San Carlos Apache Tribe
Solar Feasibility Study

an Carlos Apache Tribe And Reservation

- 90 miles east of Phoenix
- Membership: 15,000
- 1.83 million acres.
- 2nd highest rated level of solar resource potential
- Main employers: Tribe / IHS /BIA / Schools / Casino / Telecom
- Utilities: Telecom, MTSS, Utility Authority
- Revenue: Casino, farming, water leasing, saw mill, hunting/fishing, sand & gravel/telecom

San Carlos Apache Mission Statement

The Apache People will live a balanced life in harmony with spirituality, culture, language, and family unity in an ever-changing world.

VISION: The Apache People shall create a strategic framework for our tribe to grow and prosper.

CURRENT PROJECTS

- SCTI
- OUTLET/STRIP MALL
- NEW HOSPITAL
- WATER RIGHTS PROJ

* TRIBAL COLLEGE
* NEW CASINO
* SCHOOL ADDITIONS
* MASTER PLANNING

- PED
  - NEEDS ASSESSMENT
  - TRIBAL CENSUS
  - STRATEGIC PLANNING SUMMIT

- CURRENT CONSTRUCTION
  - HOSPITAL
  - SCHOOL
  - HOMES

2008 - 2013 Energy Initiatives

2008: Tribal Strategic Plan including Tribal energy goals

2009: DOE ARRA Energy grant

2010: DOE ARA Energy-funded programs & projects undertaken.

2010 - 2012: San Carlos Tribal Energy Summits.

2011: US DOE-funded energy organization.

2011: Adopted Tribal Energy Strategy & Program (EECS).

2012: Adopted Tribal Energy Organization Analysis (EOA).

2012: Hired Tribal energy program coordinator.

2012: US DOE-funded solar feasibility study grant.

2012: Tribal radio station with solar power funded by EECBG.

2012: Initiated commercial-scale solar feasibility study.

2013: Casino community-scale solar power facility.

Energy Strategy & Program PURPOSE

"Provides a framework for future energy initiatives that support the San Carlos Apache Tribe's energy security and independence, and that will reduce the negative impacts of energy consumption and greenhouse gas emissions on the Tribe's people and Reservation".

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"This Strategy sets the stage for a vigorous and forward-looking set of Tribal energy plans, projects, and programs".

Solar Study Objectives

Inform sound decision-making for site selection and infrastructure development options for commercial-scale solar development within the southwestern Reservation.

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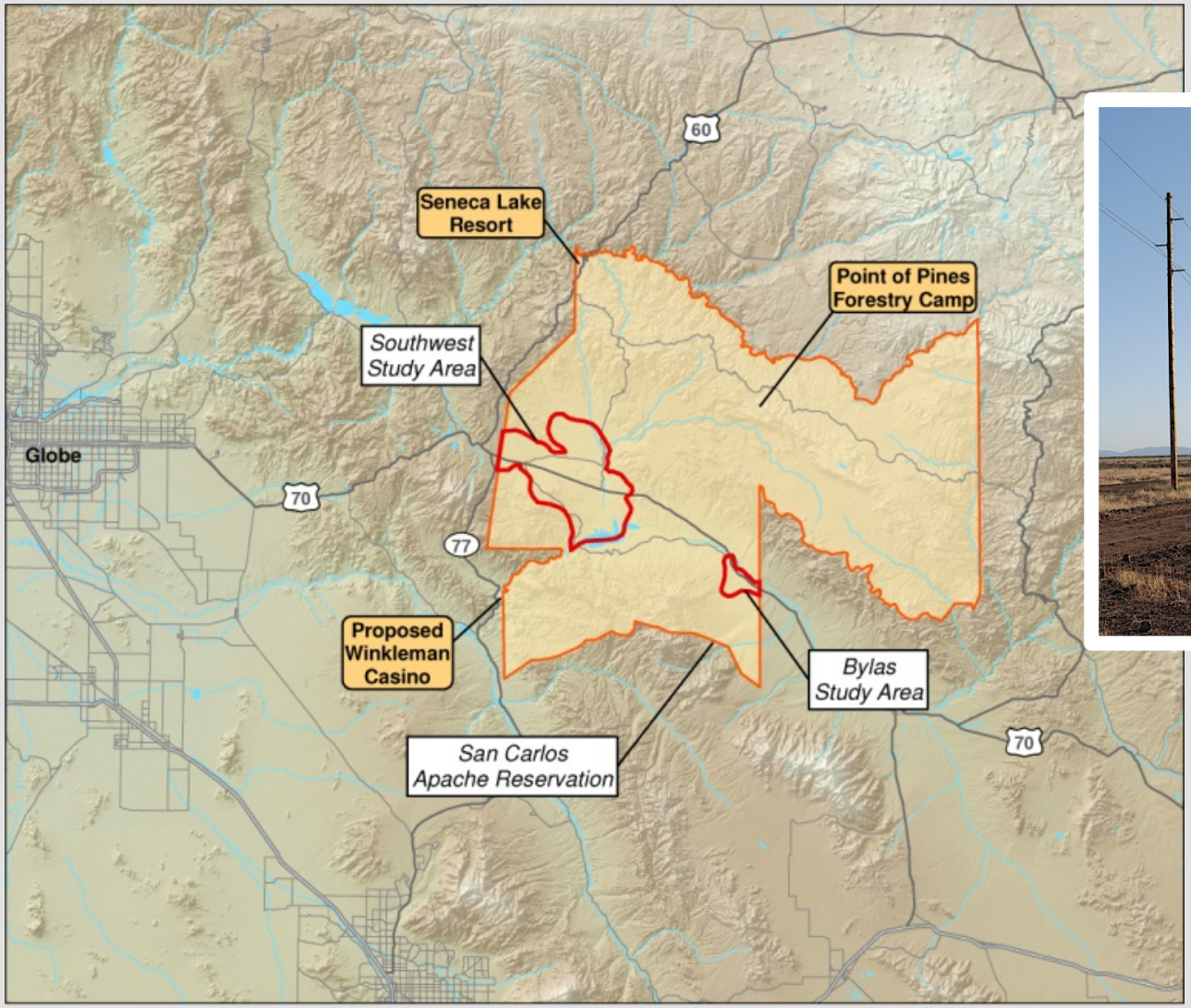
Identify opportunities for smaller community-scale solar developments within the Reservation.




- Power - 100% purchased, 98% non-renewable, retail rates 2X+ Nat'l average.
- 4 power providers – SCIP (BIA), APS, Graham County Coop, Morenci Mine.
- Commercial hydropower potential – the 1930's Coolidge Dam.
- Excellent solar and geothermal potential.



Solar Feasibility Study



Solar Study Objectives

- Identify site & infrastructure options for **commercial-scale** solar.
- Identify opportunities and sites for **community-scale** solar.

Solar Feasibility Study Elements

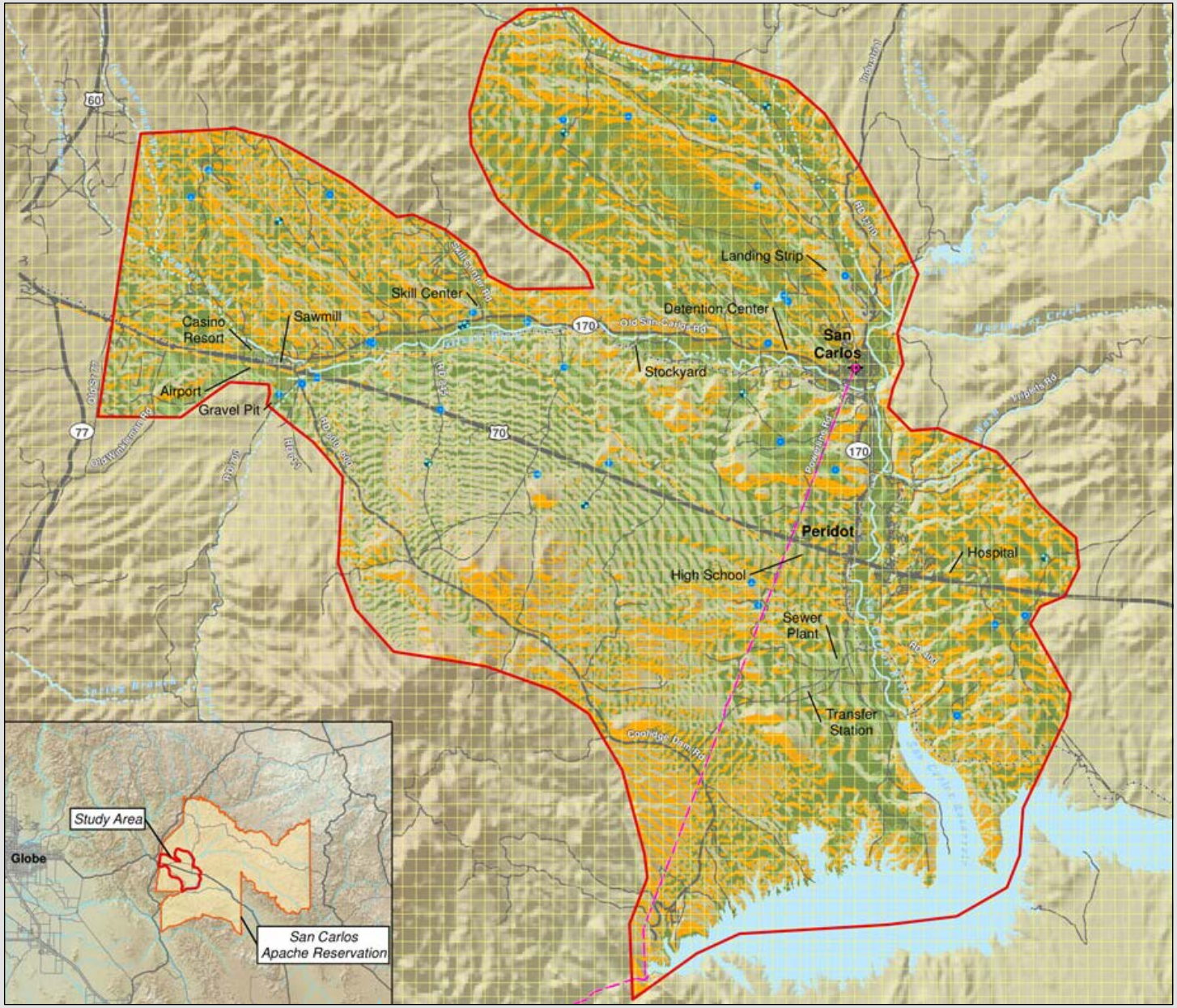
Phase 1

- Assess baselines conditions, including key site characteristics
- Match sites to infrastructure, generation, and transmission
- Identify 2 to 3 sites for commercial-scale solar development
- Identify sites for community-scale solar development

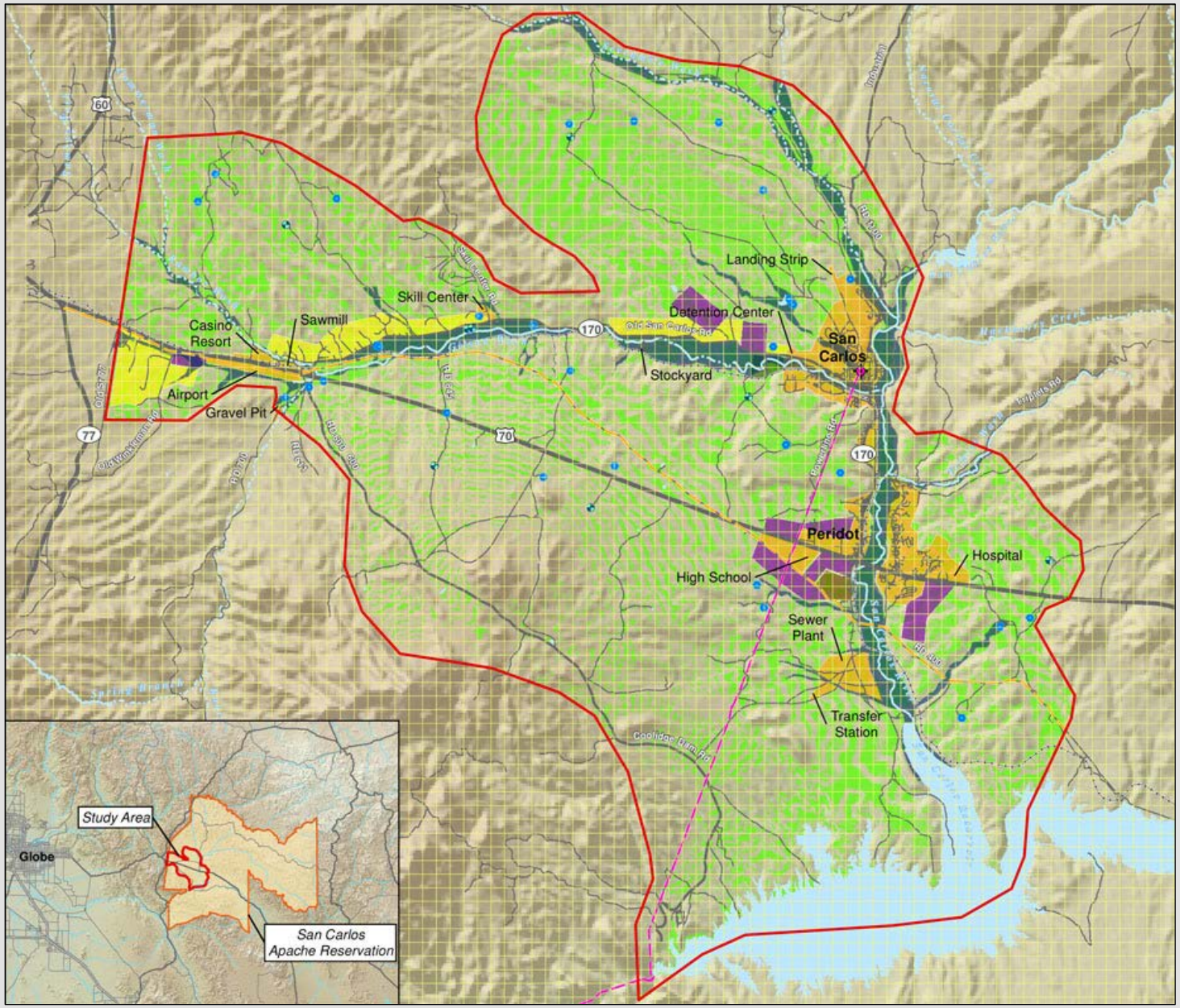
Phase 2

- Conduct more detailed assessments for “finalist” sites
- Identify costs and benefits - economic, cultural, social
- Outline a business plan approach
- Recommend priority sites and systems

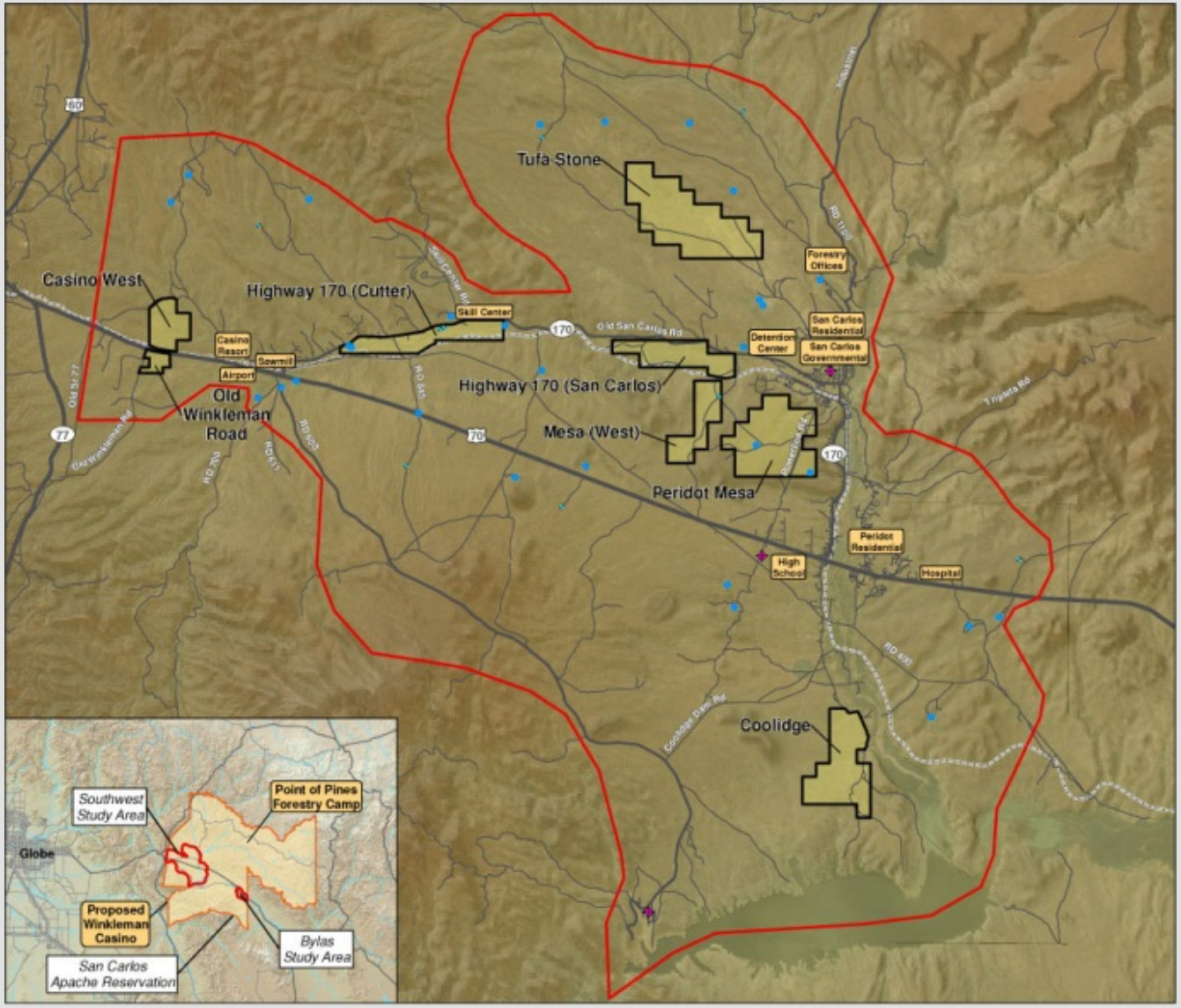
Constraints & Opportunities – Slope/Aspect



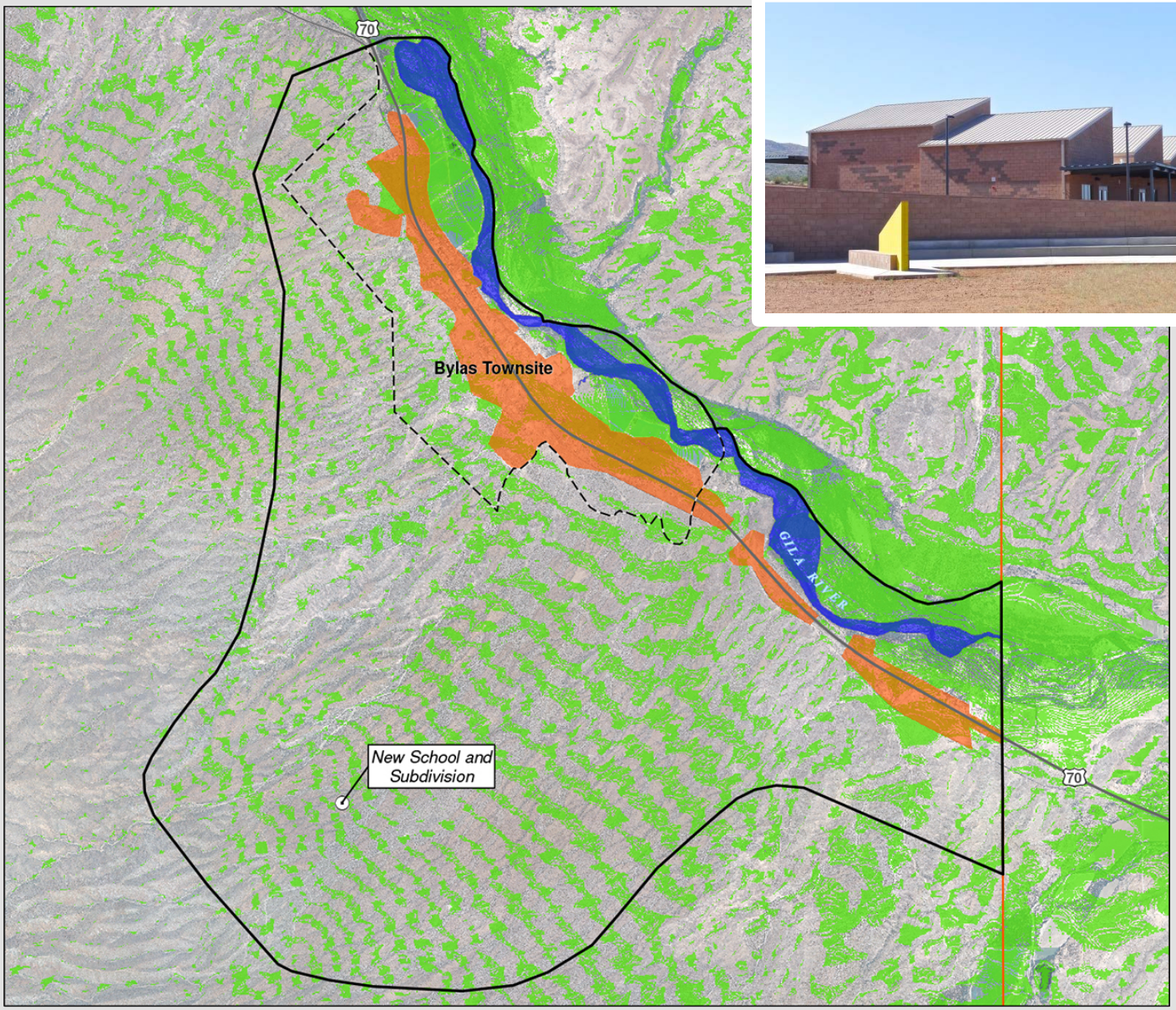
Constraints & Opportunities – Land Uses/Environmental



Commercial-scale Sites



Bylas (Southeast Reservation)

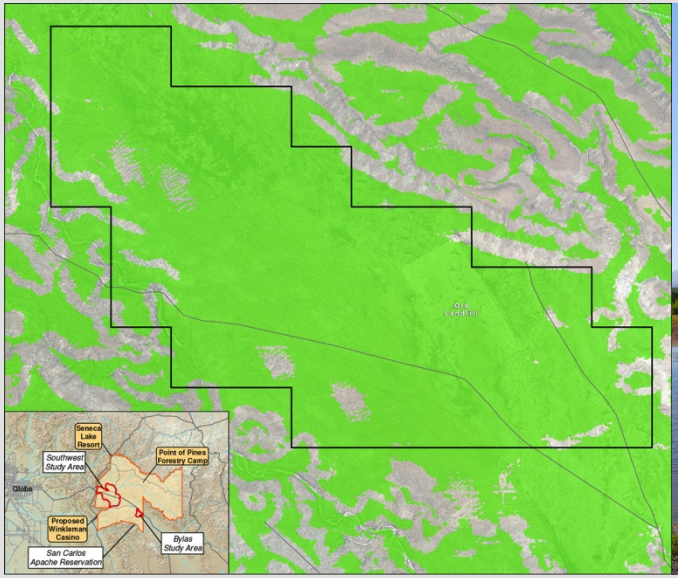


Phase 1 Findings

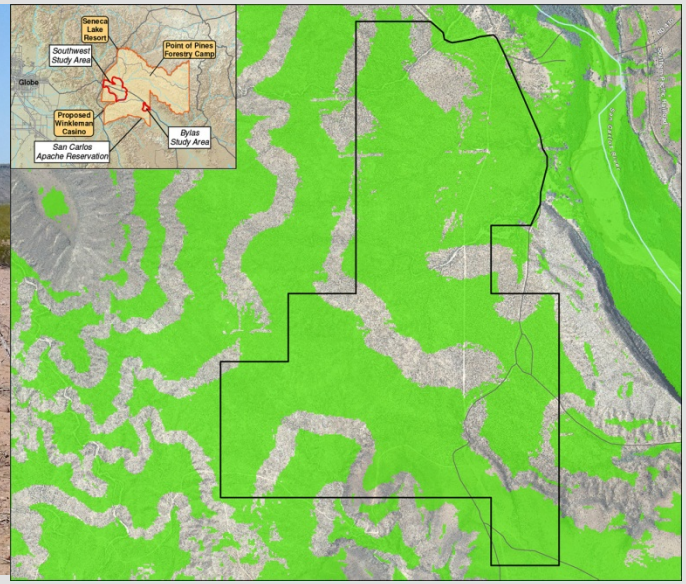
- Slope (less than 4%) - *LOTS of suitable land.*
- Aspect (southerly facing) - *ditto!*
- Climate - *highly suitable … no surprise here!*
- Environmental - *preferred sites avoid problems*
- Development - *preferred sites avoid conflicts*
- Cultural limitations - *none identified*
- Site Potential - *Many sites/facilities suitable for commercial and/or community-scale solar.*
- Utility Support Programs – *available from APS & GCEC, none from SCIP*
- Road Access - *highly variable conditions*
- ***Transmission - NONE for commercial-scale***

Possible Commercial Solar Sites: Tufa Stone and Coolidge

Tufa Stone 1,950 acres



Coolidge 1,218 acres

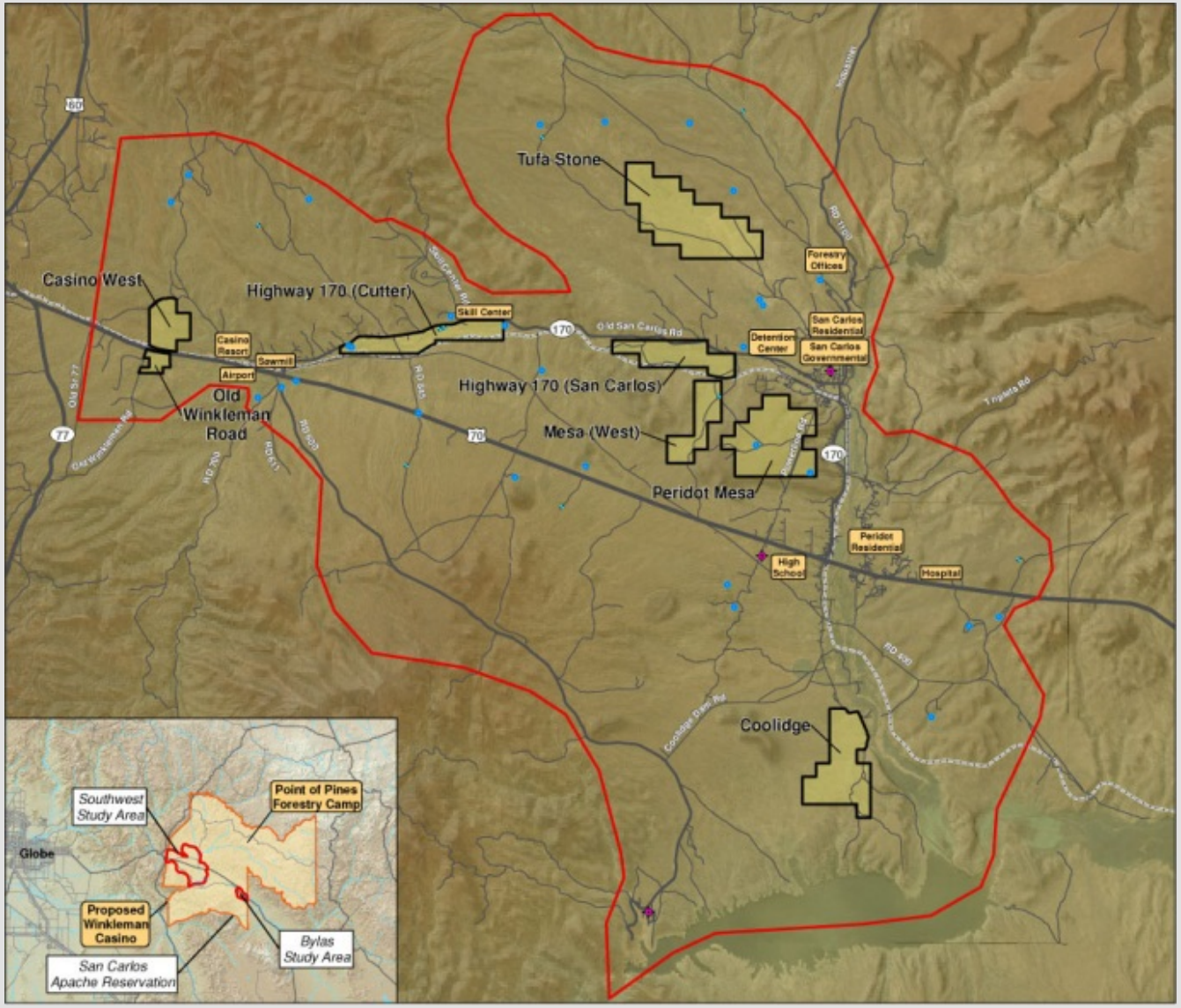


"BEST" Commercial Solar Site: Peridot Mesa

Commercial-scale Recommendations

- Cost of new commercial-scale transmission may be ***PROHIBITIVE*** for the foreseeable future (new T-line thru SCIP to Peridot Mesa = 60-70 miles and $48 million).
- Reserve land for ***FUTURE*** commercial-scale solar on Peridot Mesa and Coolidge sites.

Community-scale Sites and Facilities



Large Facility Sites

- Retro-fit existing casino/resort and the skill center with solar panels meeting facility electrical demand.
- Design new casino/resort on Highway 77 to include solar power.

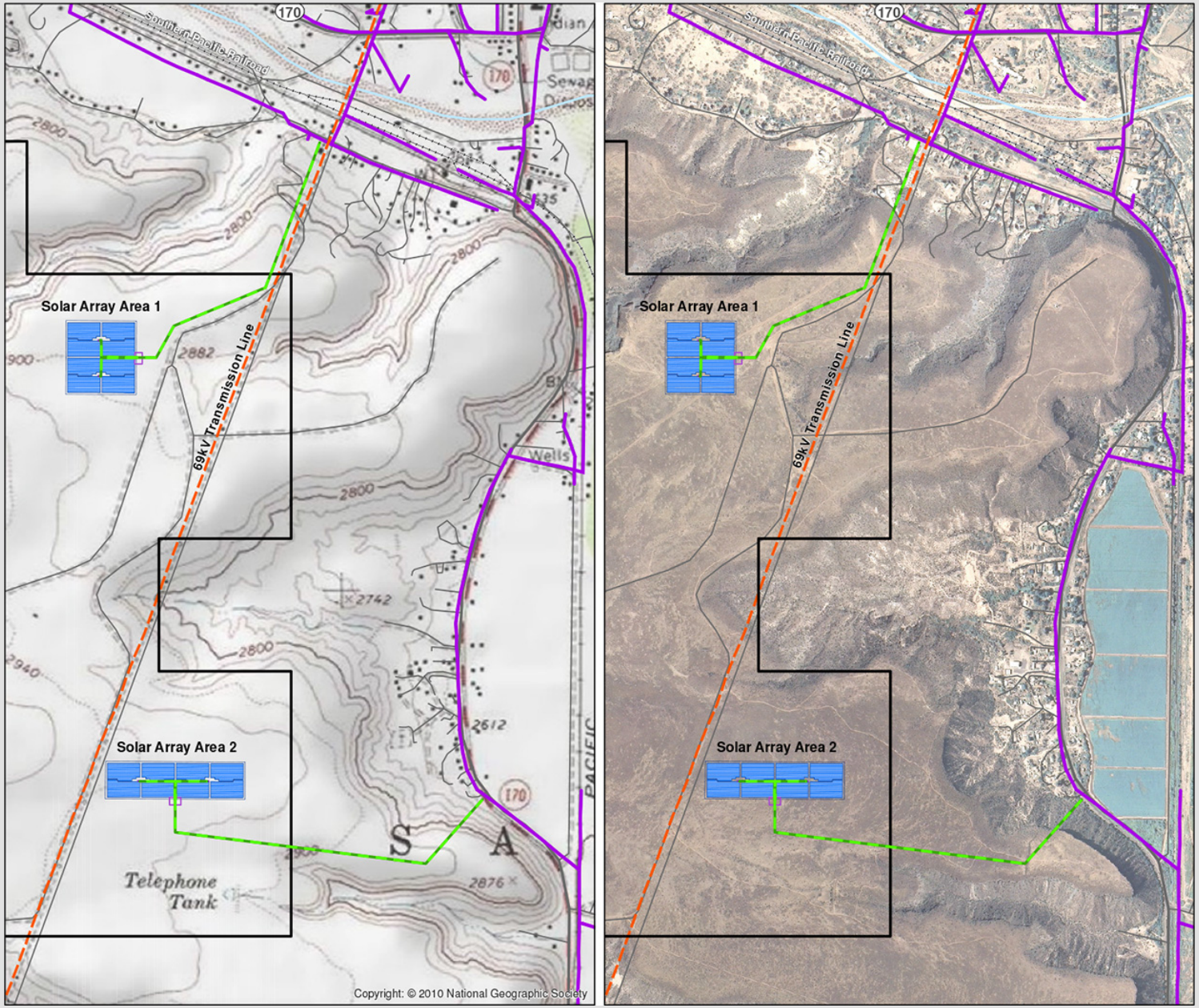
Apache Gold Casino Resort


Skill Center Ball Field

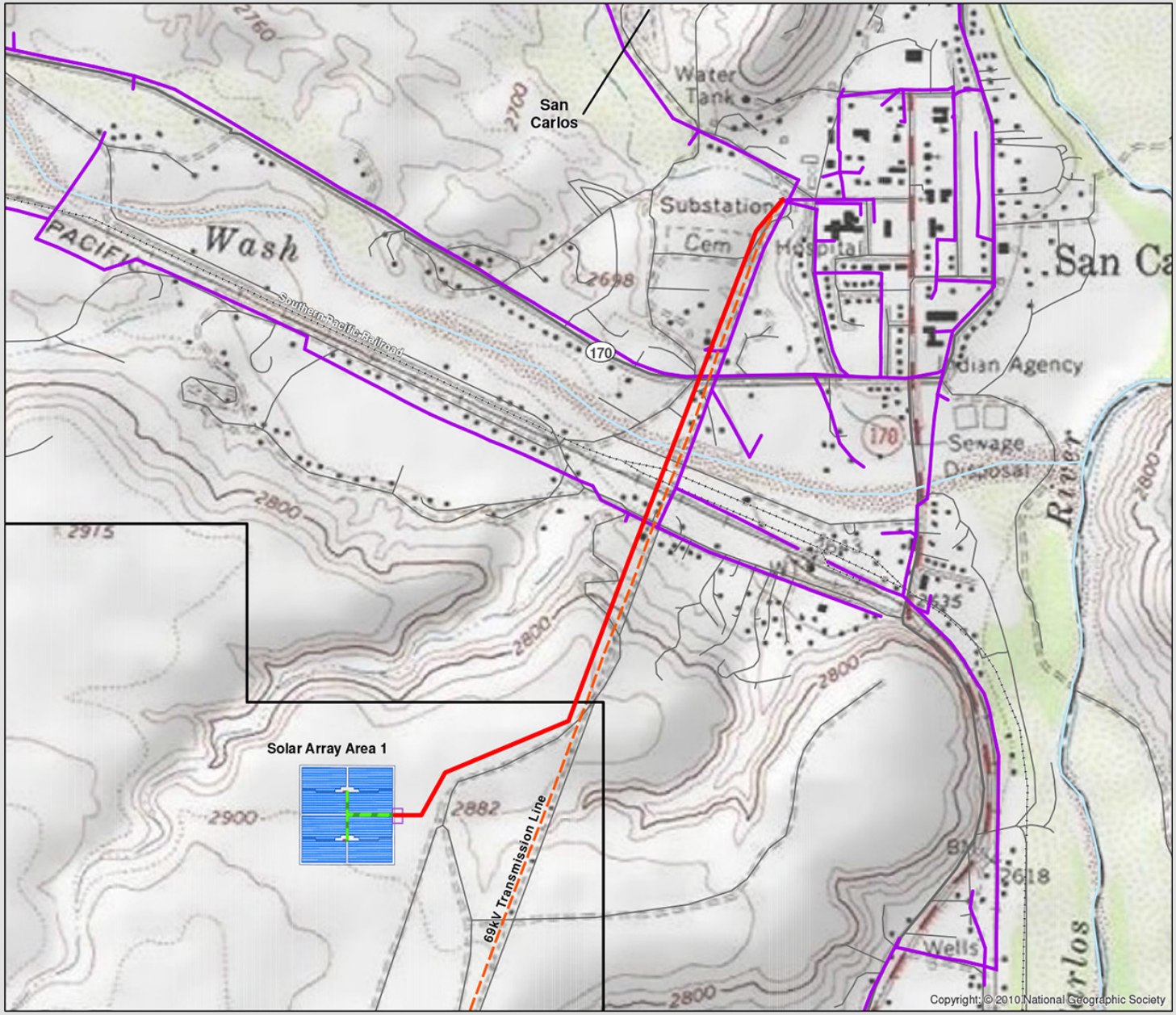
Community-scale Recommendations

- Include solar in Bylas new community development plans.
- Encourage the installation of solar panel arrays on individual buildings and smaller facilities throughout the Reservation.
- Develop a phased 5MW solar facility on Peridot Mesa off-setting electrical demand in the SCIP service territory.

Peridot Mesa Five-Megawatt Facility



Peridot Mesa Substation Connection Option



Key Findings and Recommendations

Commercial Transmission and Sale

Closest feasible transmission connection is 18 miles away. Pursuit of commercial scale solar should be a long-term goal but is not recommended until transmission-scale lines are available.

Key Findings and Recommendations

Solar Site Development

3 sites with commercial-scale potential were advanced to Phase Two. Two sites should be reserved as future commercial-solar: Peridot Mesa and Coolidge

Key Findings and Recommendations

Community-scale Solar Development

3 cost-effective sites were identified:
(1) Casino – largest consumer; already have 1.1 mw solar installation.
(2) Tribal College / Training Center
(3) Winkleman Casino – a new planned resort on US 77.

Key Findings and Recommendations

Bylas

Provide rooftop ground mounted solar for commercial buildings on US 70, and incorporate clustered or individual solar as new buildings are constructed

Key Findings and Recommendations

Phased Community Scale Development

Peridot Mesa is recommended for development of 5-10 mw, which could connect to the SCIP distribution system at the base of the mesa via short (< 1mile) and economical ($250,000/mile) extensions of 12kV lines.

Key Findings and Recommendations

Small Solar: Use1 mw or smaller installations to reduce purchased electricity. Rooftop/ground-mounted panels should be considered in all development or remodeling.

Energy Efficiency: Continue E audits and retrofits to reduce solar installations needed and to meet remaining demand. Continue E education.

Key Findings and Recommendations

Energy Corporation/Joint Venture

Being considered to support efforts with private developers at the casino and other sites.

Tribal Energy Utility

May be necessary long term to build and operate phased solar connecting to distribution or transmission lines.

91.1 KYAY RADIO STUDIO

91.1 KYAY TOWER SITE

SCHA - NEW HOUSING

APACHE SOLAR PROJECT - 1.1 mw

- Spring 2014 ground breaking * 2.37 mil incentive
- PPA Completed * Fully owned by SCAT
- Training/jobs for Tribal Members for maintaining equipt.
- First Step towards SCAT Tribal Energy Utility