IEEE Santa Clara Valley IAS/PES
SVP Electric Service to New Stadium

SILICON VALLEY POWER®
CITY OF SANTA CLARA

May 15, 2013

Orville Plum

Acting Sr. Electric Division Manager – Engineering & Compliance

AGENDA

- Overview of Silicon Valley Power
- SVP System Design
- Serving the Levi's ® Stadium (49'ers) – Challenges
- Customer Requirements
- Circuit Arrangement / Design
- Operating Procedures
- Questions

Objective of Discussion: To provide an overview of how SVP is providing reliable electric service to the new Levi's ® Stadium (49'ers).

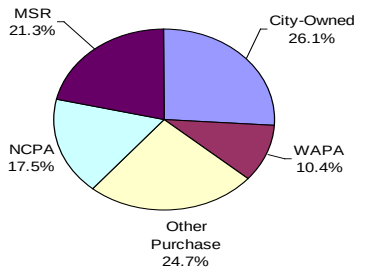
SVP Electric Facilities (In-City)

- 1-230 kV and 5-115 kV Transmission Ties to PG&E
- In-City Generating Plants
  - Donald Von Raesfeld, Gianera, CoGeneration
- 26 Substations
  - 4 Receiving / Switching
  - 13 General Distribution (60kV to 12kV)
  - 7 Single Customer (60kV)
  - 2 Generation Substation (In-City)
- 54 Miles of Transmission Line (60kV, 115kV & 230kV)
- 342 Miles of Underground Distribution Line (12kV)
- 188 Miles of Overhead Distribution Line (12kV)
- 5,700 transformers, switches and other devices
- 10,500 poles and 8,000 streetlights
- 52,000 meters

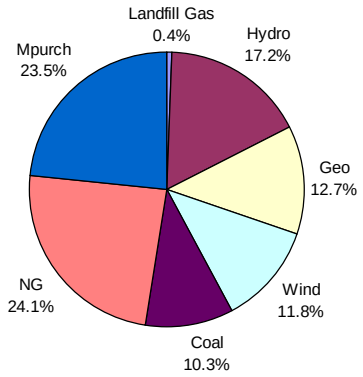
SVP Power Resource Portfolio

The City's power resource portfolio is well diversified

FY 2011-12 Generation



Generation by Source



SVP Standard System Design

Substations

- Substations are fed from 60kV transmission loops
- 60kV transmission loops can carry the full loop load
- Substation transformers are loaded so they can pick up adjacent transformers within the Substation. (Approximately 50% of capacity)

Distribution Feeders (12kV)

- Design load is approximately 50% of maximum capacity (4.5 MVA vs 9.0 MVA capacity)
- Designed to be able to pick-up a failed feeder from adjacent circuits through minimal field switching.

Challenges & Issues in Serving the Stadium

- **Schedule >>>> Schedule >>>> Schedule**

- Physical Space due to location and presence of other facilities

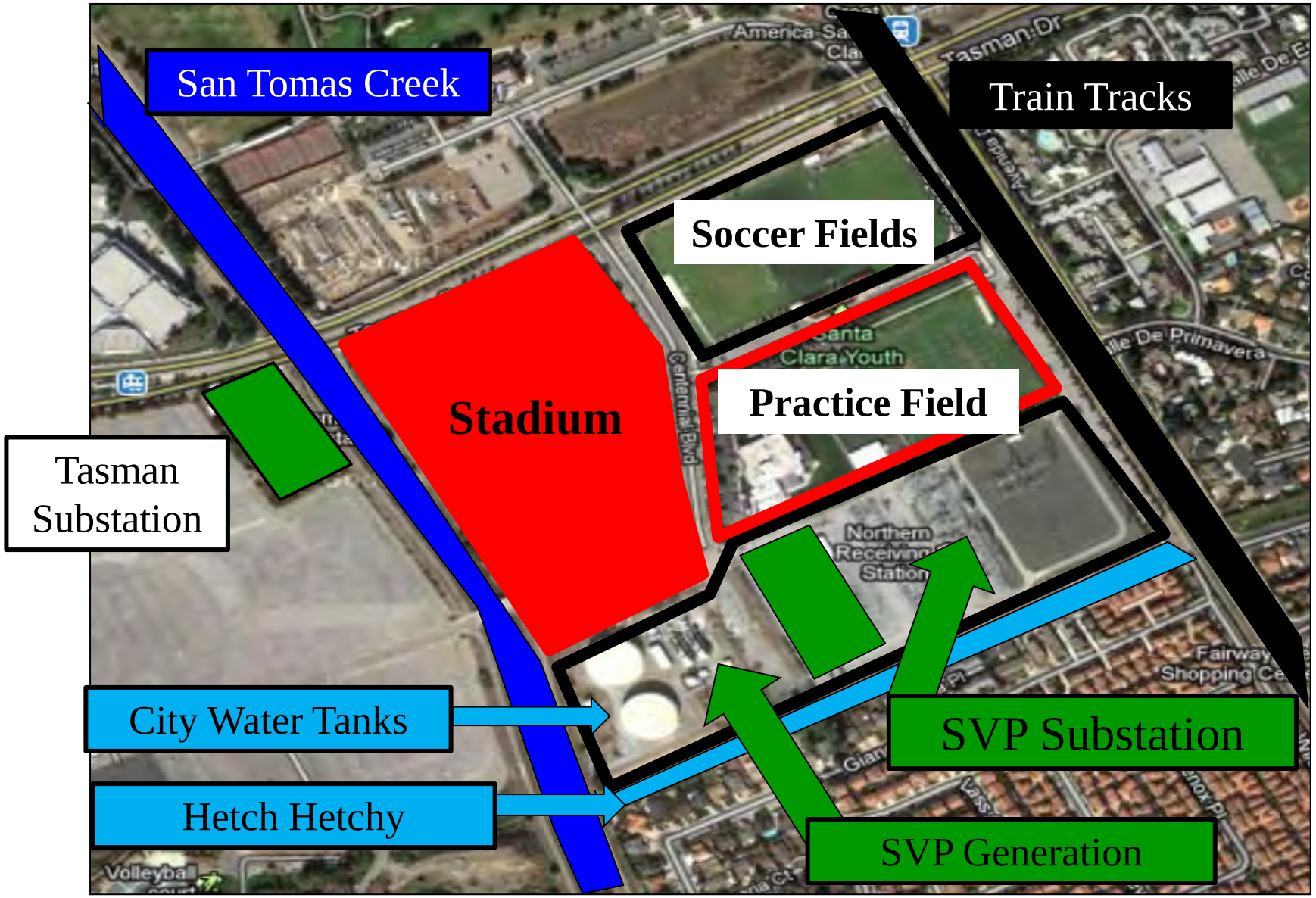
- Power Demand Estimates – Connected load vs Created Demand

- Peak “Game Day” Demand vs “Normal Daily” Demand

- SVP had to Build a new Substation and Remove an Existing Substation to meet stadium construction schedules.

SVP Substations Serving the Stadium Area

Tight Spacing for Stadium



SVP Mission Substation & Transmission

<<<<< Mission Substation

60kV Riser Poles >>>>>

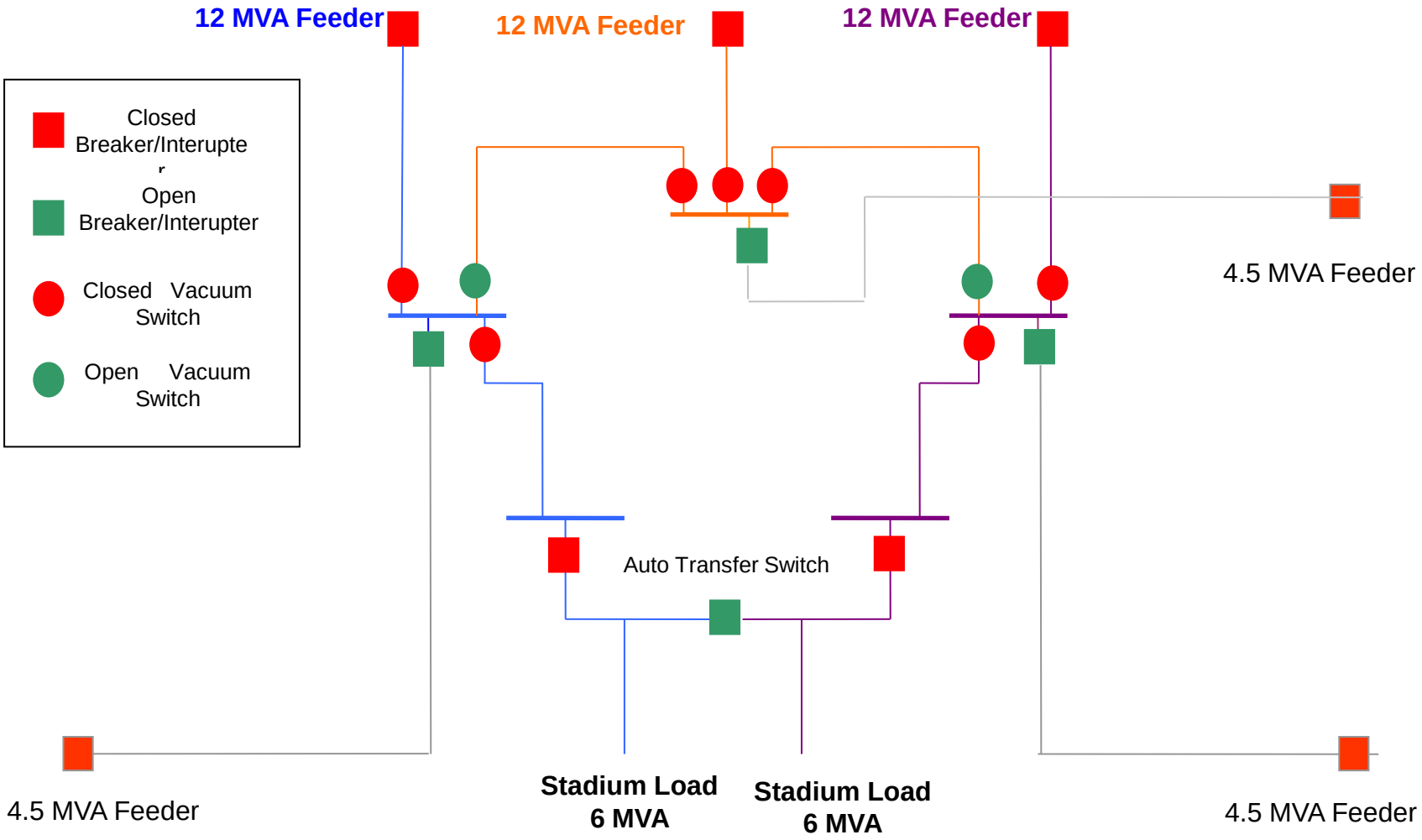
Customer Requirements

- Agreed upon maximum peak demand of 12 MW with expected demand to be closer to 7 to 8 MWs. Normal demand will be approximately 2 MW. Load factor is less than 20%.
- Agreed upon number of feeders – two (2) 12kV circuits @ 600 amps each……Dedicated for the stadium on event days.
- Customer requested transfer capability between circuits. Each feeder will be able to carry the full peak demand.
- Stadium will have Emergency / Standby Generation
- Stadium will have some level of solar…. Planned solar energy generation will offset energy use on NFL game days (in aggregate). Parallel interconnection of solar will be required.

Circuit Arrangement and Design

- Circuit Feeders will come from different Stations
- Each Feeder will have 12 MW of capacity (600 amps @ 12kV)
- Cable design will have high thermal capability and fault duty capability.
- Circuit protection set up to provide maximum coordination with Stadium main switchgear/protective relays.
- Circuits will terminate on SCADA controlled switches prior to termination at the Stadium switchgear. New Padmounted Switchgear.
- Circuits will have the ability to serve other load beyond the stadium service point on non-event days.
- Third circuit feeder is installed to provide SVP with operating flexibility.

Circuit Arrangement / Design



Operating Procedure Coordination

- Circuit protection will be coordinated between Substation Circuit Breaker and Stadium switchgear.
- SVP will provide additional protection for feeder beyond the Stadium service point.
- Stadium will have the ability to transfer loads between service feeders via internal switching and interlocks to prevent parallel operation of systems.
- SVP will monitor circuit load on non-event days so that it can be used if needed for operational clearances or emergency restoration of other circuits.
- Circuits will be express / dedicated feeders on event day activities.
- Standby personnel for event days yet to be determined.

Thank you,

Questions?

Giving You the Power
to Change the World