Diego Area (Doublet Tap-Friars) Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.17: Generation Projects Contributing to the Internal San Diego Area (Doublet Tap-Friars) Constraint

Queue	POI
1045	Otay Substation 69 kV
1047	El Cajon Substation 69 kV
1166	Imperial Valley Substation 230 kV
1531	Imperial Valley Substation 230 kV
1662	El Cajon Substation 69 kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1670	Silvergate Substation 230 kV
1673	Sycamore Canyon Substation 138 kV
2166	North Gila - Imperial Valley 500 kV Line



Queue	POI
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
Rule 21	Alpine Substation 69 kV
W129	Elliot 69kV
W130	Paradise 69kV
W131	Santee 138kV
W162	Mesa Heights Substation 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There is sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.18: TPD Allocation for Generation behind the Internal San Diego Area (Doublet Tap-Friars) Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	N/A, constraint not binding	
Eligible TPD Candidate		
TPD Allocated		
Remaining TPD available		
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)		
TPD in 2030 (informational)	754.0	754.0

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Rearrange TL23013 PQ-OT and TL6959 PQ-Mira Sorrento

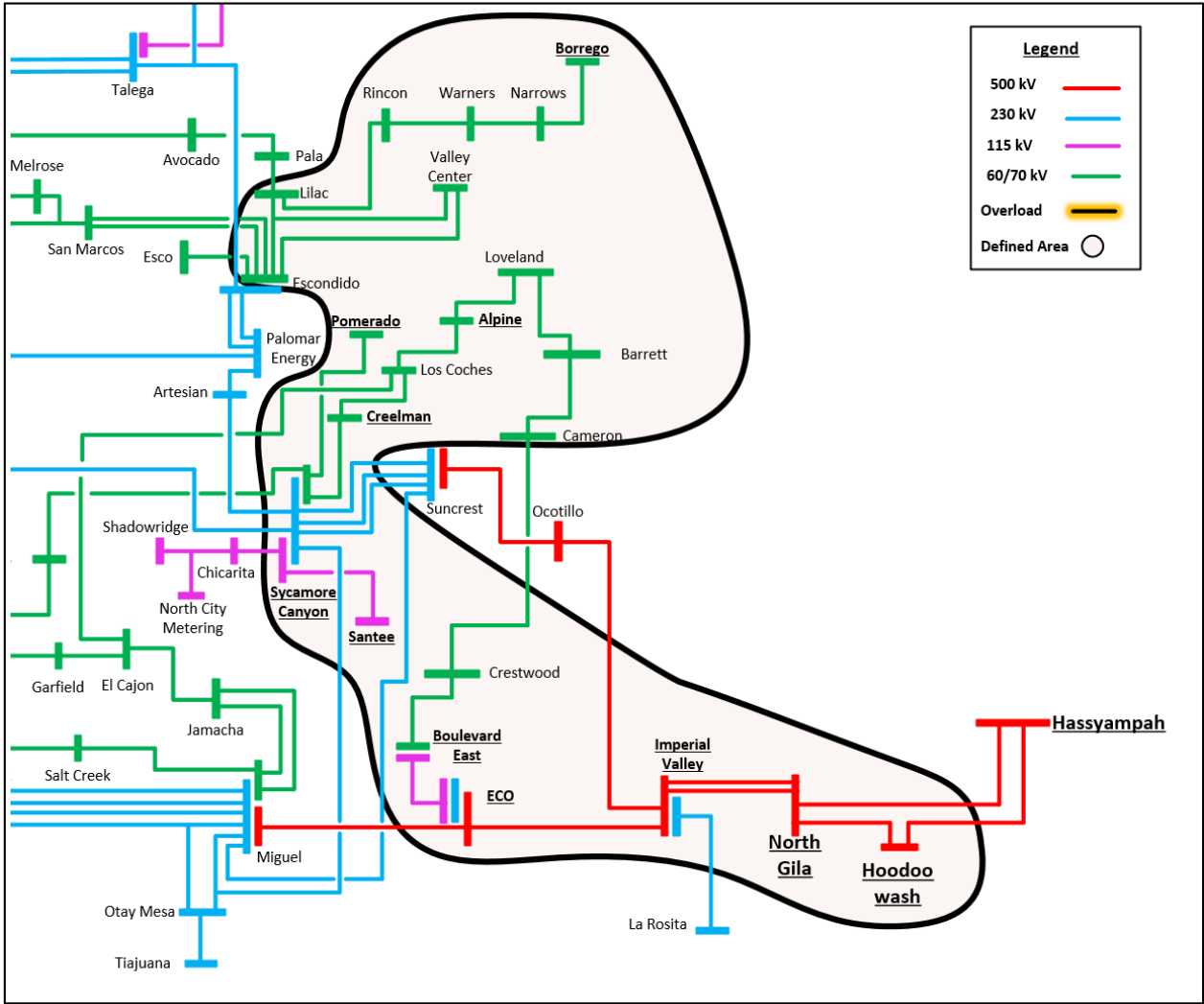
### 4.1.8 Sycamore Area Constraint

This constraint was evaluated after removing TPD candidates that did not receive an allocation for the San Luis Rey-San Onofre constraint. With all approved TPP upgrades modeled, this constraint was not

binding in this study. These results are presented to identify the TPP upgrades that are needed for Projects behind this constraint.

The following figure and table show the approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 4.8: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Sycamore Constraint



The following table shows the generation projects that are behind the constraint.

Table 4.19: Generation Projects Contributing to the Sycamore Constraint

Queue	POI
1166	Imperial Valley Substation 230 kV
1171	Hoodoo Wash Switchyard 500 kV
1432	Boulevard East Substation 69 kV

Queue	POI
1435	Hoodoo Wash Switchyard 500 kV
1531	Imperial Valley Substation 230 kV
1532	Carrizo Gorge Switchyard 138 kV
1660	East County Substation 230 kV
1664	Imperial Valley Substation 230 kV
1665	Imperial Valley Substation 230 kV
1667	Imperial Valley Substation 230 kV
1669	Pomera do Substation 69 kV
1673	Sycamore Canyon Substation 138 kV
1812	Hoodoo Wash Switchyard 500 kV
1824	East County Substation 500 kV
2154	Hoodoo Wash Switchyard 500 kV
2161	Hoodoo Wash - North Gila 500 kV
2162	Imperial Valley Substation 230 kV
2166	North Gila - Imperial Valley 500 kV Line
2172	Hoodoo Wash - Hassayampa 500 kV Line
2173	Boulevard East Substation 138 kV
2176	Imperial Valley Substation 230 kV
2181	Carrizo Gorge Switchyard 138 kV
2187	East County Substation 500 kV
Rule 21	Alpine Substation 69 kV
W127	Boulevard East Substation 138 kV
W131	Santee 138 kV
W260	Borrego Springs Substation 69 kV
W83	Creel man Substation 69 kV

TPD was allocated to the TPD candidates after first preserving for the non-operational prior commitment as described in section 2.1. There is sufficient TPD for all eligible candidates. The results are shown in the following table.

Table 4.20: TPD Allocation for Generation behind the Sycamore Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment	N/A, constraint not binding	
Eligible TPD Candidate		
TPD Allocated		
Remaining TPD available		
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)		
TPD in 2030 (informational)	1619.4	1389.4

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- 3 Ohm Series Reactor on Sycamore-Penasquitos 230 kV line
- Upgrade TL13820 Sycamore-Chicarita 138 kV
- 30 min emergency rating for Sycamore-Scripps 69 kV line

#### 4.1.9 SDGE Area Constraint Summary

The following table provides a summary showing all of the Deliverability Constraints described above and which non-operational generation projects are impacted by those constraints.

Table 4.21: SDGE Area Deliverability Constraint Mapping

Queue	San Luis Rey-San Onofre Constraint	Encina-San Luis Rey Constraint	Silvergate-Old Town Constraint	Silvergate-Bay Boulevard Constraint	East of Miguel Constraint	Internal (Melrose-San Marcos) Constraint	Internal (Friars-Doublet-Mission) Constraint	Sycamore Constraint	Lugo-Victorville Constraint
1045	x	x	x	x			x		
1047	x	x					x		
1048	x	x				x			
1166	x	x	x	x	x		x	x	
1171	x	x		x	x			x	x
1175	x	x	x	x	x				
1291					x				x
1432	x	x	x	x	x			x	
1435	x	x			x			x	
1531	x	x	x	x	x		x	x	
1532	x	x	x	x	x			x	
1534					x				x
1660	x	x	x	x	x			x	
1662	x	x					x		
1663	x	x			x				
1664	x	x	x	x	x		x	x	
1665	x	x		x	x		x	x	
1667	x	x		x	x			x	
1669	x	x				x		x	
1670	x	x	x			x	x		
1671	x	x							
1673	x	x				x	x	x	
1810	x	x	x	x					
1812	x	x		x	x			x	x
1814	x	x							
1818					x				x
1820	x	x							
1821	x	x				x			
1823					x				x
1824	x	x	x	x	x			x	
1832	x	x				x			
2023					x				
2153	x	x	x						
2154	x	x			x			x	

Queue	San Luis Rey-San Onofre Constraint	Encina-San Luis Rey Constraint	Silvergate-Old Town Constraint	Silvergate-Bay Boulevard Constraint	East of Miguel Constraint	Internal (Melrose-San Marcos) Constraint	Internal (Friars-Doulet-Mission) Constraint	Sycamore Constraint	Lugo-Victorville Constraint
2157	x	x							
2161	x	x		x	x			x	x
2162	x	x	x	x	x			x	
2165	x								
2166	x	x	x	x	x		x	x	
2167	x	x							
2172	x	x			x			x	x
2173	x	x	x	x	x		x	x	
2176	x	x	x	x	x		x	x	
2177	x	x		x					
2178	x	x		x					
2180	x	x	x	x					
2181	x	x	x	x	x			x	
2182	x	x							
2184	x	x	x	x					
2185	x	x	x	x					
2186	x								
2187	x	x	x	x	x			x	
2188	x	x	x	x					
2192	x	x	x	x					
Rule 21	x	x	x				x	x	
W122	x								
W123	x								
W127	x	x	x	x	x			x	
W128	x	x							
W129	x	x					x		
W130	x	x	x	x			x		
W131	x	x					x	x	
W162	x	x					x		
W164	x								
W165	x								
W166	x	x							
W183	x	x							
W184	x	x							
W186	x	x							
W187	x	x							

Queue	San Luis Rey-San Onofre Constraint	Encina-San Luis Rey Constraint	Silvergate-Old Town Constraint	Silvergate-Bay Boulevard Constraint	East of Miguel Constraint	Internal (Melrose-San Marcos) Constraint	Internal (Friars-Doulet-Mission) Constraint	Sycamore Constraint	Lugo-Victorville Constraint
W188	x	x							
W227	x	x							
W260	x	x				x		x	
W82	x								
W83	x	x						x	
W84	x	x				x			
W87	x								
W88	x								

## 5. TPD Allocation Results – PGE Area

### 5.1 North of Greater Bay Interconnection Area Constraints

#### 5.1.1 Delevan 500 kV Area Constraint

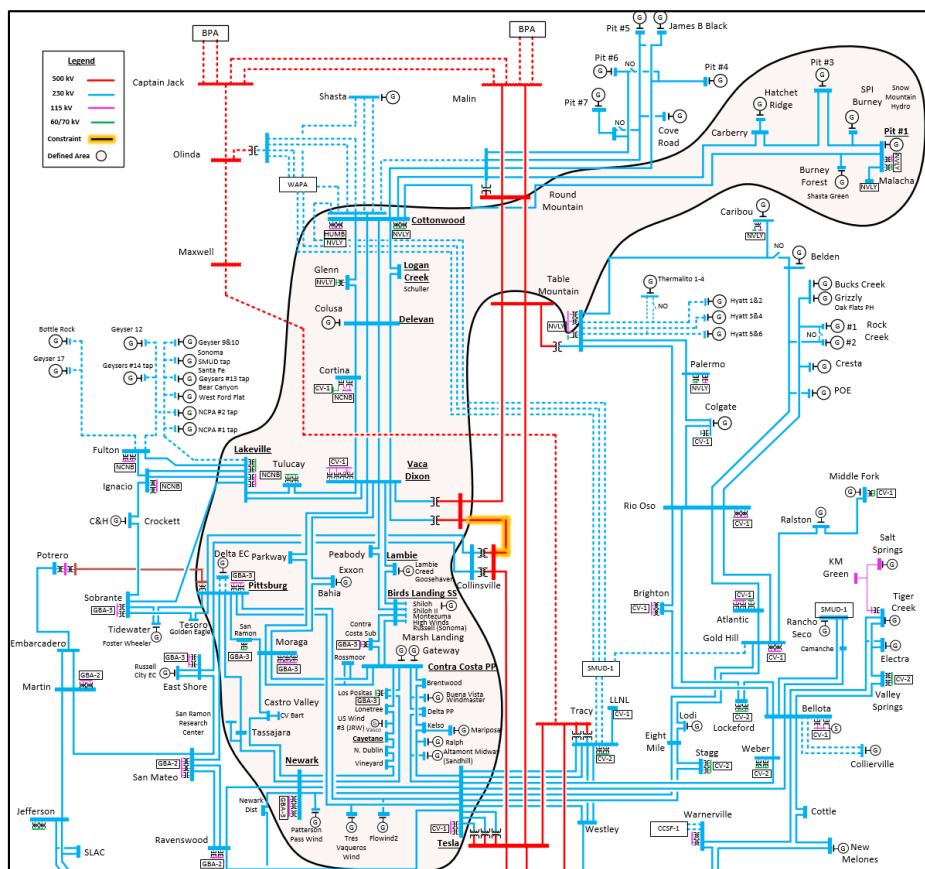
The deliverability assessment identified the following overloads:

Table 5.1: Delevan 500 kV Area

Overloaded Facility	Contingency	Overload
Collinsville-Vaca Dixon 500 kV	Base Case	138.32%
Chicago Parks-Higgins 115kV	Atlantic-Gold Hill 230 kV Line & Rio Oso-Gold Hill 230 kV Line	108%
Collinsville-Tesla 500 kV	Base Case	103.83%

This constraint limits deliverability of generators in the Greater Bay Area, North of Greater Bay Area and PG&E South 500 kV. The following figure illustrates approximate electrical boundary of the 10% Dfax circle for 500 kV constraints, and 5% DFAX circle for other lower kV constraints.

Figure 5.1: Approximate electrical boundary of the projects within the 10% Dfax circle for 500 kV, and 5% DFAX circle for other lower kV, that contribute to the Delevan-500 kV Constraint





There are 1290 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 2089 MW was available to be allocated in the area.

The results are shown in the following table.

Table 5.2 TPD allocation for generation behind the Delevan 500 kV area constraint<sup>1</sup>

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	1895	1290
Eligible TPD Candidate (MW)	6740	6736
TPD Allocated (MW)	2089	2089
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	3984	3379
TPD in 2030 (informational)	3984	3379

Table 5.3: Generation Projects Contributing to the Delevan 500 kV Constraint

<b>Queue</b>	<b>POI</b>
1106	Pit 1-Cottonwood 230kV Line
1111	Pittsburg PP 230 kV
1270	Vaca-Dixon Sub
1349	Cayetano Substation 230kV
1444	Cortina 115 kV
1455	Cortina 60kV Substation
1463	Birds Landing 230 kV
1496	Delevan 230kV Substation
1552	Martin Substation 115kV
1565	Tuluca Substation 60kV
1695	Atlantic Substation 60kV
1838	Lakeville 115 kV
1840	Vaca-Lakeville #1 230 kV Line
1842	Lambie 230 kV
1843	Lambie 230 kV
1844	Logan Creek-Delevan 230 kV Line
1845	Lakeville 60 kV
1847	Vaca-Dixon 500 kV
1850	Birds Landing 230 kV
1852	Table Mountain 115 kV

<sup>1</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

1853	Table Mountain 115 kV
1854	Vaca-Dixon 230 kV
1856	Vaca-Dixon 115 kV
1857	Fulton 115 kV
1859	Geysers #3-Cloverdale 115 kV Line
1872	Pittsburg 115 kV
1874	Pittsburg 230 kV
1875	Pittsburg-Tesla #1 230 kV Line
1877	Grant-Eastshore #1 115 kV Line
1880	Oakland C 115 kV
1892	Contra Costa PP 230 kV
1900	Martin 115 kV
1905	Millbrae 60 kV
1911	Newark 230 kV
1913	Dumbarton-Newark 115 kV Line
1914	Pittsburg 230 kV
1915	Contra Costa PP 230 kV
1919	Cooley Landing 60 kV
1700	Lakeville Substation 60kV
WDT2762	Tuluca 60 kV

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.2 Greater Bay Interconnection Area Constraints

### 5.2.1 Collinsville Area Constraint

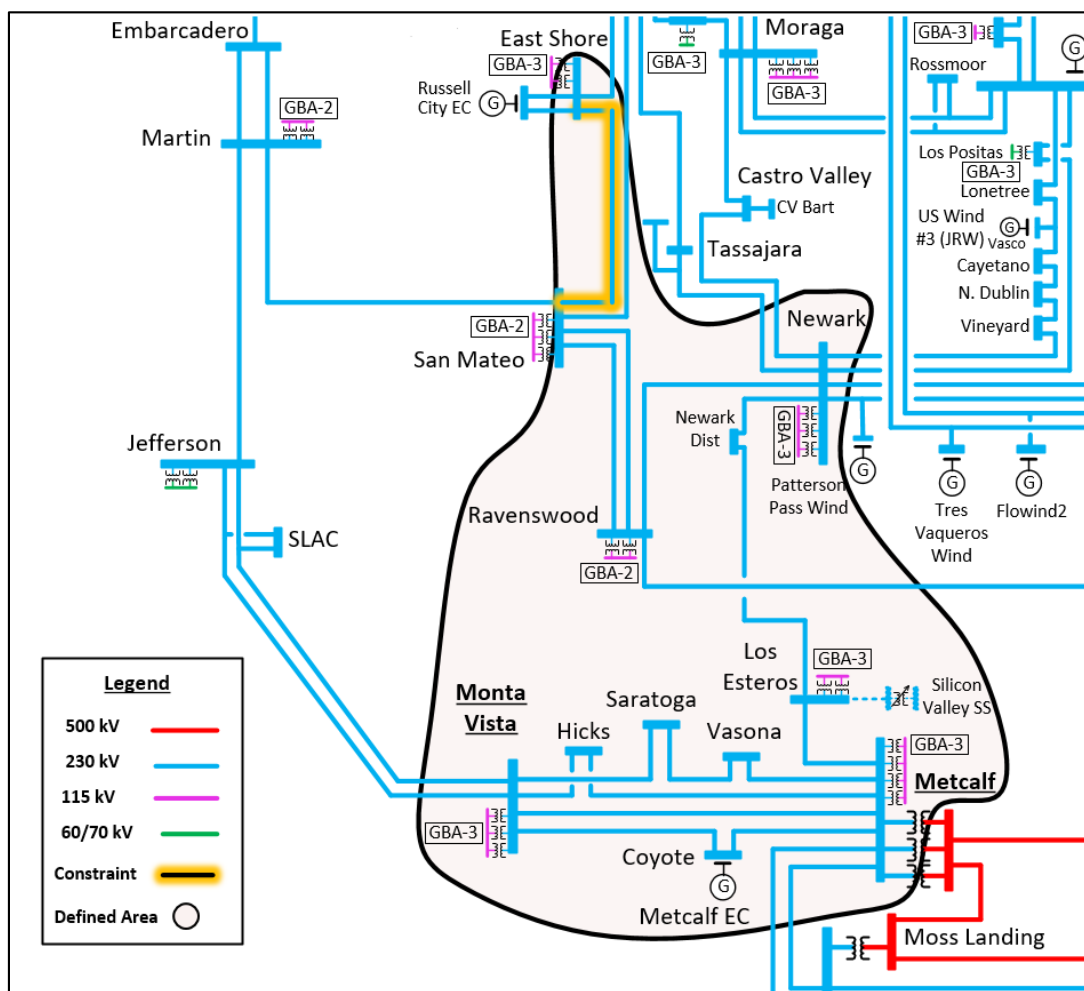
The deliverability assessment identified the following overloads:

Table 5.4: Collinsville 230 kV Area

Overloaded Facility	Contingency	Overload
East Shore-San Mateo 230 kV Line	Newark-Ravenswood 230 kV and Tesla-Ravenswood 230 kV lines	114.75%
Monta Vista-Mountain View 115 kV Line	WHISMAN-MONTA VISTA 115kV	107.72%

This constraint limits deliverability of generators in the Greater Bay Area and North of Greater Bay Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.2: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Collinsville Constraint



There are 350 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 344 MW of TPD were allocated in the area. The results are shown in the following table.

Table 5.5 TPD allocation for generation behind Collinsville area constraint<sup>2</sup>

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment (MW)	350	350
Eligible TPD Candidate (MW)	500	500
TPD Allocated (MW)	344	344
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	694	694
TPD in 2030 (informational)	694	694

Table 5.6: Generation Projects Contributing to the Collinsville area Constraint

Queue	POI
1553	Metcalf Substation 230kV
1877	Grant-Eastshore #1 115 kV Line
1880	Oakland C 115 kV
1894	Monta Vista 230 kV
1913	Dumbarton-Newark 115 kV Line

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.2.2 Bay Area Constraint

The deliverability assessment identified the following overload:

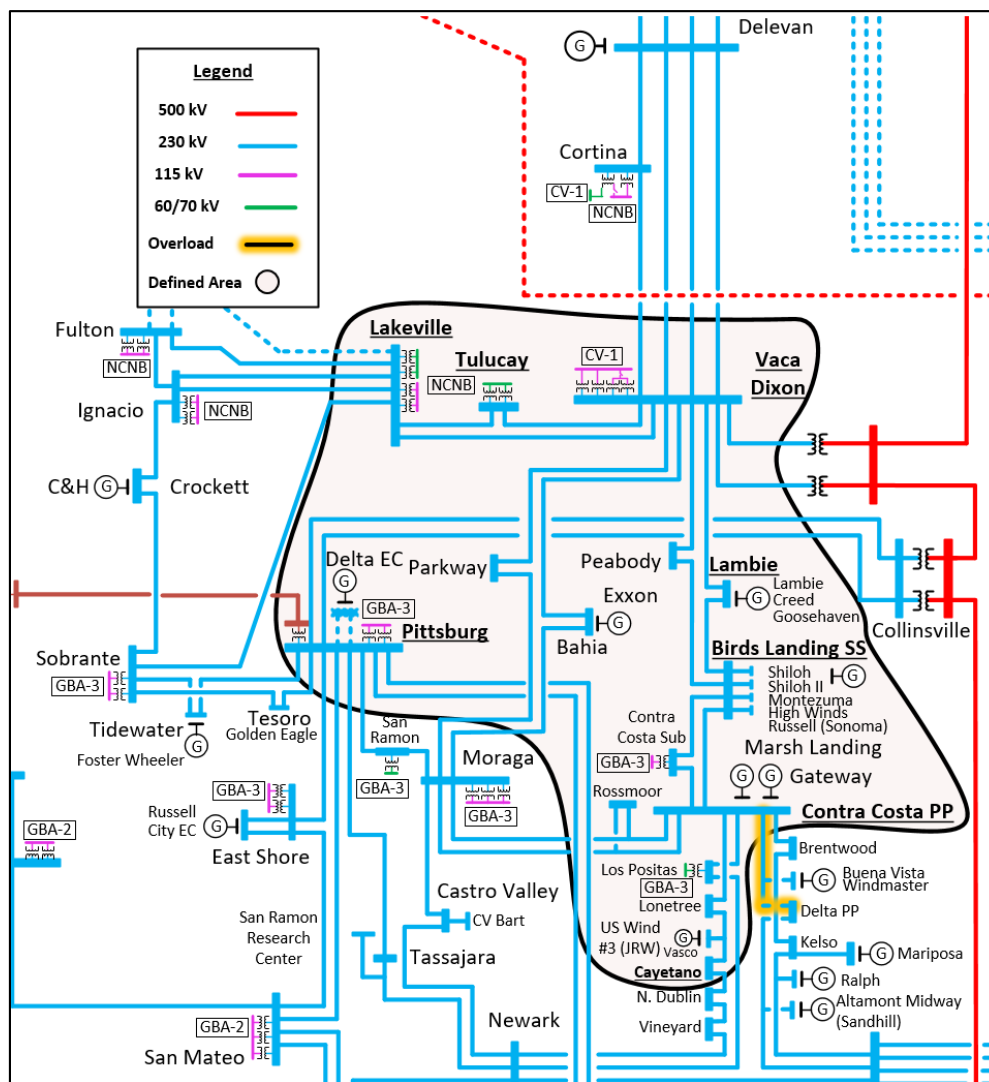
Table 5.7: Bay Area constraint

Overloaded Facility	Contingency	Overload
Contra Costa-Delta Pump (Windmaster-Delta Pump) 230 kV line	COLLINSVILLE-TESLA 500kV	127.77%

<sup>2</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

This constraint limits deliverability of generators in the Greater Bay Area and North of Greater Bay Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.3: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Bay Area Constraint



There are 493 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 53 MW of TPD was available to be allocated in the area.

The results are shown in the following table.

Table 5.8 TPD allocation for generation behind Bay Area constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	515	493
Eligible TPD Candidate (MW)	3833	3828
TPD Allocated (MW)	53	53
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	568	546
TPD in 2030 (informational)	568	546

Table 5.9: Generation Projects Contributing to the Bay Area Constraint

<b>Queue</b>	<b>POI</b>
1270	Vaca-Dixon Sub
1349	Cayetano Substation 230kV
1463	Birds Landing 230 kV
1565	Tulucay Substation 60kV
1838	Lakeville 115 kV
1840	Vaca-Lakeville #1 230 kV Line
1842	Lambie 230 kV
1843	Lambie 230 kV
1845	Lakeville 60 kV
1850	Birds Landing 230 kV
1854	Vaca-Dixon 230 kV
1856	Vaca-Dixon 115 kV
1857	Fulton 115 kV
1859	Geysers #3-Cloverdale 115 kV Line
1874	Pittsburg 230 kV
1880	Oakland C 115 kV
1892	Contra Costa PP 230 kV
1915	Contra Costa PP 230 kV
1700	Lakeville Substation 60kV
WDT2762	Tulucay 60 kV

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.2.3 Nikola Area Constraint

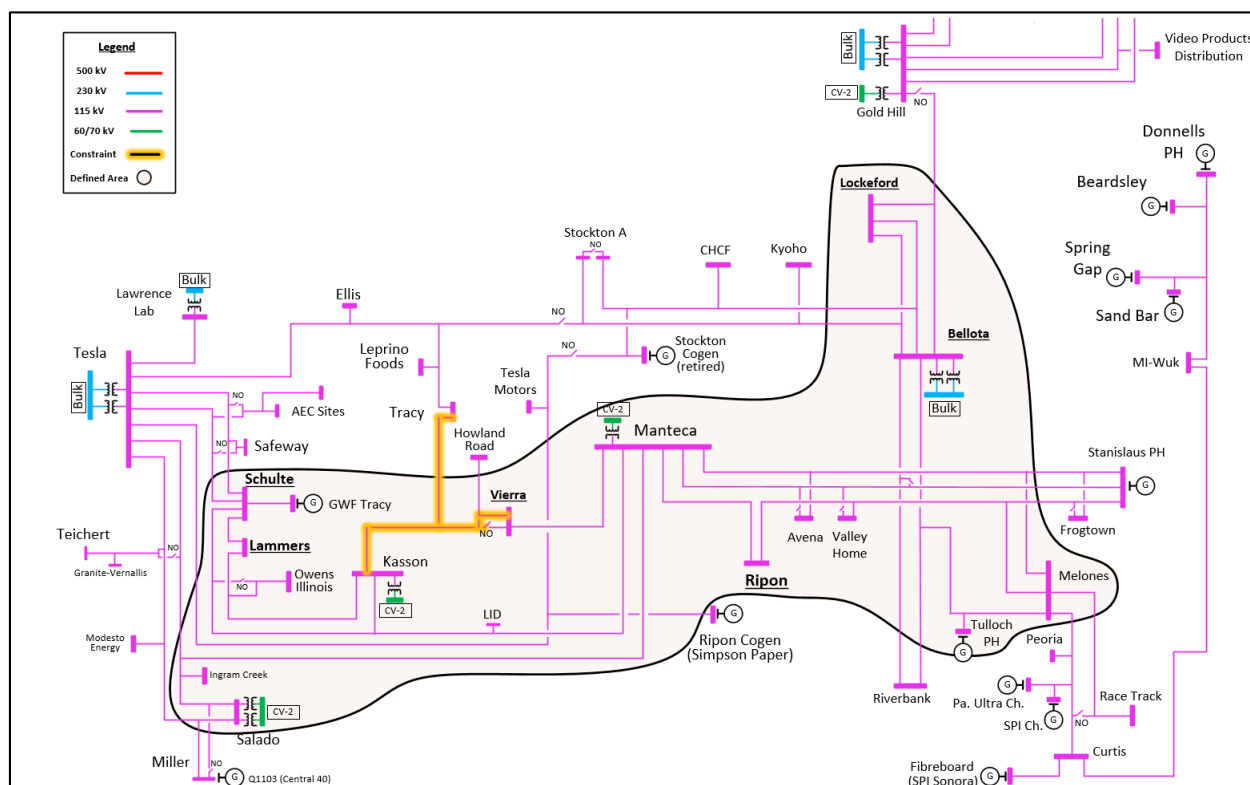
The deliverability assessment identified the following overloads:

Table 5.10: Nikola Area Constraint

Overloaded Facility	Contingency	Overload
Vierra-Tracy-Kasson 115 kV Line (Kasson Jct 2-HJ Heinz)	TESLA-SCHULTE SW STA #2 115KV [3970] & TESLA-SCHULTE SW STA #1 115KV	330.30%

This constraint limits deliverability of generators in the Greater Bay Area, North of Greater Bay Area and Fresno. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.4: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Nikola Area Constraint



There are 207 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 91 MW of TPD were allocated in the area.

The results are shown in the following table.

Table 5.11 TPD allocation for generation behind the Nikola Area constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	212	207
Eligible TPD Candidate (MW)	1108	1108
TPD Allocated (MW)	91	91
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	302	298
TPD in 2030 (informational)	302	298

Table 5.12: Generation Projects Contributing to the Nikola Area Constraint

<b>Queue</b>	<b>POI</b>
1350	Crow Creek Switching Station 60kV
1557	Ripon Substation 115kV
1690	Vierra 115 kV
1690	Vierra Substation 115kV
1867	Schulte 115 kV
1904	Bellota 115 kV
1920	Schulte 115 kV
1929	Lammers 115 kV
WDT0694	Lockeford 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.2.4 Vaca-Contra-Costa Area Constraint

The deliverability assessment identified the following overloads:

Table 5.13: Vaca-Contra Costa 230 kV Area

<b>Overloaded Facility</b>	<b>Contingency</b>	<b>Overload</b>
Lambie-Vaca Dixon 230 kV Line	Birds Landing-CC Sub 230kV Line & Birds Landing-Contra Costa PP 230kV Line	149.18%
Birds Landing-Contra Costa PP 230 kV Line	BIRDS LANDING SW STA-CONTRA COSTA SUB 230kV	115.95%



Figure 5.5: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Vaca-Contra Costa 230 kV Constraint

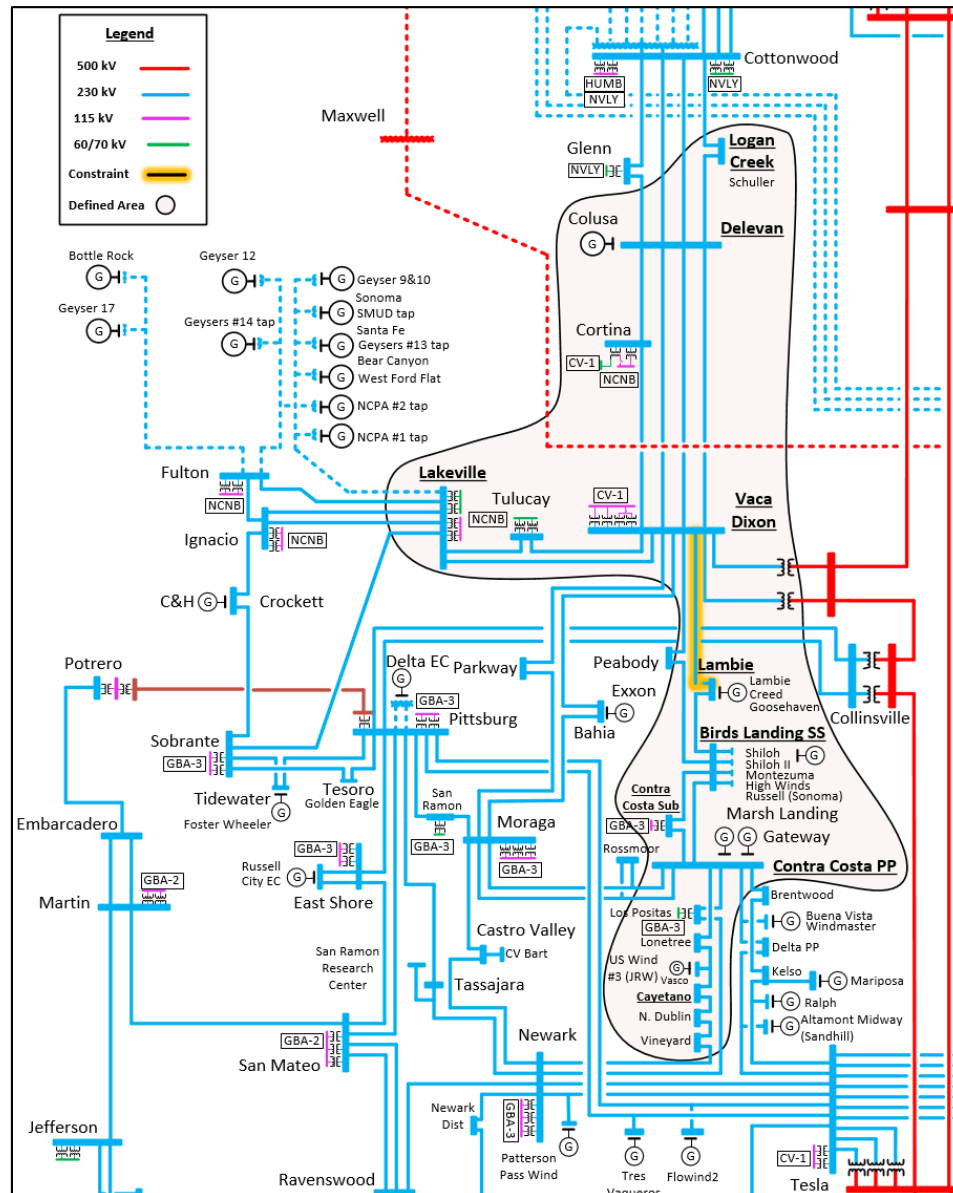


Table 5.14 TPD allocation for generation behind the Vaca-Contra Costa 230 kV area constraint<sup>3</sup>

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	1145	603
Eligible TPD Candidate (MW)	2658	2653
TPD Allocated (MW)	53	53
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1198	656
TPD in 2030 (informational)	1198	656

Table 5.15: Generation Projects Contributing to the Vaca-Contra Costa 230 kV area Constraint

<b>Queue</b>	<b>POI</b>
1270	Vaca-Dixon Sub
1349	Cayetano Substation 230kV
1444	Cortina 115 kV
1455	Cortina 60kV Substation
1463	Birds Landing 230 kV
1496	Delevan 230kV Substation
1565	Tuluca Substation 60kV
1838	Lakeville 115 kV
1840	Vaca-Lakeville #1 230 kV Line
1842	Lambie 230 kV
1843	Lambie 230 kV
1844	Logan Creek-Delevan 230 kV Line
1845	Lakeville 60 kV
1850	Birds Landing 230 kV
1854	Vaca-Dixon 230 kV
1856	Vaca-Dixon 115 kV
1857	Fulton 115 kV
1859	Geysers #3-Cloverdale 115 kV Line
1892	Contra Costa PP 230 kV
1915	Contra Costa PP 230 kV
1700	Lakeville Substation 60kV
WDT2762	Tuluca 60 kV

<sup>3</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.3 Fresno Interconnection Area Constraints

### 5.3.1 Gates 500/230 kV Transformer Area Constraint

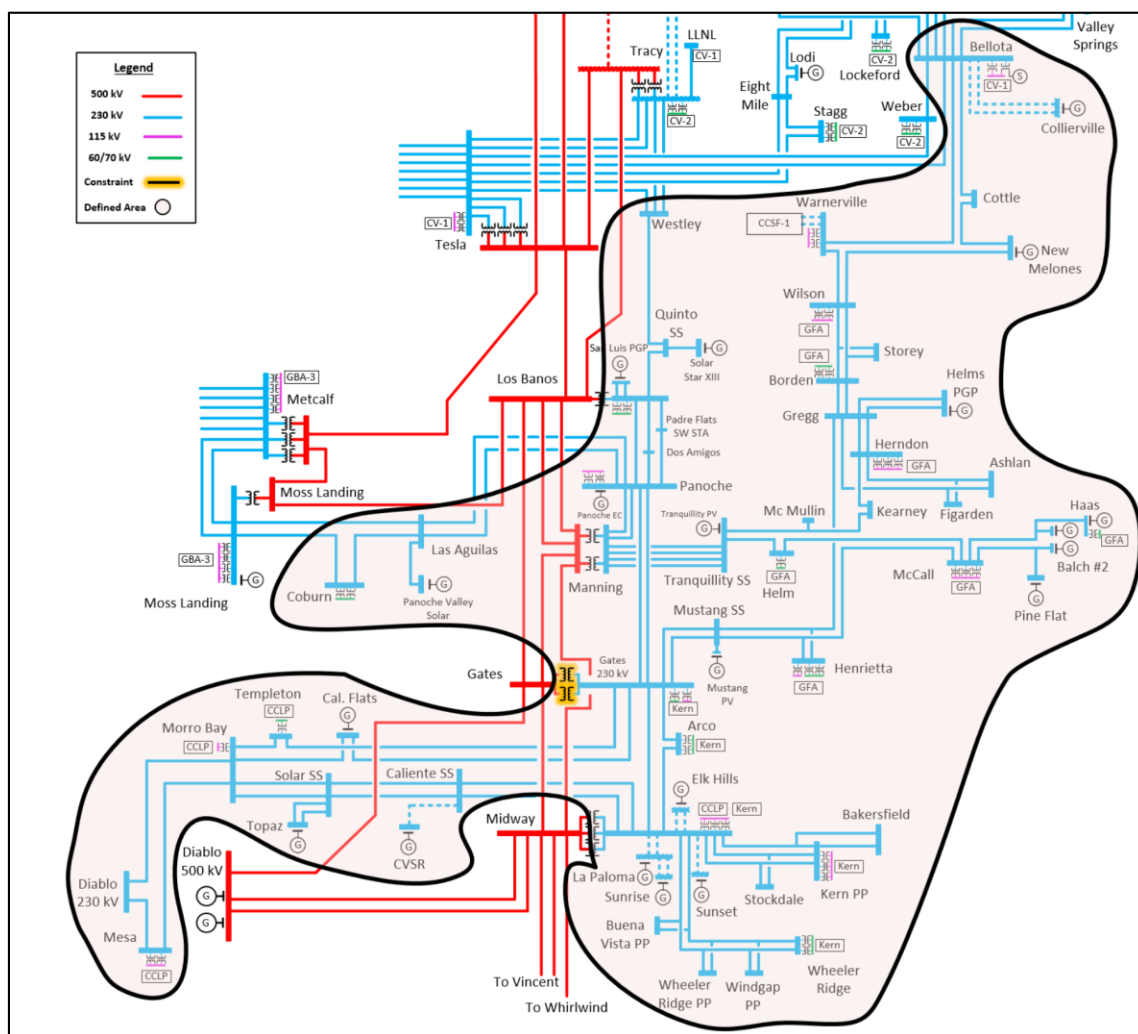
The deliverability assessment identified the following overload:

Table 5.16: Gates 500/230 kV Transformer Area

Overloaded Facility	Contingency	Overload
Gates 500/230 kV Transformer #11/#12	GATES 500/230 kV Transformer #11/#12 with QC8RAS-08	127.72%

This constraint limits deliverability of generators in the Fresno Area and Kern Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.6: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Gates 500/230 kV Transformer Constraint



There are 3587 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 1670 MW of TPD was allocated.

Table 5.17 TPD allocation for generation behind Gates Bank area constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	4230	3587
Eligible TPD Candidate (MW)	6312	6170
TPD Allocated (MW)	1670	1670
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	5900	5257
TPD in 2030 (informational)	5900	5257

Table 5.18: Generation Projects Contributing to the Gates Bank area Constraint

<b>Queue</b>	<b>POI</b>
946	Midway-Wheeler Ridge #2 230 kV Line
954	Gates Substation 230 kV
1120	Gates 230kV substation
1129	Tranquility Switching Station 230kV
1135	Tranquility 230 kV
1139	Gates 230kV substation
1143	Corcoran-Olive Switching Station 115kV Line
1223	Mustang 230 kV
1243	Gates Substation 230kV
1260	Midway-Wheeler Ridge #2 230 kV Line
1378	Los Banos Substation 70 kV
1389	Gates Substation 230kV
1391	Tranquility 230 kV
1397	Wheeler Ridge Substation 70kV
1398	Wheeler Ridge Substation 230kV
1443	Olive Switching Station 115kV
1470	Mesa Substation 230kV
1484	Panoche Substation 230kV
1493	Arco Substation 70kV
1495	Arco 230kV Substation
1499	Lakeview Substation 70kV
1593	Gates-Midway 230 kV
1709	Crescent Switching Station 70 kV

1713	GWF Switching Station 115 kV
1728	Mercy Springs Switching Station 70 kV
1736	Arco Substation 230 kV
1739	Morro Bay 230 kV
1740	Arco Substation 230 kV
1751	Midway Substation 115 kV
1831	PG&E Morro Bay 230kV
1895	Cottle 230 kV
1930	Sanger 115 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1935	Tranquility 230 kV
1940	Mendota 115 kV
1953	Gregg 230 kV
1954	Gates 230 kV
1955	Excelsior 115 kV
1956	Tranquility 230 kV
1959	Gates-Templeton 230 kV Line
1963	Wilson 230 kV
1966	Giffen 70 kV
1969	Corcoran 70 kV
1970	Le Grand 115 kV
1973	Tranquility 230kV
1975	Crescent 70 kV
1977	Chowchilla 115 kV
1980	Arco 230 kV
1980	Arco 230 kV
1992	Arco 230 kV
1994	Lamont 115 kV
1995	Kern PP 230 kV
2001	Kern PP 230 kV
2004	Gates-Midway 230 kV Line
2006	7th Standard 115 kV
2010	Midway 115 kV
2012	Morro Bay 230 kV
2015	Wheeler Ridge 230 kV
2017	Olive 115 kV
WDT1320	Manville 115 kV Tap Line
WDT1620	Elk Hills 70 kV Bus
WDT1642	Cayuma 70 kV Bus
WDT2040	Taft 115 kV Bus
WDT2041	Cuyama Sub

WDT2105	Taft 115 kV Bus
WDT2131	Tevis 115 kV Bus
WDT2132	Merced 115 kV Bus
WDT2142	Ortiga Sub
WDT2174	Taft 115 kV Bus
WDT2175	Taft 115 kV Bus
WDT2226	Panoche Sub
WDT2764	Fairway 115 kV

For projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the projects:

- New Manning 500/230 kV Substation project

### 5.3.2 Gregg 500 kV Area Constraint

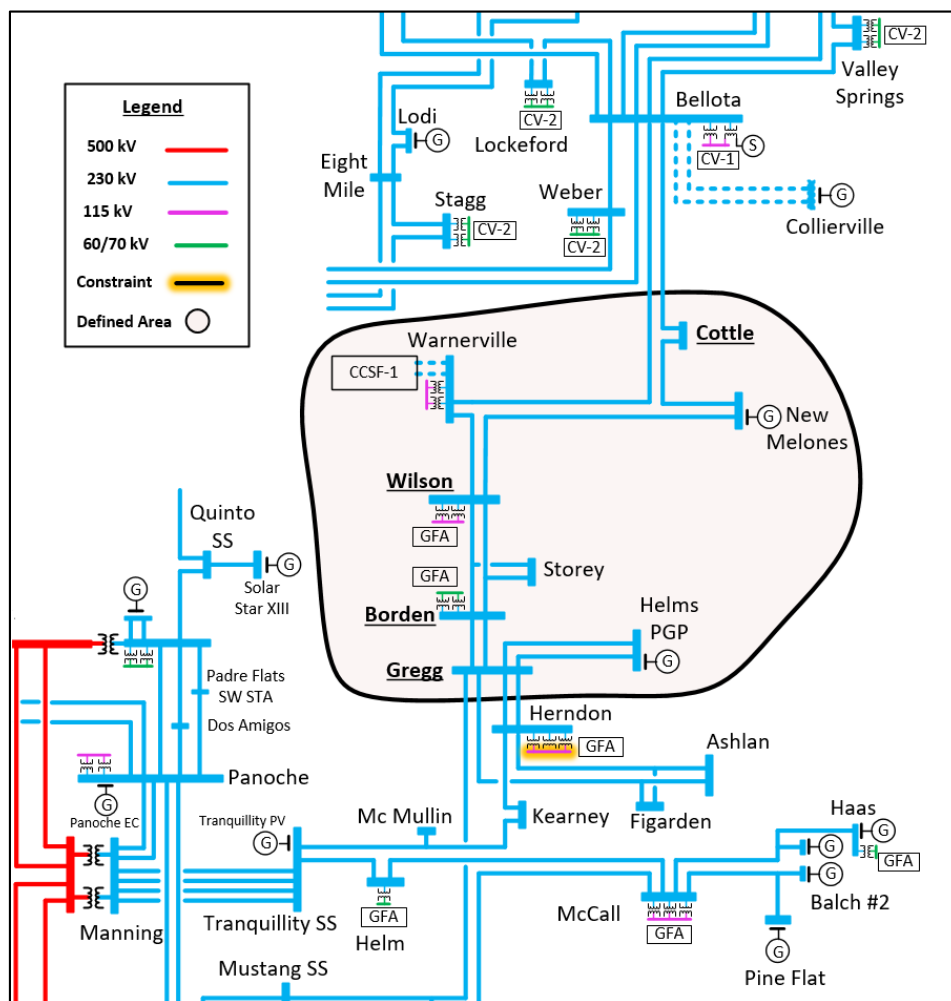
The deliverability assessment identified the following overloads:

Table 5.19: Gregg 500 kV Area

Overloaded Facility	Contingency	Overload
Herndon-Woodward 115 kV Line (Herndon-Childrens Hospital)	HERNDON-BARTON 115KV [1750] & HERNDON-MANCHESTER 115KV	140.11%
Herndon-Barton 115 kV Line	HERNDON-MANCHESTER 115kV	114.99%

This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.7: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Gregg 500 kV Constraint



There are 20 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 128 MW of TPD was allocated in the area.

The results are shown in the following table.



Table 5.20 TPD Allocation for Generation behind the Gregg 500 kV Constraint<sup>4</sup>

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	20	20
Eligible TPD Candidate (MW)	1000	1000
TPD Allocated (MW)	128	128
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	148	148
TPD in 2030 (informational)	148	148

Table 5.21: Generation Projects Contributing to the Gregg 500 kV Constraint

<b>Queue</b>	<b>POI</b>
1895	Cottle 230 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1953	Gregg 230 kV
1963	Wilson 230 kV
1970	Le Grand 115 kV
1977	Chowchilla 115 kV
WDT2132	Merced 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

<sup>4</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

### 5.3.3 Le Grand 230 KV Area Constraint

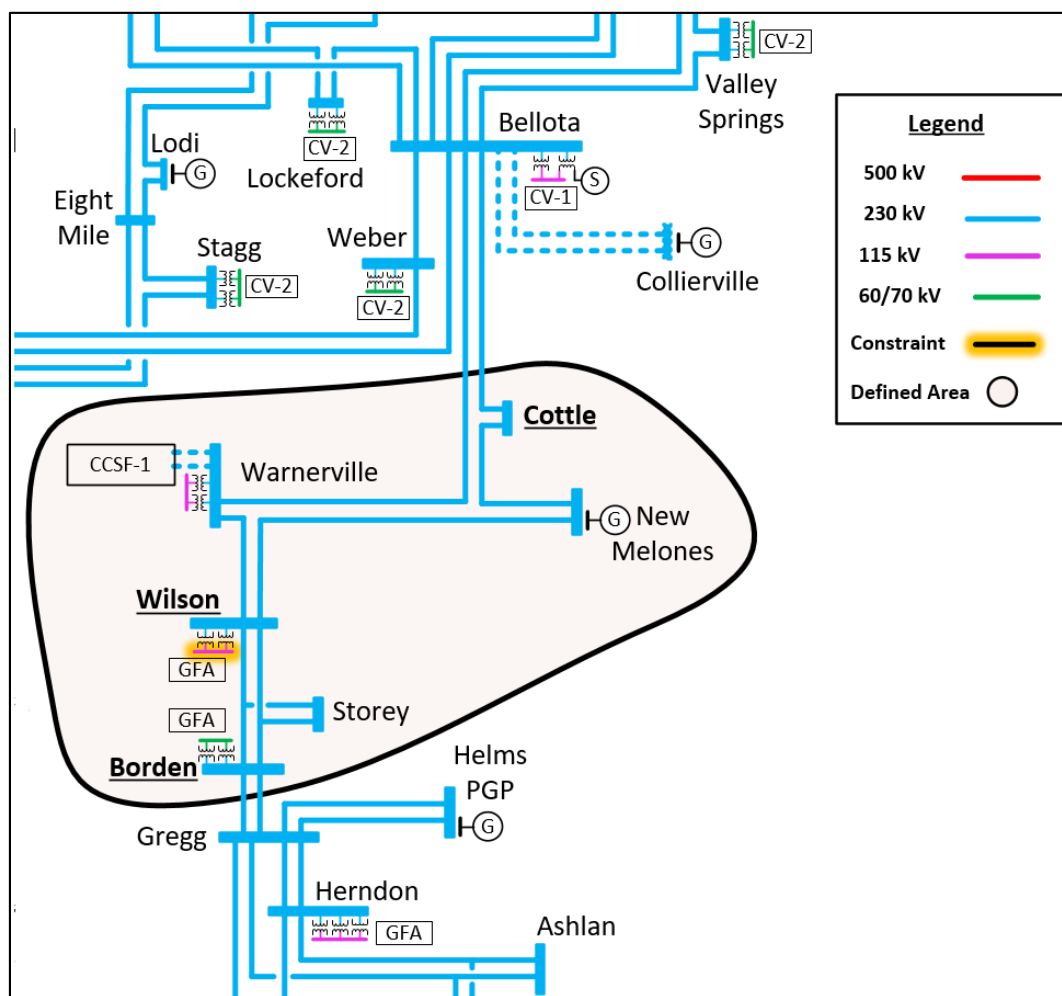
The deliverability assessment identified the following overload:

Table 5.22: Le Grand 230 kV Area

Overloaded Facility	Contingency	Overload
Chowchilla-Kerckhoff 115 kV Line (Certaineed Jct 1-Sharon Tap)	BORDEN-GREGG 230KV #1 & #2	158.12%

This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.8: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Le Grand 230 kV Constraint



There are 20 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 203 MW of TPD was allocated in the area.

The results are shown in the following table.

Table 5.23 TPD Allocation for Generation behind the Le Grand 230 kV Constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	20	20
Eligible TPD Candidate (MW)	1205	1153
TPD Allocated (MW)	203	203
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	223	223
TPD in 2030 (informational)	223	223

Table 5.24: Generation Projects Contributing to the Le Grand 230 kV Constraint

<b>Queue</b>	<b>POI</b>
1895	Cottle 230 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1940	Mendota 115 kV
1963	Wilson 230 kV
1970	Le Grand 115 kV
1977	Chowchilla 115 kV
WDT2132	Merced 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 5.3.4 Manning 500 kV Area Constraint

The deliverability assessment identified the following overload:

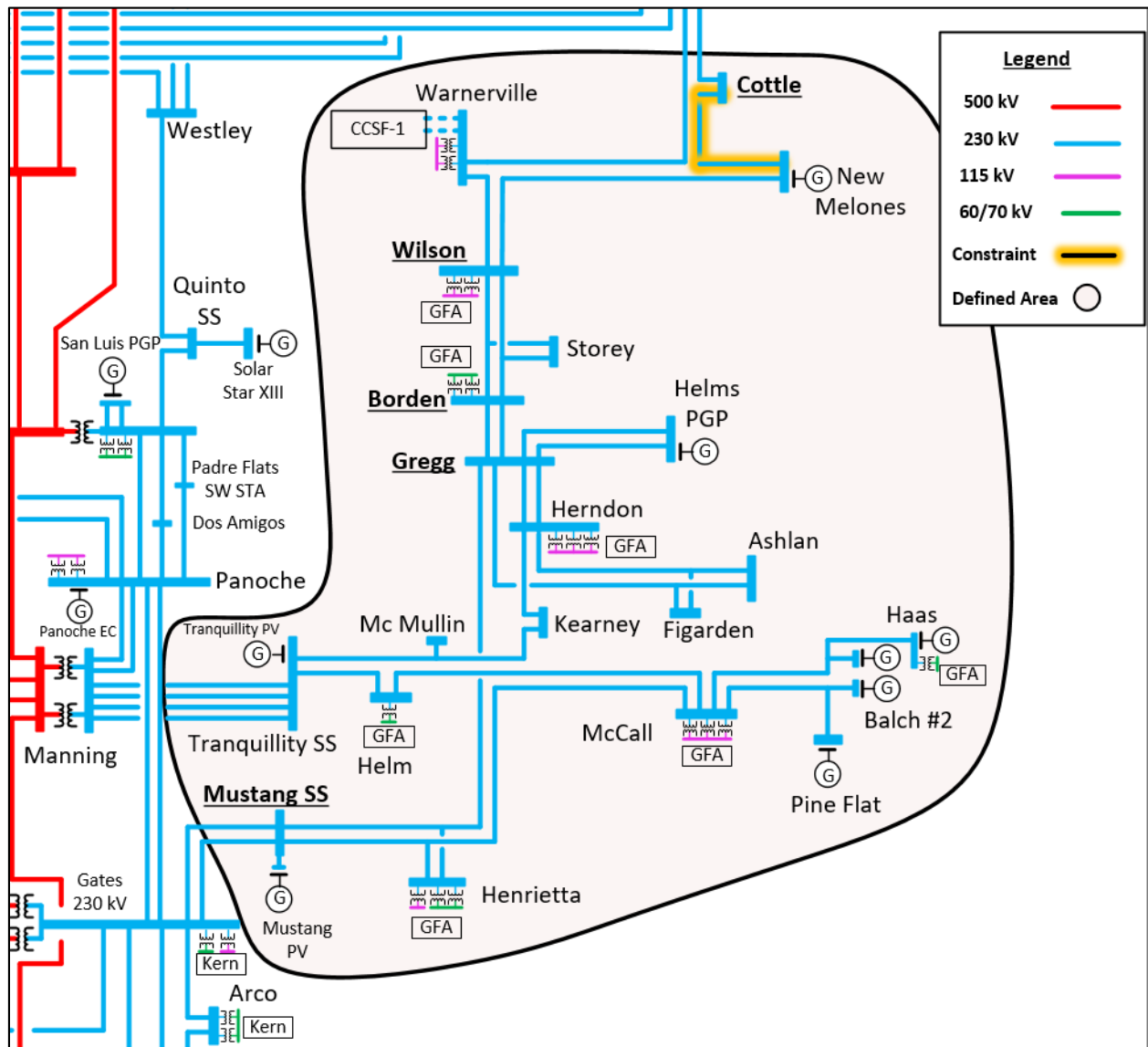
Table 5.25: Manning 500 kV Area

<b>Overloaded Facility</b>	<b>Contingency</b>	<b>Overload</b>
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Cottle-Melones 230 kV Line	GATES-MUSTANG SW STA #1 230kV [2604] & GATES-MUSTANG SW STA #2 230kV [2605] Lines	124.94%
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This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.9: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Manning 500kV Constraint



There are 52 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 583 MW of TPD was allocated in the area.

The results are shown in the following table.

Table 5.26 TPD Allocation for Generation behind the Manning 500 kV Constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	52	52
Eligible TPD Candidate (MW)	1670	1618
TPD Allocated (MW)	583	583
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	635	635
TPD in 2030 (informational)	635	635

Table 5.27: Generation Projects Contributing to the Manning 500 kV Constraint

<b>Queue</b>	<b>POI</b>
1223	Mustang 230 kV
1709	Crescent Switching Station 70 kV
1713	GWF Switching Station 115 kV
1895	Cottle 230 kV
1930	Sanger 115 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1940	Mendota 115 kV
1953	Gregg 230 kV
1963	Wilson 230 kV
1966	Giffen 70 kV
1969	Corcoran 70 kV
1970	Le Grand 115 kV
1975	Crescent 70 kV
1977	Chowchilla 115 kV
WDT2132	Merced 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 5.3.5 Manning 115 kV Area Constraint

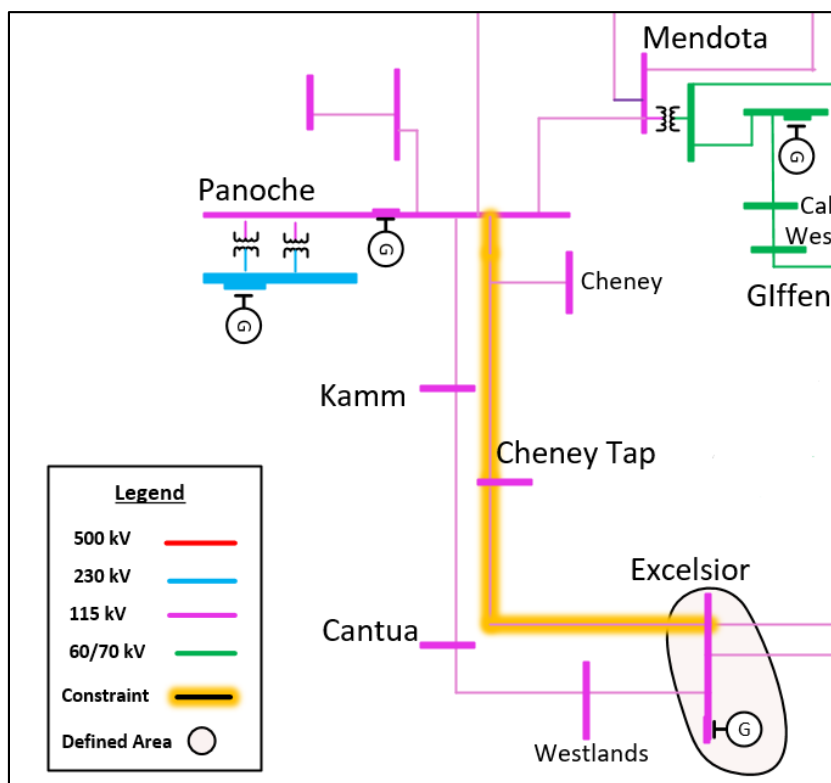
The deliverability assessment identified the following overload:

Table 5.28: Manning 115 kV Area

Overloaded Facility	Contingency	Overload
Wilson-Le Grand 115 kV Line	BELLOTA-COTTLE 230KV & BELLOTA-WARNERVILLE 230KV	141.53%

This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.10: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Manning 115kV Constraint



There are 0 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 97 MW of TPD was allocated in the area.

The results are shown in the following table.

Table 5.29 TPD Allocation for Generation behind the Manning 115kV Constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	0	0
Eligible TPD Candidate (MW)	125	125
TPD Allocated (MW)	97	97
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	97	97
TPD in 2030 (informational)	97	97

Table 5.30: Generation Projects Contributing to the Manning 115kV Constraint

<b>Queue</b>	<b>POI</b>
1955	Excelsior 115 kV

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

### 5.3.6 Wilson-Storey-Borden 230 kV Area Constraint

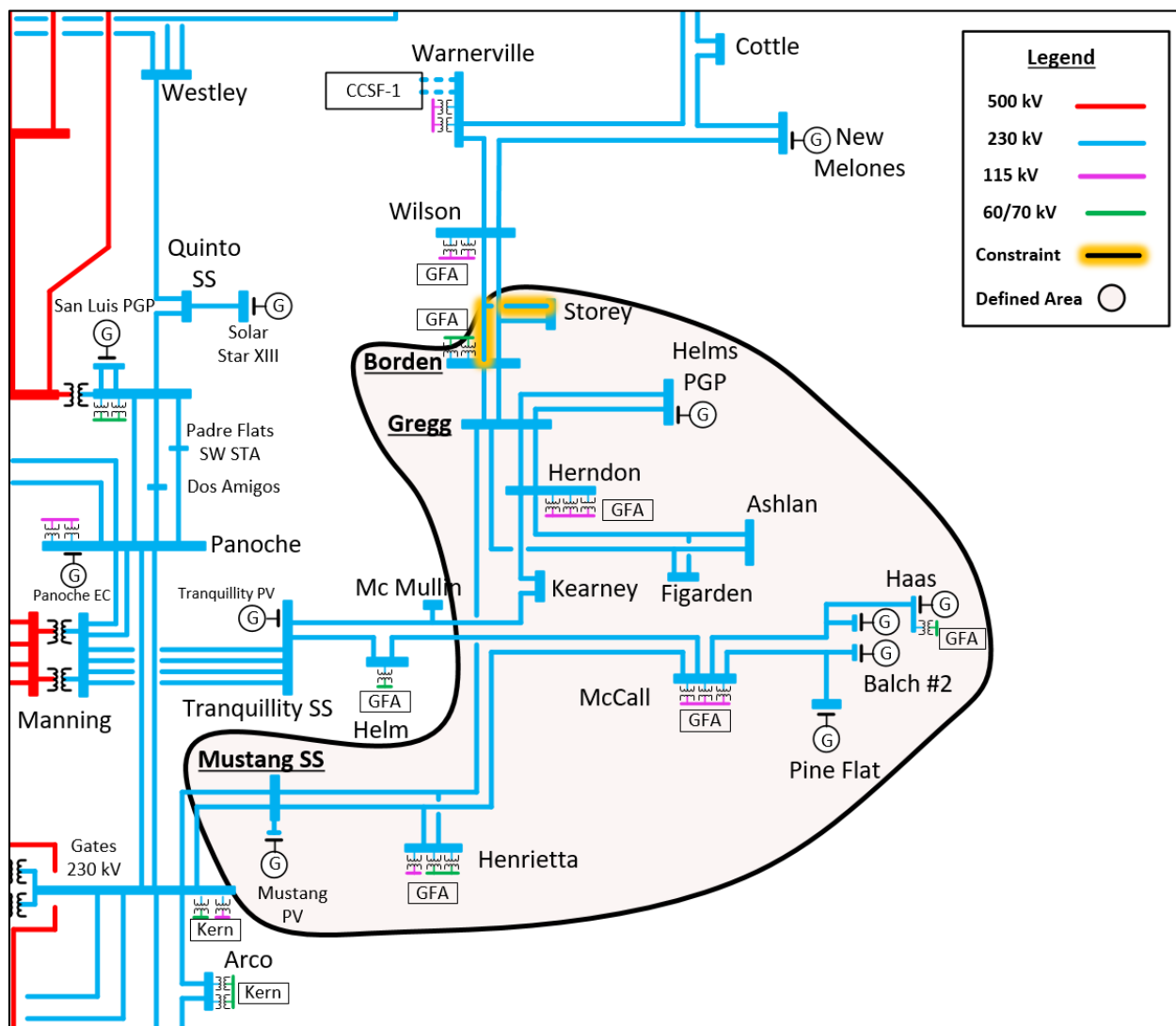
The deliverability assessment identified the following overloads:

Table 5.31: Wilson-Storey-Borden Area

<b>Overloaded Facility</b>	<b>Contingency</b>	<b>Overload</b>
Wilson-Storey #1 230kV	Wilson-Borden #2 230kV line	114.00%
Storey-Borden #1 230kV	BELLOTA-COTTLE 230KV & BELLOTA-WARNERVILLE 230KV	<100%

This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.11: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Wilson-Storey-Borden Constraint



There are 32 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 380 MW of TPD was available to be allocated in the area.

The results are shown in the following table.



Table 5.32 TPD Allocation for Generation behind the Wilson-Storey-Borden Area Constraint<sup>5</sup>

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	32	32
Eligible TPD Candidate (MW)	1015	1015
TPD Allocated (MW)	380	380
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	412	412
TPD in 2030 (informational)	412	412

Table 5.33: Generation Projects Contributing to the Wilson-Storey area Constraint

<b>Queue</b>	<b>POI</b>
1223	Mustang 230 kV
1709	Crescent Switching Station 70 kV
1713	GWF Switching Station 115 kV
1895	Cottle 230 kV
1930	Sanger 115 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1940	Mendota 115 kV
1953	Gregg 230 kV
1963	Wilson 230 kV
1966	Giffen 70 kV
1969	Corcoran 70 kV
1970	Le Grand 115 kV
1975	Crescent 70 kV
1977	Chowchilla 115 kV
WDT2132	Merced 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- Borden-Storey #1 and #2 230kV Reconductoring Project

<sup>5</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

### 5.3.7 Wilson-Oro Loma 115 kV Area Constraint

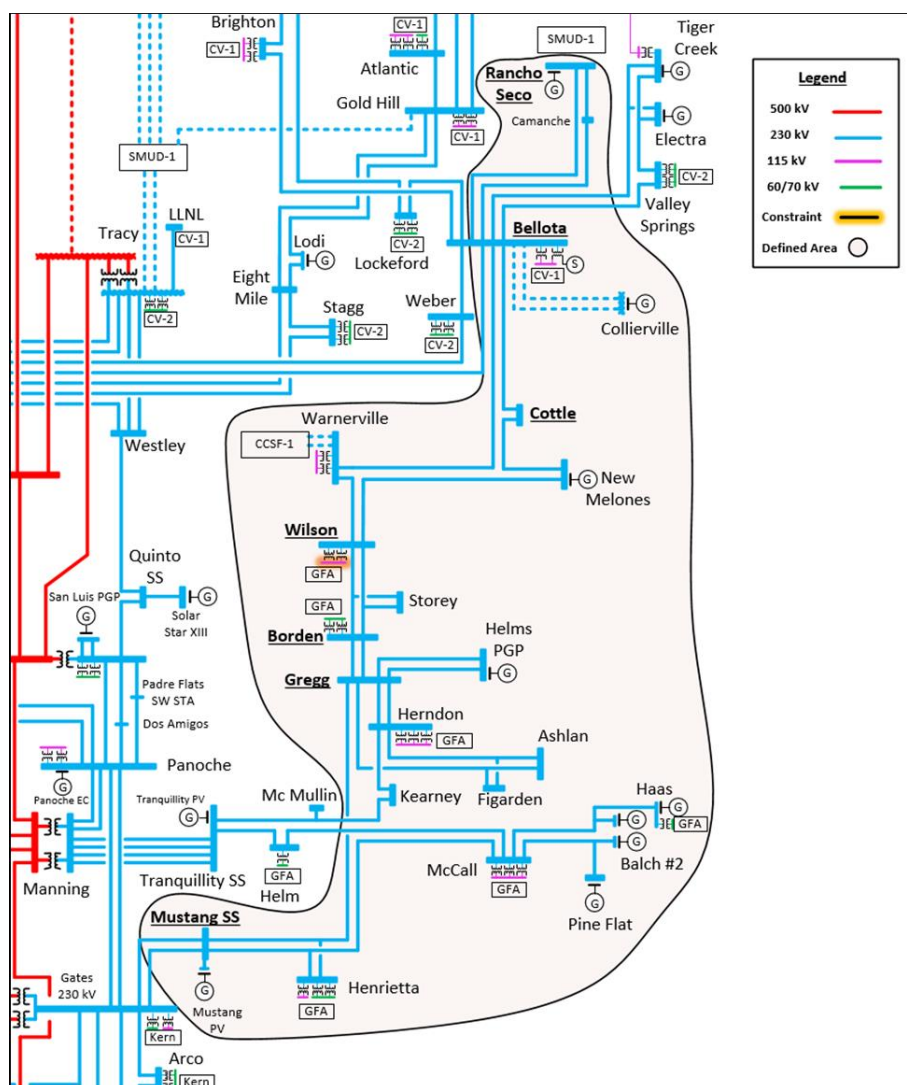
The deliverability assessment identified the following overload:

Table 5.34: Wilson-Oro Loma 115 kV Area

Overloaded Facility	Contingency	Overload
Wilson-Oro Loma 115 kV Line	BELLOTA-COTTLE 230KV & BELLOTA-WARNERVILLE 230KV	141.53%

This constraint limits deliverability of generators in the Fresno Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.12: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Wilson-Oro Loma 115kV Constraint



There are 20 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 456 MW of TPD was allocated in the area.

The results are shown in the following table.

Table 5.35 TPD Allocation for Generation behind the Wilson-Oro Loma 115kV Constraint

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	20	20
Eligible TPD Candidate (MW)	1505	1453
TPD Allocated (MW)	456	456
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	476	476
TPD in 2030 (informational)	476	476

Table 5.36: Generation Projects Contributing to the Wilson-Oro Loma 115 kV Constraint

<b>Queue</b>	<b>POI</b>
1223	Mustang 230 kV
1887	Rancho Seco-Bellota #1 230 kV Line
1895	Cottle 230 kV
1904	Bellota 115 kV
1930	Sanger 115 kV
1932	Wilson 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1953	Gregg 230 kV
1963	Wilson 230 kV
1970	Le Grand 115 kV
1977	Chowchilla 115 kV
WDT2132	Merced 115 kV Bus

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.4 Kern Interconnection Area Constraints

### 5.4.1 Morro Bay 230 kV Area Constraint

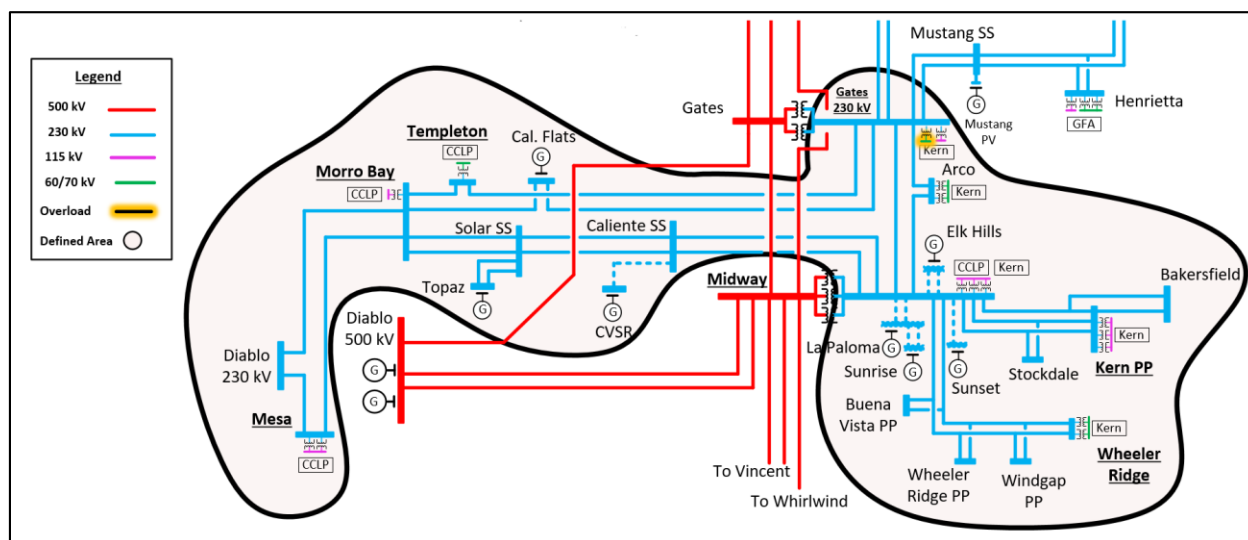
The deliverability assessment identified the following overload:

Table 5.37: Morro Bay 230 kV Constraint

Overloaded Facility	Contingency	Overload
San Miguel-Union 70 kV Line section 1	GATES-14C1959SS #1 230kV & CALIFORNIA FLATS SW STA-GATES230kV	204.04%

This constraint limits deliverability of generators in the Kern and Los Padres Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.13: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Morro Bay 230 kV Constraint



There are 632 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 294 MW of TPD was allocated in the area.

Table 5.38 TPD allocation for generation behind the Morro Bay Constraint

	Interconnection Service Capacity (MW)	Study Amount (MW)
Non-Operational Prior Commitment (MW)	698	632
Eligible TPD Candidate (MW)	1315	1224
TPD Allocated (MW)	294	294
Remaining TPD Available	0	0

Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	992	926
TPD in 2030 (informational)	992	926

Table 5.39: Generation Projects Contributing to the Morro Bay 230 kV Constraint

Queue	POI
946	Midway-Wheeler Ridge #2 230 kV Line
1143	Corcoran-Olive Switching Station 115kV Line
1260	Midway-Wheeler Ridge #2 230 kV Line
1397	Wheeler Ridge Substation 70kV
1398	Wheeler Ridge Substation 230kV
1443	Olive Switching Station 115kV
1470	Mesa Substation 230kV
1499	Lakeview Substation 70kV
1739	Morro Bay 230 kV
1751	Midway Substation 115 kV
1831	PG&E Morro Bay 230kV
1959	Gates-Templeton 230 kV Line
1994	Lamont 115 kV
1995	Kern PP 230 kV
2001	Kern PP 230 kV
2006	7th Standard 115 kV
2010	Midway 115 kV
2012	Morro Bay 230 kV
2015	Wheeler Ridge 230 kV
2017	Olive 115 kV
WDT1320	Manville 115 kV Tap Line
WDT1620	Elk Hills 70 kV Bus
WDT1642	Cayuma 70 kV Bus
WDT2040	Taft 115 kV Bus
WDT2041	Cuyama Sub
WDT2105	Taft 115 kV Bus
WDT2131	Tevis 115 kV Bus
WDT2174	Taft 115 kV Bus
WDT2175	Taft 115 kV Bus
WDT2764	Fairway 115 kV

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None

## 5.4.2 Gates-Arco-Midway 230 kV Area Constraint

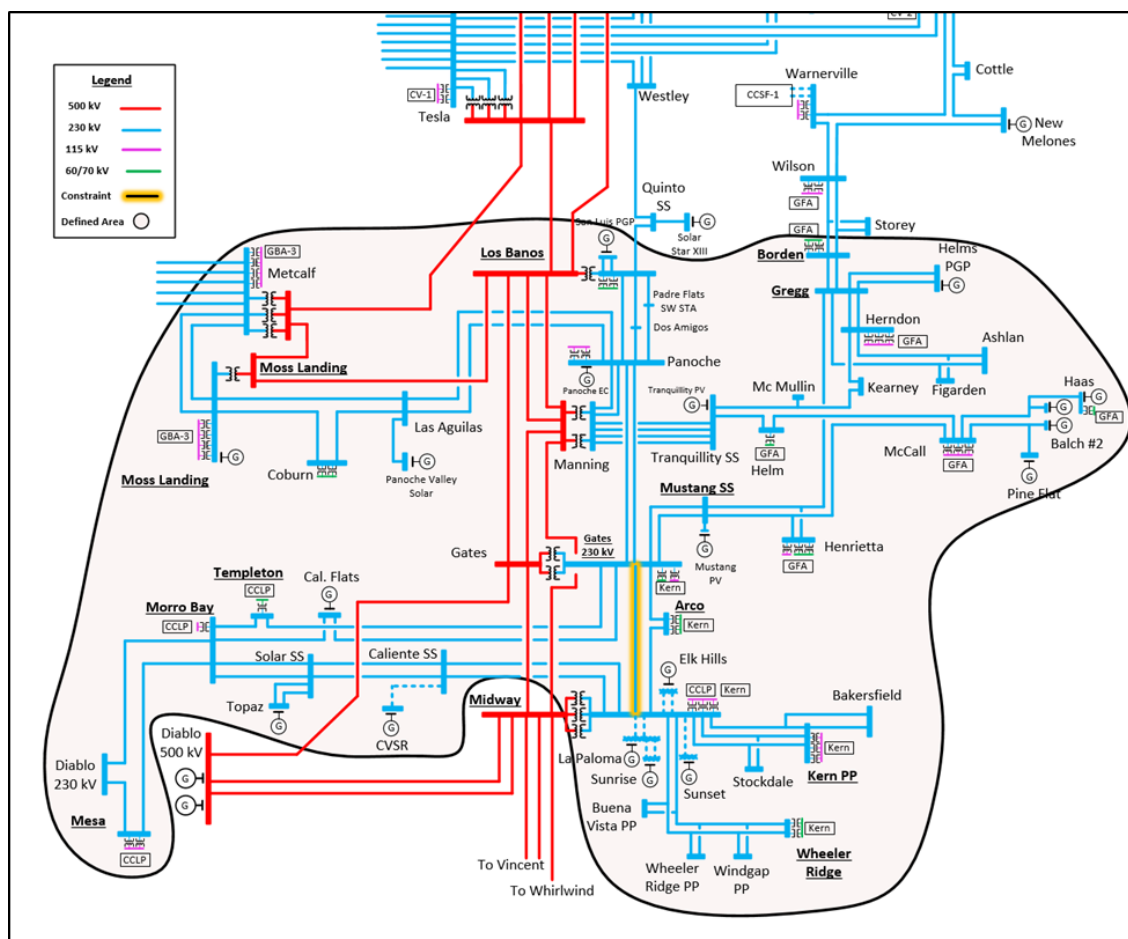
The deliverability assessment identified the following overload:

Table 5.40: Gates-Arco-Midway 230 kV Constraint

Overloaded Facility	Contingency	Overload
Gates- Arco 230kV line	P7-1:A14:1016: _ARCO-MIDWAY 230kV [4320] & Q1593SWSTA-MIDWAY #1 230kV [0] Lines	232%
Q1959 SS-Gates 230 kV Line	CALIFORNIA FLATS SW STA-GATES 230kV	207.97%

This constraint limits deliverability of generators in the Kern Area. The following figure illustrates approximate electrical boundary of the 5% DFAX circle for the constraint.

Figure 5.14: Approximate electrical boundary of the projects within the 5% DFAX circle that contribute to the Gates-Arco-Midway 230 kV Constraint



There are 1116 MW of previously allocated TPD to non-operational prior commitment as described in section 2.1. 405 MW additional TPD was available to be allocated in the area.

Table 5.41 TPD Allocation for Generation behind the Gates-Arco-Midway 230 kV Constraint<sup>6</sup>

	<b>Interconnection Service Capacity (MW)</b>	<b>Study Amount (MW)</b>
Non-Operational Prior Commitment (MW)	1551	1166
Eligible TPD Candidate (MW)	2483	2392
TPD Allocated (MW)	405	405
Remaining TPD Available	0	0
Total TPD (Non-Operational Prior Commitment + TPD Allocated + Remaining TPD available)	1956	1571
TPD in 2030 (informational)	1956	1571

Table 5.42: Generation Projects Contributing to the Gates- Arco-Midway 230 kV Constraint

<b>Queue</b>	<b>POI</b>
946	Midway-Wheeler Ridge #2 230 kV Line
954	Gates Substation 230 kV
1143	Corcoran-Olive Switching Station 115kV Line
1223	Mustang 230 kV
1260	Midway-Wheeler Ridge #2 230 kV Line
1389	Gates Substation 230kV
1397	Wheeler Ridge Substation 70kV
1398	Wheeler Ridge Substation 230kV
1443	Olive Switching Station 115kV
1470	Mesa Substation 230kV
1493	Arco Substation 70kV
1495	Arco 230kV Substation
1499	Lakeview Substation 70kV
1593	Gates-Midway 230 kV
1713	GWF Switching Station 115 kV
1736	Arco Substation 230 kV
1739	Morro Bay 230 kV
1740	Arco Substation 230 kV
1751	Midway Substation 115 kV
1831	PG&E Morro Bay 230kV
1889	Moss Landing 500 kV
1930	Sanger 115 kV
1933	Borden 230 kV
1934	Borden 230 kV
1943	Los Banos 500 kV

<sup>6</sup> This area constraint has multiple overloads. Numbers provided in the table are based on the most representative constraint.

1953	Gregg 230 kV
1954	Gates 230 kV
1959	Gates-Templeton 230 kV Line
1969	Corcoran 70 kV
1980	Arco 230 kV
1980	Arco 230 kV
1992	Arco 230 kV
1994	Lamont 115 kV
1995	Kern PP 230 kV
2001	Kern PP 230 kV
2004	Gates-Midway 230 kV Line
2006	7th Standard 115 kV
2010	Midway 115 kV
2012	Morro Bay 230 kV
2015	Wheeler Ridge 230 kV
2017	Olive 115 kV
WDT1320	Manville 115 kV Tap Line
WDT1620	Elk Hills 70 kV Bus
WDT1642	Cayuma 70 kV Bus
WDT2040	Taft 115 kV Bus
WDT2041	Cuyama Sub
WDT2105	Taft 115 kV Bus
WDT2131	Tevis 115 kV Bus
WDT2174	Taft 115 kV Bus
WDT2175	Taft 115 kV Bus
WDT2764	Fairway 115 kV

For Projects behind this constraint that are receiving an allocation in this TPD cycle, the following TPP upgrades are required in addition to the Reliability Network Upgrades and Local Delivery Network Upgrades identified for the Projects:

- None