

12 | COMMUNICATIONS DIVISION STAFF SITE VISITS

Principal takeaways

- In some AT&T areas, outside plant technicians' reporting locations (garages) are a long distance from their assigned distribution areas resulting in long travel times to customer locations.
- Most AT&T central offices in rural areas are not [REDACTED] basis; outside plant technicians engaged in troubleshooting must drive to the central office and perform the necessary tasks or wait for a CO technician to be dispatched.
- In rural areas served by both AT&T and Frontier, the distance from the Central Office to many users is well beyond 18,000 feet resulting in long loops or the use of electronic pair-gain equipment; both conditions require a higher level of preventative maintenance and have higher rates of failure.
- In some areas, non-management outside plant workers who leave through attrition or retirement are not replaced resulting in fewer well-trained resources.
- Cable maintenance technicians' workload has shifted from a balance of preventative maintenance work and "chasing troubles" to mostly working on customer trouble tickets.
- In rural areas, customers have fewer (if any) competitive options.

COMMUNICATIONS DIVISION STAFF SITE VISITS

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Introduction

Section 2.2.1 of the Request for Proposal (RFP) defined the selection criteria of facilities and locations to be physically inspected by the CPUC Communications Division (CD) Staff. The areas to be examined were chosen based on analysis conducted by ETI. These included:

1. “Areas that were out of service for a longer duration than the respective statewide average for each company, based on detailed service quality trouble report data; and
2. A random selection of remaining areas and facilities for each company not reviewed in a) above where the Consultant believes should be examined to make a complete report as described.”²⁵¹

The site visits described and documented in this Chapter were conducted by CPUC Communications Division Staff. The text, photos and other materials included within this Chapter were prepared by CPUC Staff.

Criteria for Selecting Site Visits for Network Exam

AT&T Sites were chosen using service quality report data and the following criteria:

1. Using AT&T’s quarterly service quality data, ETI produced a ranking of wire centers from worst to best for the time period of 2016-2017.²⁵² The measure chosen for this ranking was “highest number of out-of-service (OOS) troubles lasting more than 24 hours per 100 access lines.”
2. ETI produced a ranking of the same measure (OOS more than 24 hours) over the full study period from 2010-2017.²⁵³ These are areas that have had poor service quality over the full 8-year period.
3. Wire centers with higher numbers of subscribers that are located in urban areas were selected to serve as a comparison to rural/small wire centers.
4. Wire Centers with relatively better service quality results that are contiguous to a poorly performing area, e.g. Inverness is near Nicasio and San Geronimo.
5. Areas identified by AT&T that would receive Construction and Engineering investment from the incremental fines imposed by General Order 133-D, e.g., Fort Bragg²⁵⁴ and Los Gatos.²⁵⁵

251. CPUC Request for Proposal 17PS5007 issued October 31, 2017, at 9

252. WC OOS Performance 2016-17” spreadsheet created by ETI, 05/09/2018.

253. ATT OOS over 24 Ratio Trend” spreadsheet created by ETI, 05/09/2018.

254. AT&T Advice Letters 47212 filed February 16, 2018 and 47212A, filed July 31, 2018.

6. Areas with clusters of outage complaints filed by customers with the CPUC's Consumer Affairs Branch (CAB).

CD Staff completed physical examinations of the AT&T Wire Centers listed in Table 12.1. The rank refers to ETI's calculation of the poorest performing wire centers; those with the highest ratio of POTS access lines that were Out of Service in excess of 24 hours during the period of 2016-2017. A lower number reflects a worse condition, for example, Pleasant Grove is considered AT&T's 7th poorest performing wire center (out of approximately 612).

Wire Center	Rank	County	Area Designation
Nicasio	98	Marin	Rural
Inverness	137	Marin	Rural
San Geronimo	15	Marin	Rural
Boonville	43	Mendocino	Rural
Fort Bragg	158	Mendocino	Urban
Hopland	67	Mendocino	Rural
Potter Valley	20	Mendocino	Rural
Pleasant Grove	7	Sutter	Rural
Nicolaus	8	Sutter	Rural
Georgetown	11	El Dorado	Rural
Lake of the Pines	54	Nevada	Urban
Placerville	35	El Dorado	Urban
Menlo Park	132	San Mateo	Urban
Los Altos	138	Santa Clara	Urban
Urban is a density of at least 1,000 persons per mile ² . (US Census Bureau)			

Criteria for Selecting Site Visits for Network Exam – Frontier

Frontier represented approximately 20% of the Network Exam, therefore approximately 20% of the site visits conducted by Staff were to Frontier facilities. Additional visits were cancelled due to emergency declarations from wildfires and mudslides in Northern and Southern California in 2018. The two sites which were visited, reflected in Table 12.2 below, included a Distribution Area in Los Gatos that was identified by Frontier as receiving additional investment under § 9.7 of General Order 133-D (Alternative Proposal for Mandatory Corrective Action).

255. Frontier Advice Letter 12772A filed April 4, 2018.

FRONTIER CALIFORNIA PHYSICAL SITE VISIT LOCATIONS		
Wire Center	County	Area Designation
Los Gatos – Montebello	Santa Clara	Urban
Los Gatos – Blossom Hill	Santa Clara	Urban

Site Visit Guidelines

In advance of each site visit, CD Staff sent a formal Site Visit Request to define the area under review, arrange logistics, request high level network maps (see Figures 12.7-12.21 on pages 569-583) and actual customer addresses of out-of-service trouble reports taken from Service Quality data.

Site visit activities in each wire center focused on the following:

1. *Central Office* – General condition, security and accessibility of building (exterior and interior). Inspection of the following items inside the central office (CO): MDF (main distribution frame), switching equipment, ancillary equipment, battery plant, stand-by generator, fuel storage, maintenance logs and cable vault.
2. *Staffing resources* – Whether central office is staffed full-time, part-time or solely “on-demand.” Approximate number of Outside Plant resources available in the area, and amount of traveling required.
3. *Outside Plant network equipment* – Inspection of digital loop carrier equipment in cabinets and associated SAI (Serving Area Interface) cross-boxes, FTTN (fiber to the node) and FTTP (fiber to the premises) equipment (where applicable).
4. *General Outside Plant* – Inspection of poles, pedestals, cables, splices, pole-mounted cross-boxes and associated facilities. Photographic documentation of damaged plant (cables, terminals, splice cases, pedestals) and temporary fixes.
5. *Specific inspections of distribution areas* (neighborhoods) with high incidences of out-of-service (OOS) trouble reports, repeated troubles and customer complaints.
6. *General observation of the population density* of wire center serving area and prevalence of customers located more than 18,000 feet from the central office.

Methodology

CD Staff started each site visit at the central office building; both AT&T and Frontier provided staff (usually first-line managers) to answer questions and provide an overview of the building, switch, vault, battery back-up, generator and day-to-day activities and staffing. The supervisors from the Outside Plant (OSP) departments answered questions about facilities and levels of services available (POTS, high-speed vs. lower speed broadband). In some cases,

additional personnel, such as a design engineer or environmental site manager were present to answer questions about the network or building facilities. In central offices where the cable vault was located in a basement, a construction or maintenance supervisor “vented” the vault to purge any dangerous gasses that may have accumulated.

After completing the full inspection of the central office, CD Staff began most Outside Plant (OSP) surveys with an inspection of a standard serving area interface (SAI) otherwise known as a cross-box or distribution box where feeder cables from the CO are cross-connected to the distribution cables that feed the individual customers. If the exchange contained Remote Terminals (“RTs”) that housed electronic equipment (pair-gain or fiber-optical electronics), at least one location was inspected. While the equipment cabinet is generally out in the open and publicly visible, in order to see inside the cabinets, CD Staff relied on ILEC personnel to unlock the cabinets and provide an overview of the cable plant and equipment contained within.

The remainder of the activities consisted of traveling to pre-identified locations of customer reported complaints and “outage clusters,” which are areas within the exchange that contained multiple outages on the same street or within the same neighborhood. CD Staff observed the general condition of outside plant facilities and photographed components that showed signs of deterioration or deferred maintenance. Examples included: lack of cable guards in areas of heavy tree branch overgrowth; severe de-lashing of the strand on non-self-supported copper cable; improperly sealed splice closures (or lack of closure); improper attachments of aerial plant; insufficient cable clearances between utilities; extreme cable sag between poles; bonding/grounding deficiencies; bad terminal attachments; and sloppy cable/drop maintenance practices (both aerial and buried). CD Staff were not permitted to open ground-mounted pedestals or pole-mounted terminals and splices, so any in-depth inspection or hands-on testing of facilities was not possible. CD Staff did not proactively make contact with customers, but if a resident approached, CD Staff identified themselves, stated the purpose of their visit, and inquired as to the quality of the customer’s wireline service.

AT&T Trip Reports

Marin County – Nicasio, Inverness and San Geronimo

Nicasio, Inverness and San Geronimo are rural towns located approximately 1.5 hours north of San Francisco (see Figure 12.1). Table 12.3 provides general information about each of these wire centers.²⁵⁶ San Geronimo is ranked as the 15th worst area (out of 612); Nicasio and Inverness are ranked 98th and 137th respectively. These rankings are based on the highest number of OOS reports exceeding 24 hours per hundred lines that occurred during the 2016-2017 time period.

256. The area calculations in Tables 12.3, 12.4, 12.5, 12.6 and 12.7 reflect the total square mileage of the central office serving area, which may include multiple cities and towns. CPUC GIS Staff provided this information as AT&T’s reply to DR 02-A requesting the actual square mileage of each wire center was non-responsive.

Table 12.3

**MARIN COUNTY
PHYSICAL SITE VISIT INFORMATION**

Wire Center	Rank (worst)	# Lines 4Q2017	Broad-band?	Population (2010)	Area (sq. mi.)	Designation
Nicasio	98	280	No	96	46 m ²	Rural
Inverness	137	484	Yes	1,304	23 m ²	Rural
San Geronimo	15	509	Yes	446	12 m ²	Rural

Sources: ETI rankings, AT&T service quality report 4Q2017, AT&T DR 01-A, US Census Bureau.

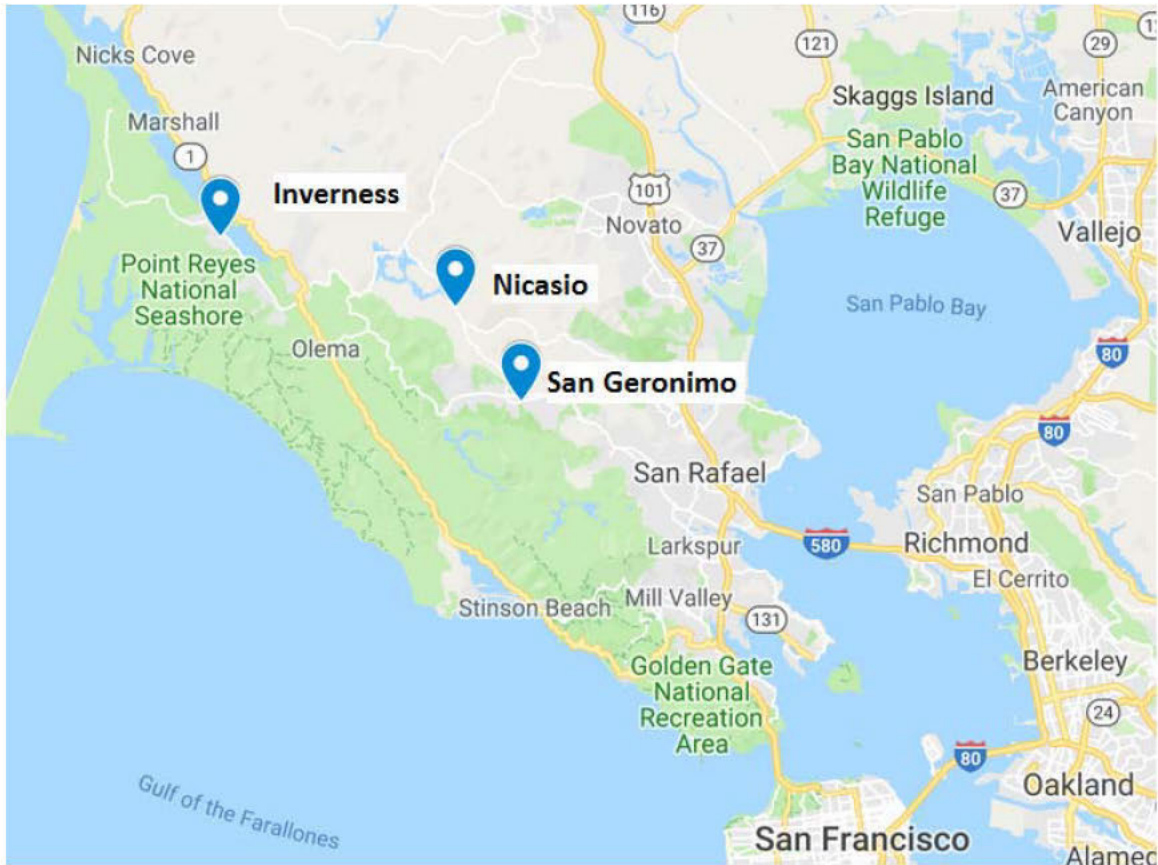


Figure 12.1. Marin County Site Visit Locations

The Nicasio and Inverness Central Offices do [REDACTED]; the feeder cables are [REDACTED]. The San Geronimo Central Office has a [REDACTED]. All three COs contain [REDACTED] switches that are controlled by a host switch at a larger central office. Batteries, generators and fuel storage areas were observed to be in full working order. San Geronimo has a [REDACTED]. CD Staff inquired as to how long the CO could operate without commercial power, and was advised that it could

operate for an infinite amount of time as long as diesel fuel was delivered. If the roads were blocked due to severe weather or fires, AT&T personnel presumed that at “normal” operation, phone service could last for at least 3-5 days, but this is dependent on customer traffic and other variables.

None of the three locations have [REDACTED]; technicians in the district are [REDACTED] based on workload. The 1 line supervisor for the area manages a team of technicians who cover anywhere from [REDACTED] central offices in Marin and Sonoma Counties. In instances where an Outside Plant technician requires assistance from a CO technician, e.g., to put tone on a line, swap a pair (wires on the Main Distribution Frame) or any other task, one option is to [REDACTED]; this may or may not require an undetermined wait time. The Outside Plant (OSP) technician is permitted to enter the CO and access the OSP cable connection blocks on [REDACTED] to test pairs or place tone, but in rural areas, the amount of travel time from the customer’s location to the CO (and back) often results in high levels of inefficiency.

AT&T fiber-enabled high-speed internet service is not available in any of these three wire centers. In Inverness and San Geronimo, customers are limited to copper-fed DSL (digital subscriber line), but only if they live within approximately 3 route miles of the central office. In its response to CD Data Request 01-A, AT&T stated that broadband service is not available in Nicasio.

Overall, the outside plant facilities in all three wire centers showed signs of deferred maintenance that included double-pole conditions (deferred reconnection of new terminals and drop lines), broken lashing wire on cable runs (the cable sags below the supporting strand) and limited tree trimming resulting in tree branches that put weight and/or tensile force on cables. The central office buildings themselves, while old, appeared to be in good condition; the only exception was the cable vault in San Geronimo; on the day of the site visit, it appeared to be recovering from water (and mud) intrusion.

Marin County Photographs

The following photographs are a mix of outdoor “public” pictures taken by CD Staff and “indoor” photographs taken by AT&T personnel and deemed confidential. The attestation attached to confidential photos states the following:

“PROPRIETARY AND CONFIDENTIAL INFORMATION under Cal. Gov. Code §6254 (k); Cal. PUC GO 133-D; 18 U.S.C. 1905; the Critical Infrastructure Information Act of 2002, 6 U.S.C. §133(a)(1)(E); Executive Order 12600; and New Part 4 of the Commission's Rules Concerning Disruptions to Communications, ET Docket No. 04-35, Report and Order (FCC 04-188), 19 FCC Rcd 16830, para. 40 (2004); MAY NOT BE DISCLOSED PURSUANT TO PUBLIC UTILITIES CODE SECTION 583.

See the Declaration of Mark Berry, dated 05-10-2018.”



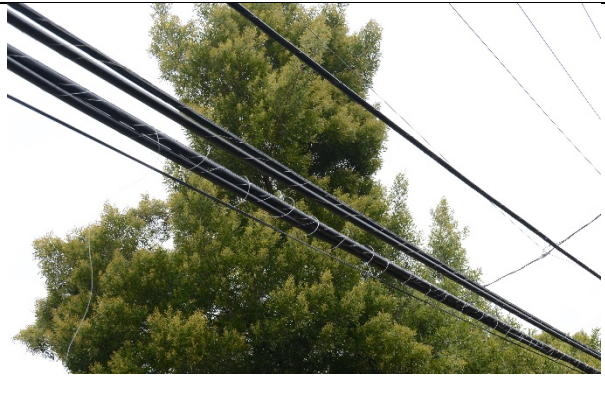
Inverness Central Office



Nicasio Central Office



San Geronimo Central Office



Cables unlashed from strand



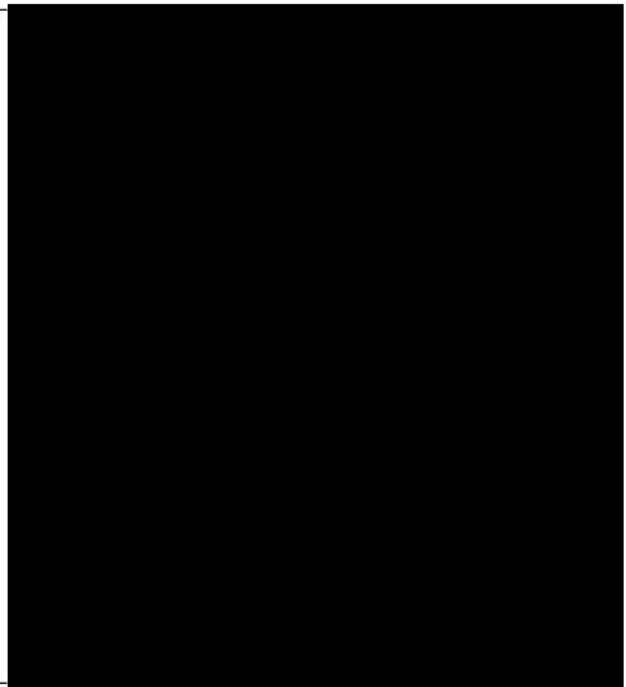
Cables rubbing against tree branches



Deferred maintenance (San Geronimo)



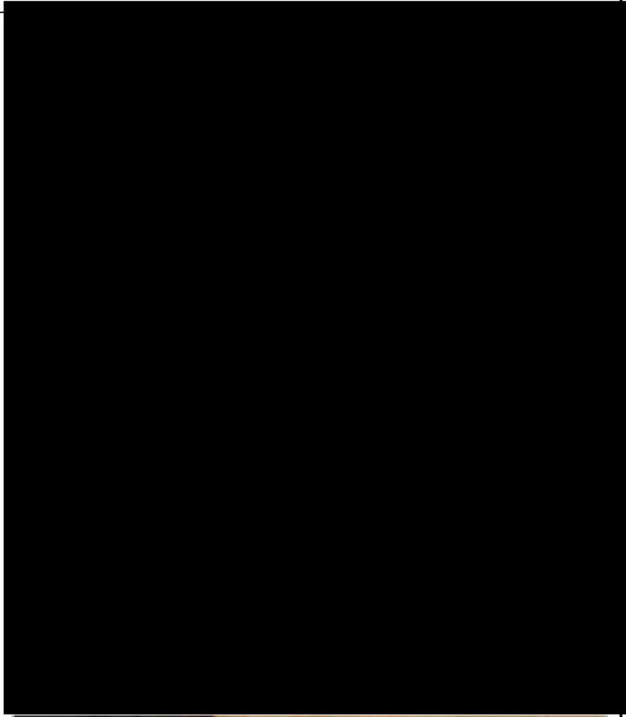
Inverness cable vault (main floor)



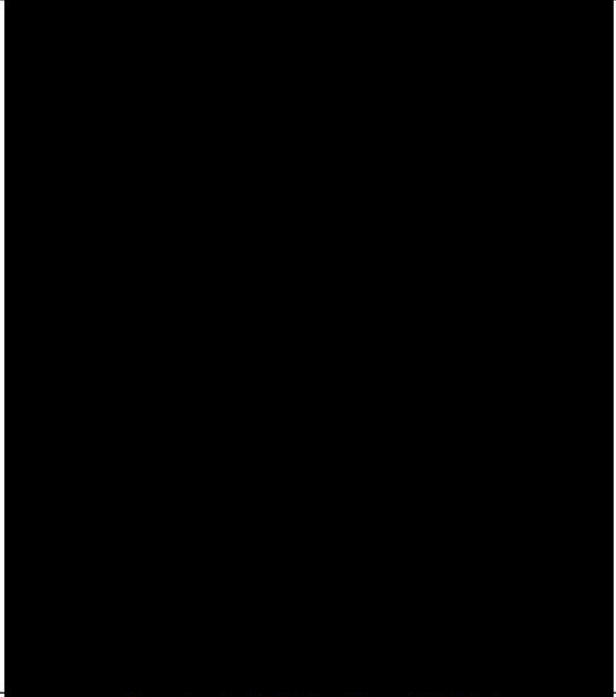
Nicasio cable vault (main floor)



Inverness cable vault (basement)



Northern Telecom DMS-100 Switch

	
<p>Vertical (OSP) side of MDF</p>	<p>Horizontal side of MDF (to CO switch)</p>
	
<p>Generator (San Geronimo CO)</p>	<p>Diesel Fuel Supply (San Geronimo)</p>

Mendocino County – Boonville, Fort Bragg, Potter Valley and Hopland

The towns of Boonville, Potter Valley, Hopland and the city of Fort Bragg are located in Mendocino County. Boonville and Hopland are approximately 2 hours north of San Francisco, while Fort Bragg and Potter Valley are further north at 3 to 3.5 hours from San Francisco (see Figure 12.2). Table 12.4 provides general information about each wire center. Of the four wire centers that CD Staff had visited, the worst ranked is Potter Valley at 20th out of AT&T's 612 wire centers. Potter Valley is the only CO in this group in which AT&T does not provide broadband services to customers and as the data show, service quality is poor.

MENDOCINO COUNTY PHYSICAL SITE VISIT INFORMATION						
Wire Center	Rank (worst)	# Lines 4Q2017	Broad- band?	Population (2010)	Area (sq. mi.)	Designation
Boonville	43	740	Yes	1,035	213 m ²	Rural
Fort Bragg	158	3,563	Yes	7,278	341 m ²	Urban
Potter Valley	20	579	No	646	420 m ²	Rural
Hopland	67	228	Yes	756	83 m ²	Rural

Sources: ETI rankings, AT&T service quality report 4Q2017, AT&T DR 01-A, US Census Bureau.

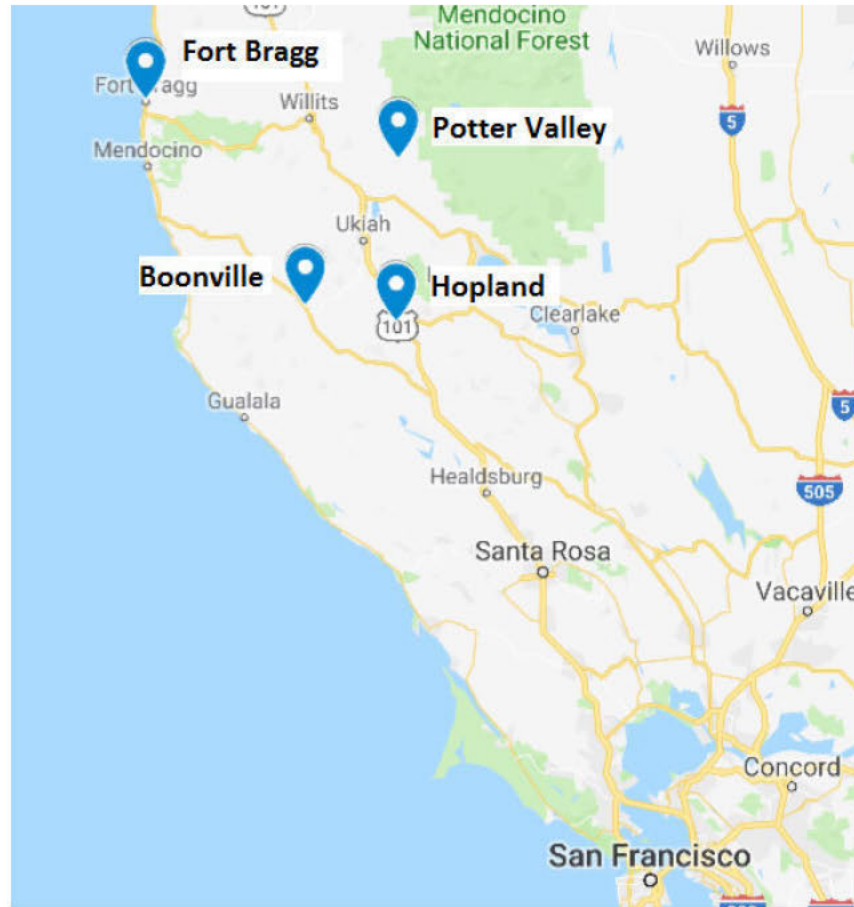


Figure 12.2. Mendocino County Site Visit Locations

The Boonville, Potter Valley and Hopland Central Offices contain [REDACTED] switches that are [REDACTED]. There are [REDACTED]; feeder cables are [REDACTED]. The Fort Bragg Central Office, located in an urban area, serves as [REDACTED] and has a larger central office building [REDACTED] in the basement. The Boonville Central Office also serves the town of Philo located 5 miles north; in order to efficiently serve customers over the entire exchange area of 213 square miles, AT&T deployed a [REDACTED] (see photo below).

All four locations appeared to have the requisite back-up batteries, generators and fuel storage; both Fort Bragg and Hopland had what looked like portable generators (see photos below). The Hopland Central Office building has [REDACTED] and a larger footprint than other comparable COs in the surrounding area. This may have been part of a past or future plan for a network expansion of some kind.

None of the Mendocino locations have [REDACTED]; the 1st line manager distributes technicians throughout the area based on workload and need. Outside Plant technicians cover a large geographic area and, when necessary, can enter [REDACTED]

████████ central office to test and troubleshoot a customer’s line. In some of the more remote areas, the driving distance from AT&T’s repair garage to a customer’s location might take up to two hours, which limits the number of repair jobs a technician can complete in one day.

The design engineer for the area confirmed that none of the exchanges have fiber-enabled internet service available; copper-fed DSL is the only option, and is limited to a distance of approximately 3 route miles from the serving central office. In Potter Valley, AT&T does not offer DSL; residents confirmed that the only available non-mobile broadband options are satellite technologies, fixed wireless, or starting in 2018, DSL provided by a Competitive Local Exchange Carrier (CLEC). The CLEC currently uses AT&T’s copper facilities (unbundled network elements or “UNEs”) to provide wired broadband services to customers. Figure 12.3 below from the California Interactive Broadband Map²⁵⁷ confirms the absence of wireline broadband service as of December, 2017; the areas in red represent “Unserved – No Service”.



Potter Valley, AT&T’s 20th worst-ranked wire center has no wired broadband option offered by AT&T.

Overall, CD Staff noted examples of deferred maintenance such as a black plastic “drape” covering a splice instead of a properly sealed closure. While it is possible that the splice locations in question are part of an ongoing construction or maintenance job in, CD Staff did not see any evidence of activity in those locations, and noted that some of the “temporary” fixes showed signs of exposure to weather. There were also areas where tree branches needed to be trimmed and where cables were sagging due to being de-lashed from the support strand.

In one of the locations, a non-management employee approached a CD Staff member to arrange a telephone call to discuss service quality issues. This technician relayed to the staff member that AT&T’s business decision not to replace technicians who retire or quit is negatively impacting service quality because it forces technicians to “do more work with fewer trained resources.” Until a few years ago, technicians worked on a balance of preventative maintenance projects and trouble reports (out of service conditions), but most of the work now is “fixing troubles instead of keeping them from happening”. The technician noted that on days when his dispatch load (number of customer troubles) contains more jobs than can be cleared in a day, the unfinished locations are pushed out to the next day, whereas in the past, there were more technicians available to share the load. This could explain the decrease in the percentage of out-of-service conditions cleared within 24 hours over the study period, as referenced in Chapter 4A.

257. California Interactive Broadband Map”, <http://www.broadbandmap.ca.gov/>

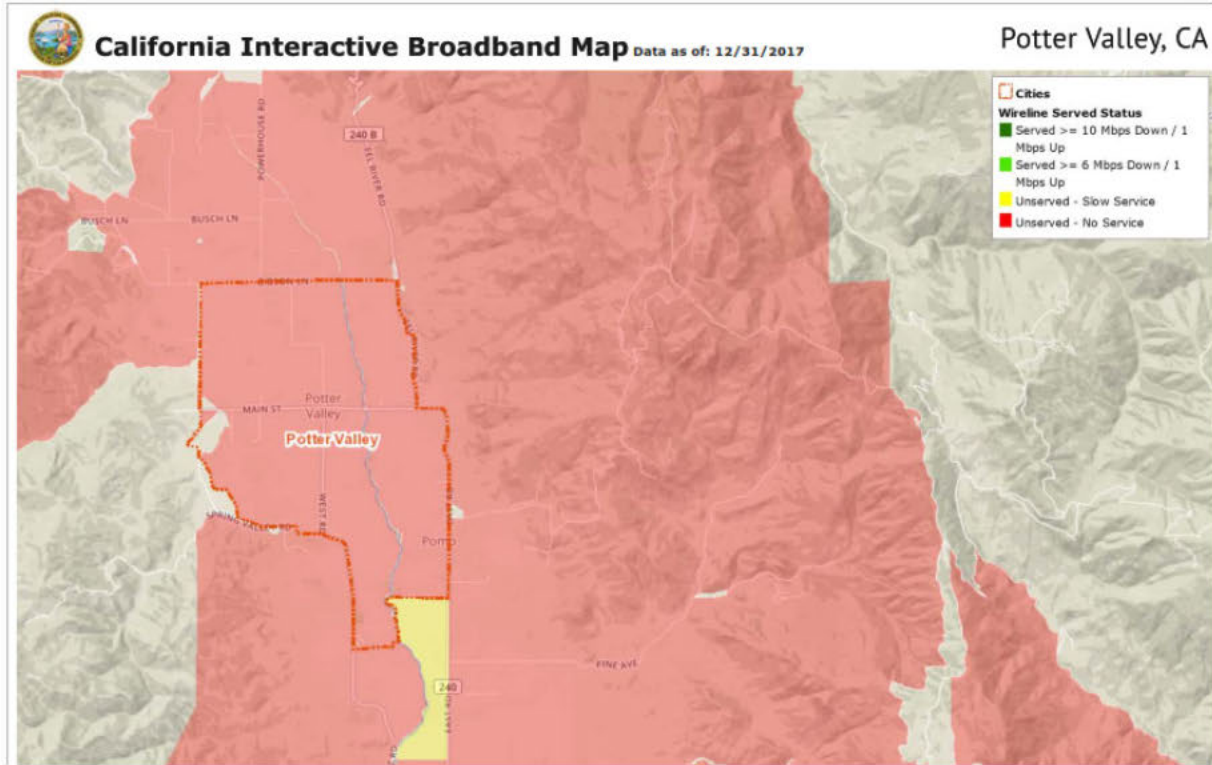
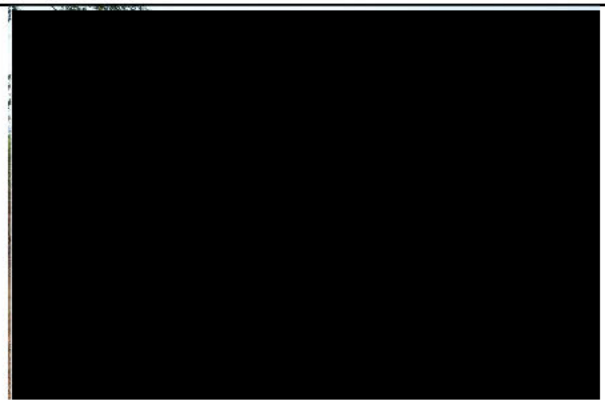


Figure 12.3. Lack of broadband in Potter Valley (map shows the town, not full exchange area)

Mendocino County Photographs



Boonville Central Office



Philo Remote Terminal (fed by Boonville)



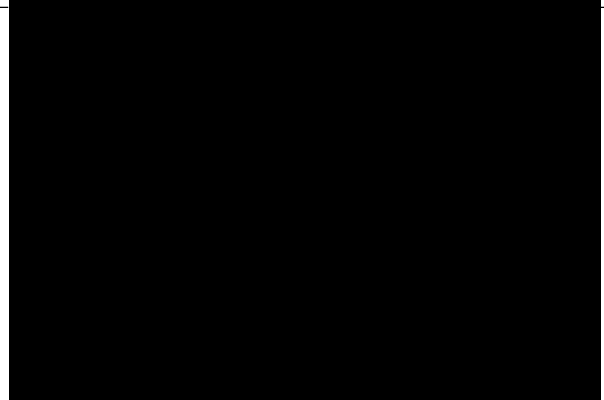
Temporary splice closure in Boonville



Splice location with plastic cover



Rear of Fort Bragg Central Office



Portable generator, Fort Bragg



Long drops serving remote customers



Overgrowth of trees near facilities

	
<p>Potter Valley CO & generator</p>	<p>Pair-gain Remote Terminal & cross-box</p>
	
<p>Splice wrapped in plastic drape</p>	<p>Hopland Central Office</p>
	
<p>Hopland permanent generator</p>	<p>Hopland portable generator</p>

Sutter, El Dorado and Nevada Counties: Pleasant Grove, Nicolaus, Georgetown, Lake of the Pines and Placerville

Pleasant Grove, Nicolaus, Georgetown, Lake of the Pines and Placerville are located in three different counties north and northeast of Sacramento (see Figure 12.4). Pleasant Grove and Nicolaus are in Sutter County, Georgetown and Placerville are in El Dorado County. The Lake of the Pines Central Office is officially in the city of Auburn, but serves a gated residential community named “Lake of the Pines” in Nevada County. Table 12.5 provides general information about each wire center. Of the five wire centers, Pleasant Grove and Nicolaus are the lowest ranked at 7th and 8th respectively.

SUTTER, EL DORADO AND NEVADA COUNTIES PHYSICAL SITE VISIT INFORMATION						
Wire Center	Rank (worst)	# Lines 4Q2017	Broad- band?	Population (2010)	Area (sq. mi.)	Designation
Pleasant Grove	7	183	Yes	815	67 m ²	Rural
Nicolaus	8	116	Yes	211	61 m ²	Rural
Georgetown	11	1,486	Yes	300	141 m ²	Rural
Lake of the Pines	54	2,119	Yes	3,917	103 m ²	Rural
Placerville	35	8,045	Yes	10,936	252 m ²	Urban
Sources: ETI rankings, AT&T service quality report 4Q2017, AT&T DR 01-A, US Census Bureau.						

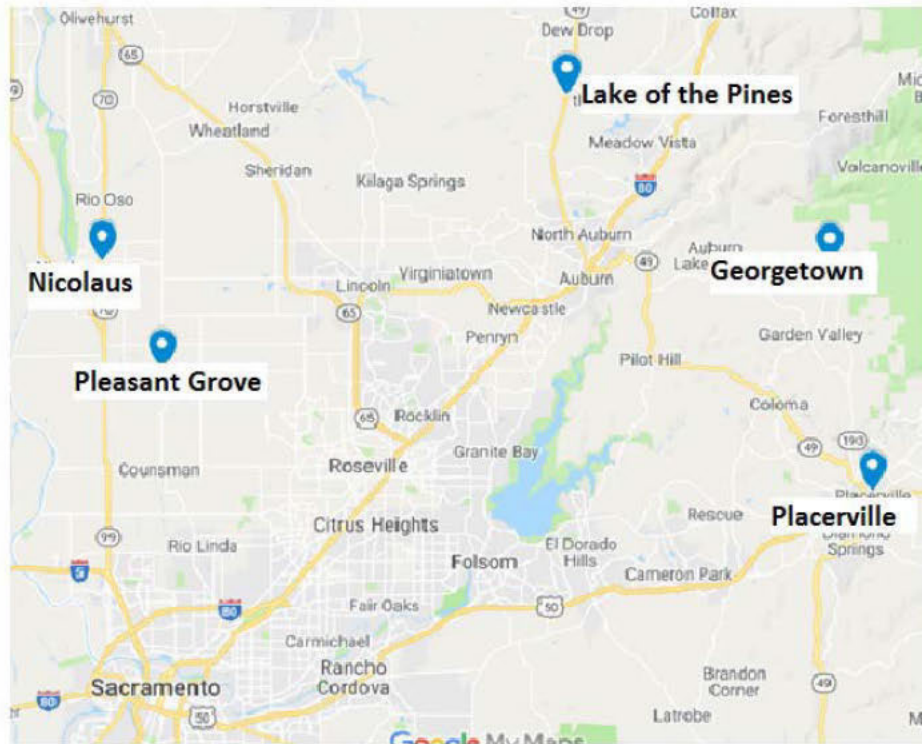


Figure 12.4. Sutter, El Dorado and Nevada Counties

DSL broadband service is available in all five wire centers with speed limitations based on the customer's cable route distance from the CO, (the further the distance, the lower the speed). Placerville is the only area served by fiber-enabled facilities that are capable of providing service beyond the approximate 15,000-foot limitation. A maintenance supervisor who lives on the border of the area served by the Lake of the Pines CO informed CD Staff that his residence is beyond AT&T's DSL service area. His only option for high-speed internet is from a fixed-wireless provider. Other competitive offerings include cable internet and satellite; however, availability depends on the location of the end-user.

The Pleasant Grove, Nicolaus, Georgetown and Lake of the Pines Central Offices contain [REDACTED] switches that are hosted by other central offices. Placerville is equipped with a [REDACTED] switch that presumably serves other smaller central offices in the region. The Pleasant Grove, Nicolaus and Georgetown Central Office buildings [REDACTED] [REDACTED] feeder cables are [REDACTED]. All locations appeared to have the requisite back-up batteries, generators and fuel storage; however, Placerville's generator is [REDACTED].

At the time of CD Staff's site visit, Lake of the Pines was the only central office with [REDACTED]. The other four areas are handled by [REDACTED].

multiple central offices. Outside Plant technicians cover large geographic areas and can enter [REDACTED] central office to troubleshoot a customer's line.

CD Staff observations and inquiries with AT&T personnel provided insights that revealed the possible cause(s) of the poor performance in these five areas. Pleasant Grove and Nicolaus are sparsely populated large agricultural areas where the primary crop is rice which is grown in standing water. The biggest contributor to the high rate of troubles is due to flooding; cables get wet and the water causes short-circuit conditions (known as a "loop-cross") in the copper wires. In many locations, CD Staff observed customers' homes served by a buried drop wire because the distance from the serving terminal to the minimum point of entry (MPOE) was too far for an aerial drop wire. Over time, and sometimes due to external factors (construction, digging) these buried drops deteriorate (or are cut), resulting in an out-of-service condition for the customer. In Nicolaus, CD Staff met a customer who had filed multiple CAB (Customer Affairs Branch) complaints with the CPUC. Her home, which was fed with a buried drop approximately 200 feet from the serving pedestal, lost telephone service every time it rained. After multiple visits by AT&T repair crews who did not resolve the problem, she filed a complaint with the CAB that resulted in AT&T doing a full re-route and replacement of the buried drop wire.

Deferred maintenance and outside plant facilities that are in service beyond their usable life are contributing factors to higher rates of failure. AT&T field personnel in Georgetown and Placerville cited multiple factors including water intrusion (rain), overgrowth of tree branches, lightning strikes (which might indicate improperly bonded and grounded facilities), and damage caused by animals that chew on or otherwise damage aerial cables and facilities. In addition, both wire centers cover large geographical areas that require either long copper loops or the use of electronic pair gain systems. A longer path from the central office to the end-customer provides more potential points of failure. An AT&T employee commented that long loops are a constant source of problems, and that "from a design standpoint, the towns [Placerville and Georgetown] grew further away from the central office, we [AT&T] probably should have added another CO years ago."

Subscriber loop carrier or pair gain systems that provide telephone service to areas with a high density of subscribers and are typically located far from the central office are often a source of customer troubles. Enclosed in cabinets, or in some cases small buildings known as "huts," they are active systems that rely on commercial power and are equipped with battery backup systems. While designed to be installed outdoors and to withstand operating temperatures in the range of -20 C to +65 C,²⁵⁸ AT&T technicians reported that if the cabinet is in an open area under direct sunlight, the temperature inside can exceed the upper level of the operating range. In one area, a remote terminal that is exposed to direct sunlight often fails due to excessive heat; AT&T was not able to install a canopy or shade cover over the cabinets due to permitting restrictions and homeowner association objections.

258. Telecordia GR-487-CORE, "Generic Requirements for Electronic Equipment Cabinets".

Sutter, El Dorado and Nevada County Photographs



Pleasant Grove Central Office



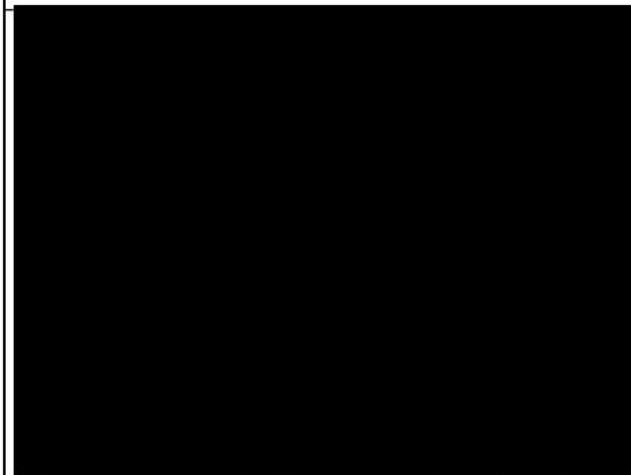
Nicolaus Central Office



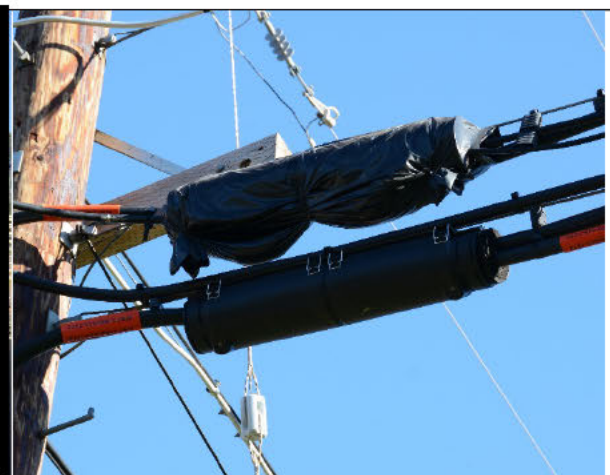
Splice wrapped in plastic drapery (Nicolaus)



Lake of the Pines Central Office



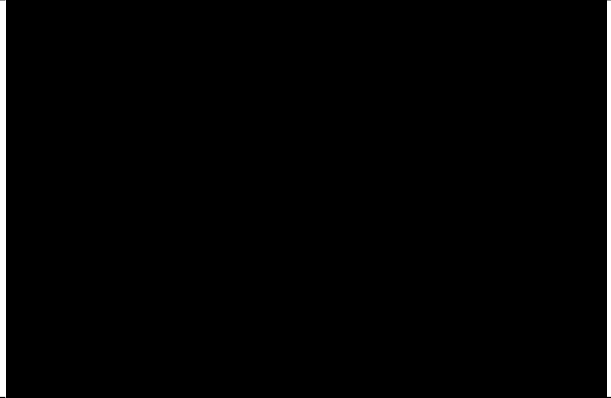
Generator at Lake of the Pines



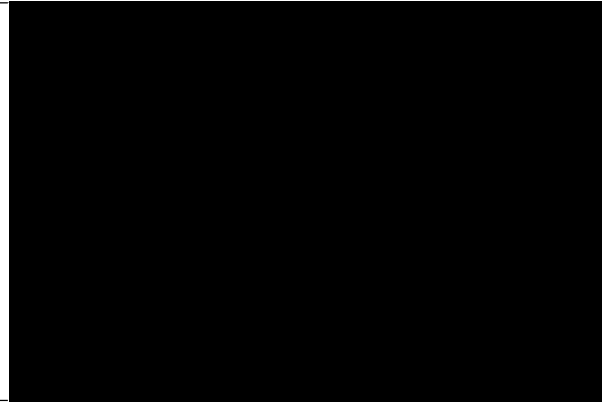
Plastic covered splice (Lake of the Pines)



Georgetown Central Office



Generator at Georgetown Central Office



Remote Terminal 5 miles from CO



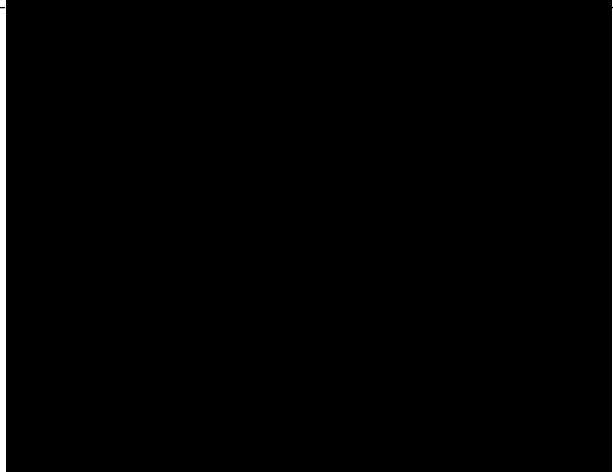

Aerial Plant in El Dorado County



Dented cross-connect box



Placerville Central Office

	
Remote Terminal with portable generator	Remote Terminal (electronics inside)

San Mateo and Santa Clara Counties: Menlo Park and Los Altos

The exchanges of Menlo Park and Los Altos are located in San Mateo and Santa Clara counties respectively, approximately 45-60 minutes south of San Francisco (see Figure 12.5). Table 12.6 provides general information about each of these wire centers. While among the most affluent cities in California, Menlo Park and Los Altos rank as the 132nd and 138th poorest performing areas in AT&T's network in California. The median household incomes (in 2017 dollars) are \$132,928 and \$208,309 for Menlo Park and Los Altos respectively. In comparison, the statewide median household income for California is \$67,169.²⁵⁹

Customers in the Menlo Park and Los Altos exchanges have many broadband options available, including cable, high-speed fiber provided by AT&T and by competitive local exchange carriers (CLECs) and fixed-wireless. CD Staff noted that a major fiber-to-the-home project under construction in Los Altos appeared to be targeting the same customers served by the local CLEC. However, customers that are located far from the central offices and/or in a Distribution Area that does not contain a Remote Terminal, are either relegated to low speed copper DSL or are not eligible for broadband service provided by AT&T. Given the high availability of competitive broadband options, it appears that most residents have at least one viable option for home internet service.

SAM MATEO AND SANTA CLARA COUNTIES PHYSICAL SITE VISIT INFORMATION						
Wire Center	Rank (worst)	# Lines 4Q2017	Broad- band?	Population (2010)	Area (sq. mi.)	Designation
Menlo Park	132	4,478	Yes	32,088	78 m ²	Urban
Los Altos	138	5,014	Yes	29,076	41 m ²	Urban
Sources: ETI rankings, AT&T service quality report 4Q2017, AT&T DR 01-A, US Census Bureau.						

259. United States Census Bureau, www.census.gov/quickfacts/ca



Figure 12.5. Menlo Park and Los Altos

Each central office is equipped with AT&T [REDACTED] switches; it is not apparent if these switches serve other wire centers. Cable vaults are [REDACTED]. Both buildings are quite large with much unused space, most likely due to technological advances in switching systems that reduced the size of telecommunications equipment. Neither central office [REDACTED]; however, [REDACTED] is available. AT&T personnel noted that the battery back-up system is designed to provide at least [REDACTED]-hours of power in the event of commercial power loss, and that the battery and generator systems are tested for one hour per month.

While the highly populated areas of both towns are densely concentrated, there are customers that are located in the hills and therefore are further away from the central offices. In these areas, Outside Plant technicians cover large geographic areas; when the technicians must travel a long distance to [REDACTED] central office to troubleshoot a customer's line, it increases the time that a customer is out of service.

AT&T personnel reported that many outside plant troubles are caused by conditions outside their control such as squirrels and other rodents that chew on or otherwise destroy cables, vandalism, construction mishaps such as heavy equipment that causes damage to facilities, and water damage caused by rain. CD Staff maintains that while precipitation does cause problems for copper cable, proper maintenance by service providers will ensure that the network is robust enough to handle the largely predictable annual rainfall in Northern California.

Menlo Park and Los Altos Photographs



Menlo Park Central Office



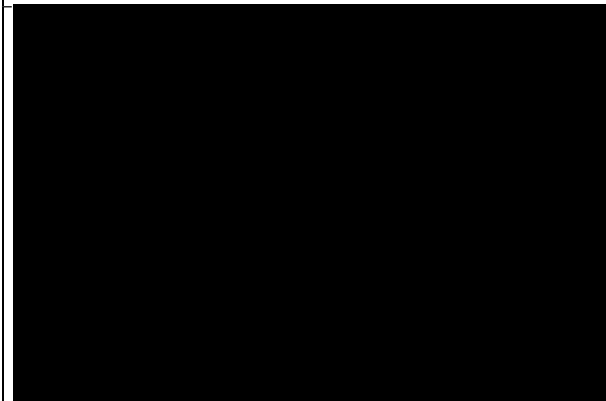
Terminal improperly attached



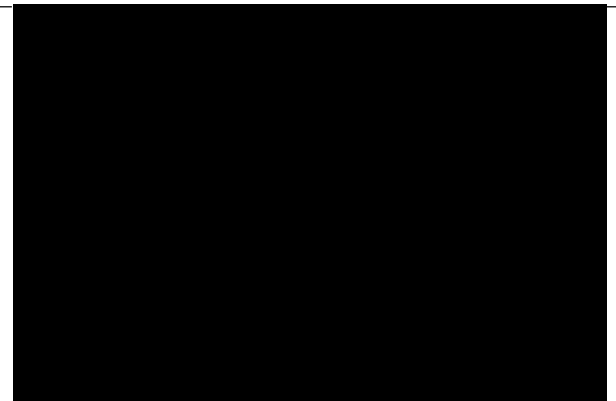
Terminal and drops



Los Altos Central Office



Los Altos Central Office generator



Remote Terminal (hut)



Fiber build-out in progress



Cable de-lashed from support strand


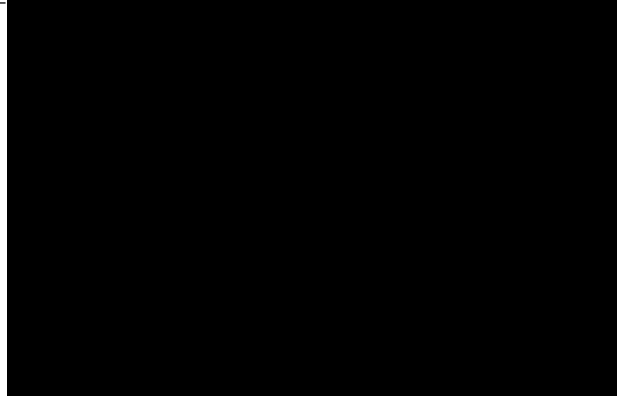
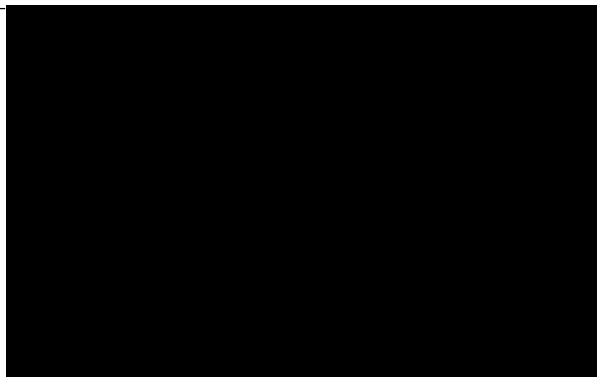
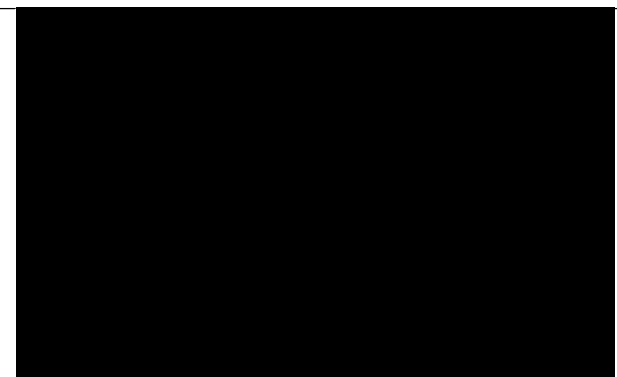
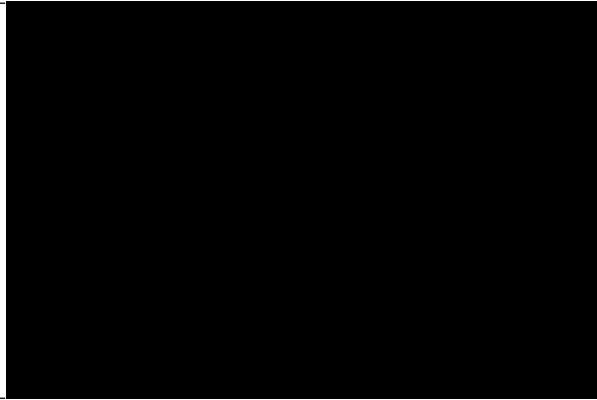
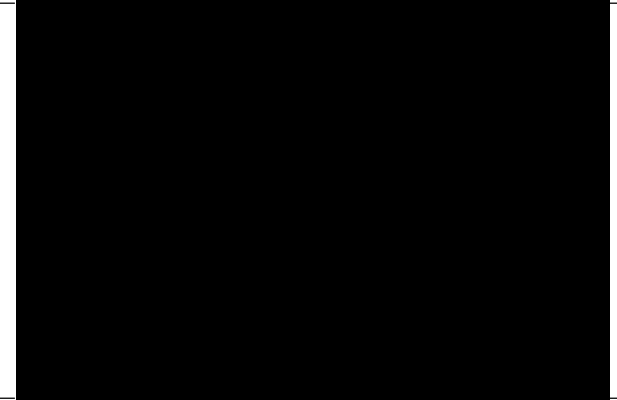
In contrast to many other central offices, Frontier’s Blossom Hill and Montebello Central Offices are [REDACTED] with technicians who administer the switch operations, wiring additions/changes on the main distribution frame, and assist outside plant field personnel with service orders and troubleshooting of customer lines. CD Staff observed significant activity in each location, with personnel from multiple departments either based in the building, or utilizing space as a “satellite” office. An outside plant engineer works out of the Montebello office and is able to provide engineering support to field technicians when necessary. Feeder cables are contained in [REDACTED]. Both central offices contain switches manufactured by [REDACTED], that serve as the main switching systems for the wire centers. Montebello also contains an [REDACTED] switch; Frontier personnel noted that it was added “some time ago” to upgrade the central office and retire the [REDACTED] switch, but the plan was abandoned. The [REDACTED] switch remains in service with a small number of working lines.

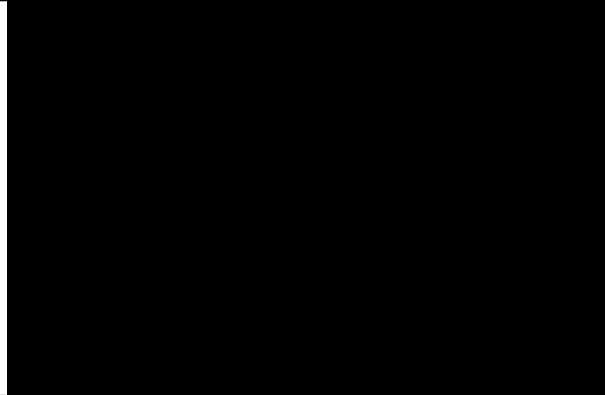
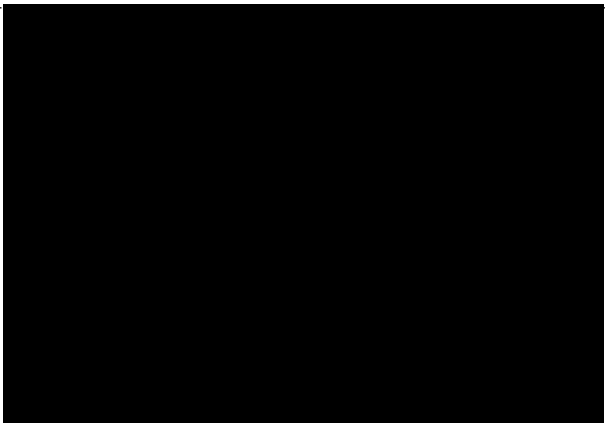
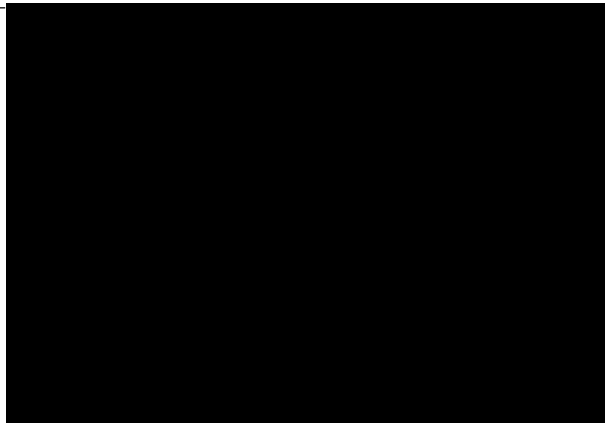
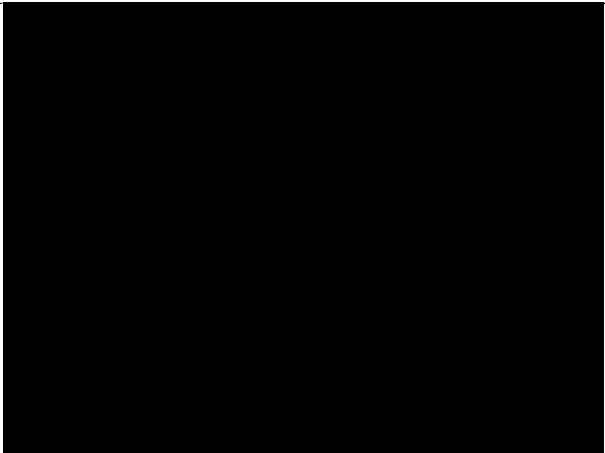

Generators are [REDACTED]. The generators undergo a monthly load test and the battery system is checked twice a year. Frontier staff noted that upon loss of commercial power, the generator activates automatically to provide power to the building, the network and the battery system. Battery capacity is sized to maintain service for at least [REDACTED] hours in the event of a catastrophic loss of power that affects both the commercial power feed and the on-site generator.

Frontier’s fiber-to-the-premises *FiOS*[®] high-speed internet service is not available in any of the wire centers that serve Los Gatos. DSL and Fiber-to-the-Node internet services, with download speeds of up to 6, 12, and 18 megabits-per-second are available to most residents within the Blossom Hill and Montebello wire centers. Competitive options include Xfinity by Comcast (cable internet), fixed-wireless, and satellite. It appears that some form of high-speed internet service is available to almost all residents.

CD Staff observed signs of deferred maintenance including broken lashing wire on cable runs (cable sags below the supporting strand), exposed cables on riser poles (not properly contained within protective cover), overgrown tree branches (excess weight and or tensile force on cables) and pedestals and other buried cable closures that were not properly sealed.

Los Gatos (Blossom Hill and Montebello) Photographs

	
<p>Blossom Hill Central Office</p>	<p>Batteries for back-up system</p>
	
<p>Cable records in engineering office</p>	<p>Exchange maps</p>
	
<p>Main Distribution Frame (horizontal)</p>	<p>Main Distribution Frame (vertical)</p>

	
<p>Blossom Hill cable vault</p>	<p>Feeder cables with air pressure tags</p>
	
<p>Grounding bar in cable vault</p>	<p>Indoor back-up generator</p>
	
<p>Fiber-fed Remote Terminal</p>	<p>Cable de-lashed from strand</p>



Montebello Central Office



Cables de-lashed from support strand



Unprotected cables on riser pole



Cables detached and unprotected

Exchange Maps provided by AT&T

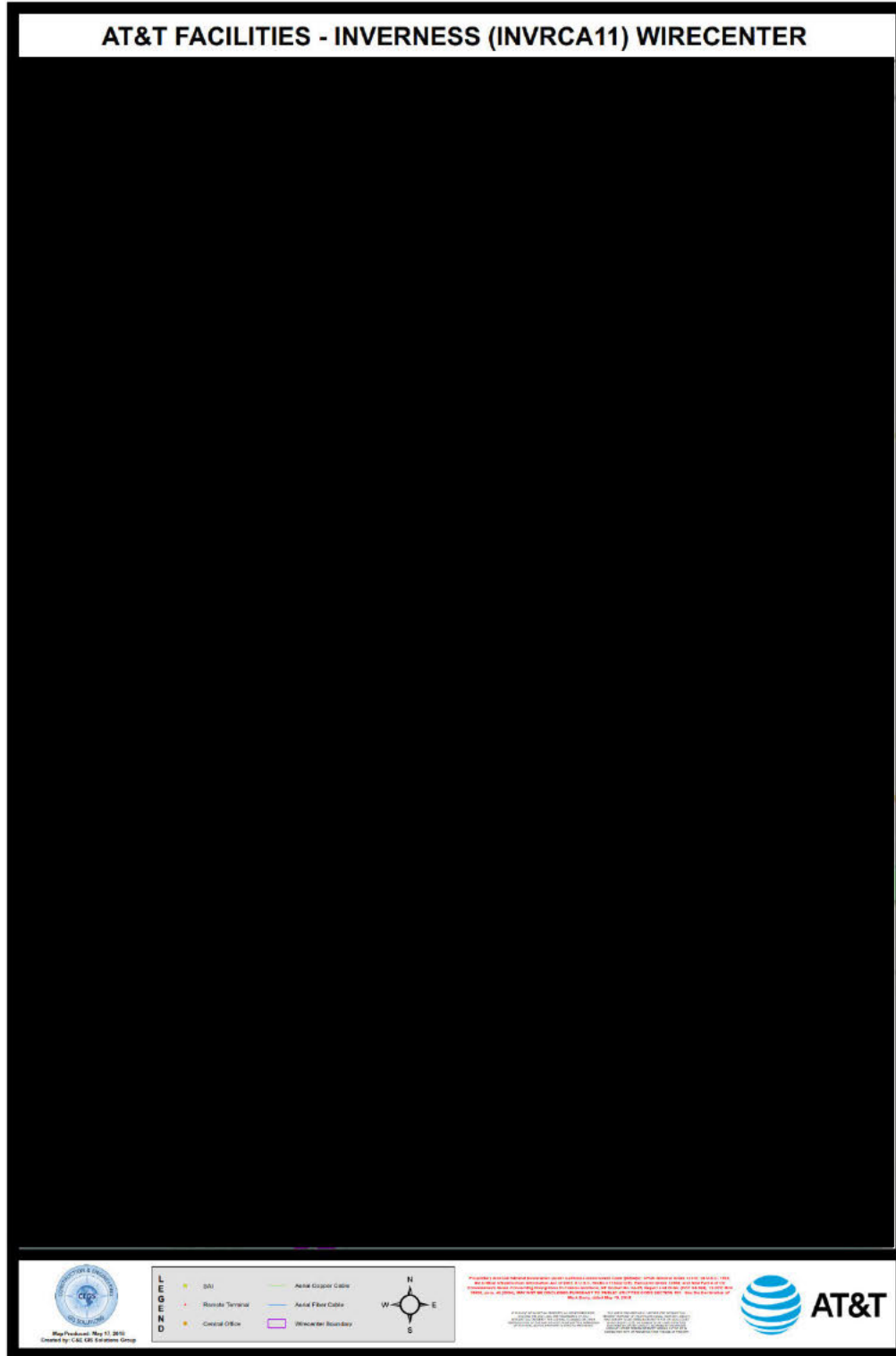


Figure 12.7. Map of Inverness Exchange

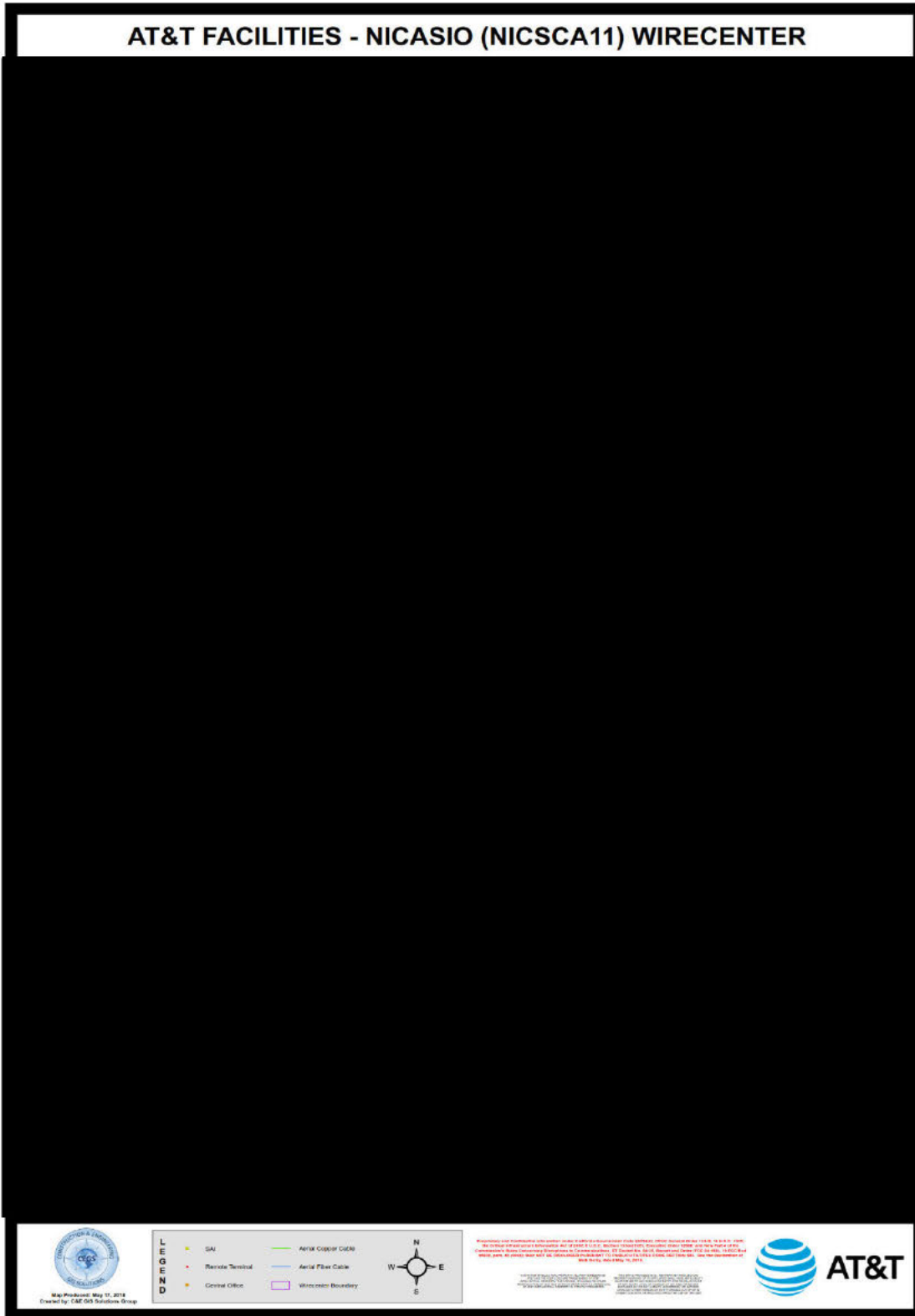


Figure 12.8. Map of Nicasio Exchange



Figure 12.9. Map of San Geronimo Exchange

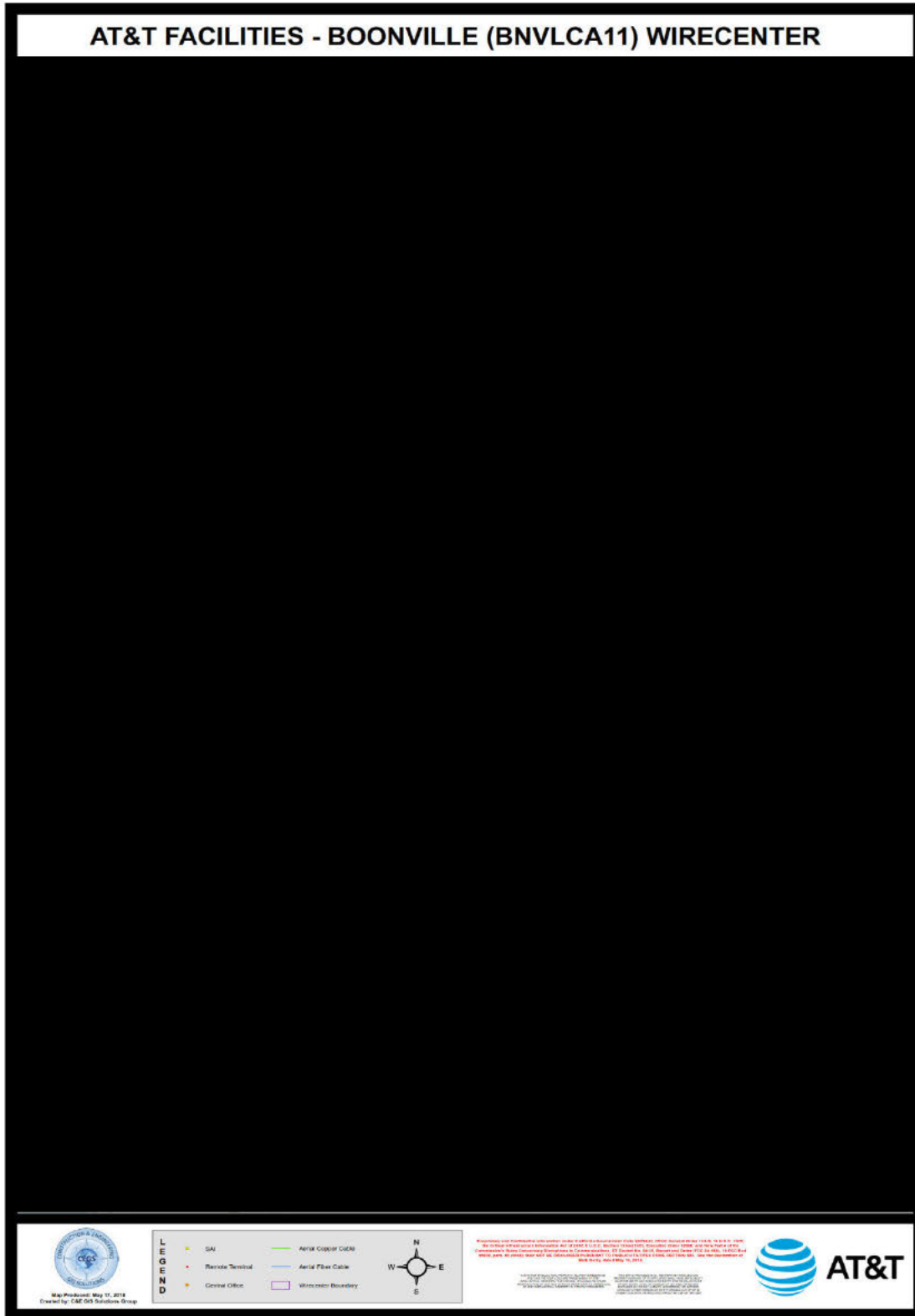


Figure 12.10. Map of Boonville Exchange

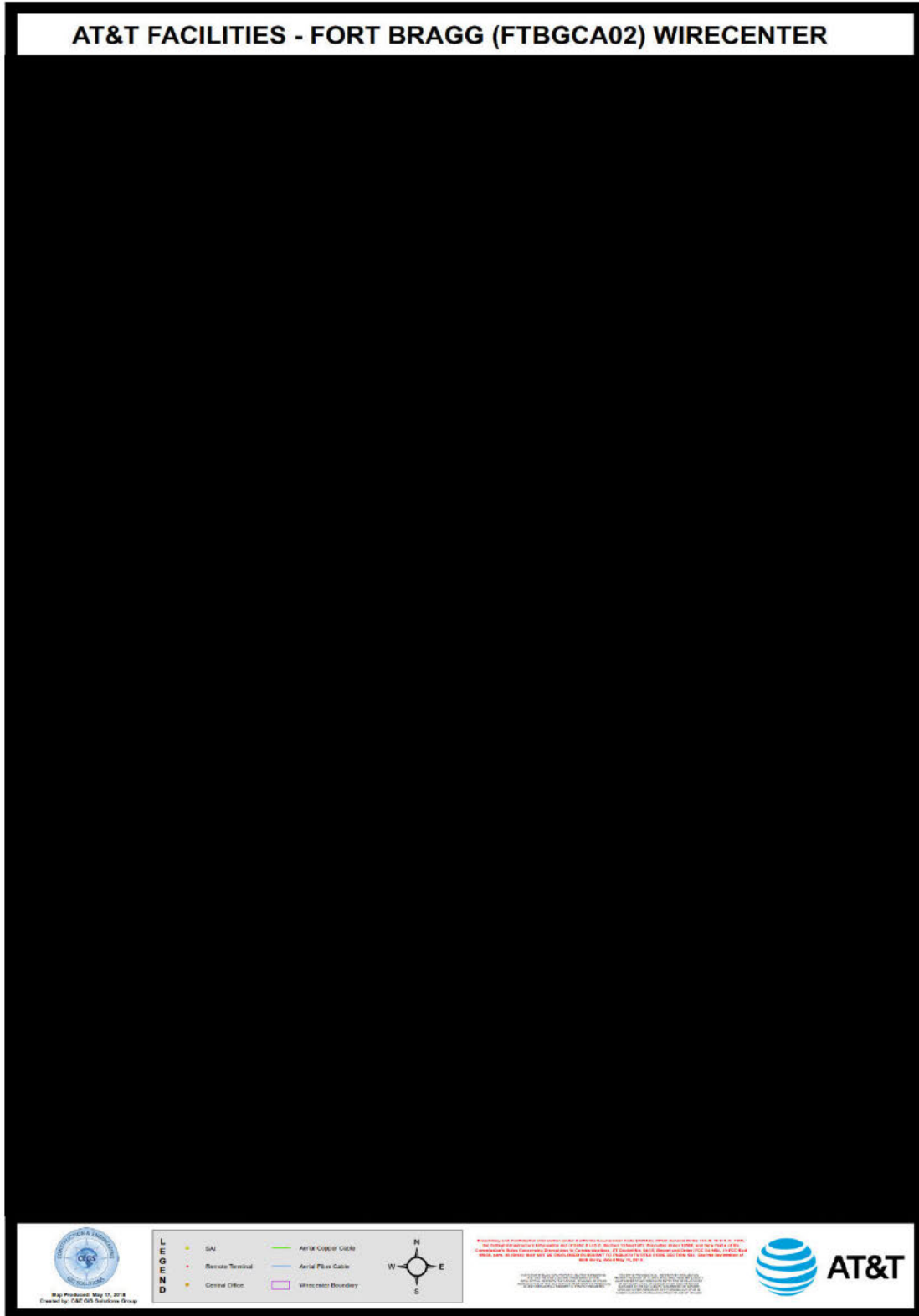


Figure 12.11. Map of Fort Bragg Exchange

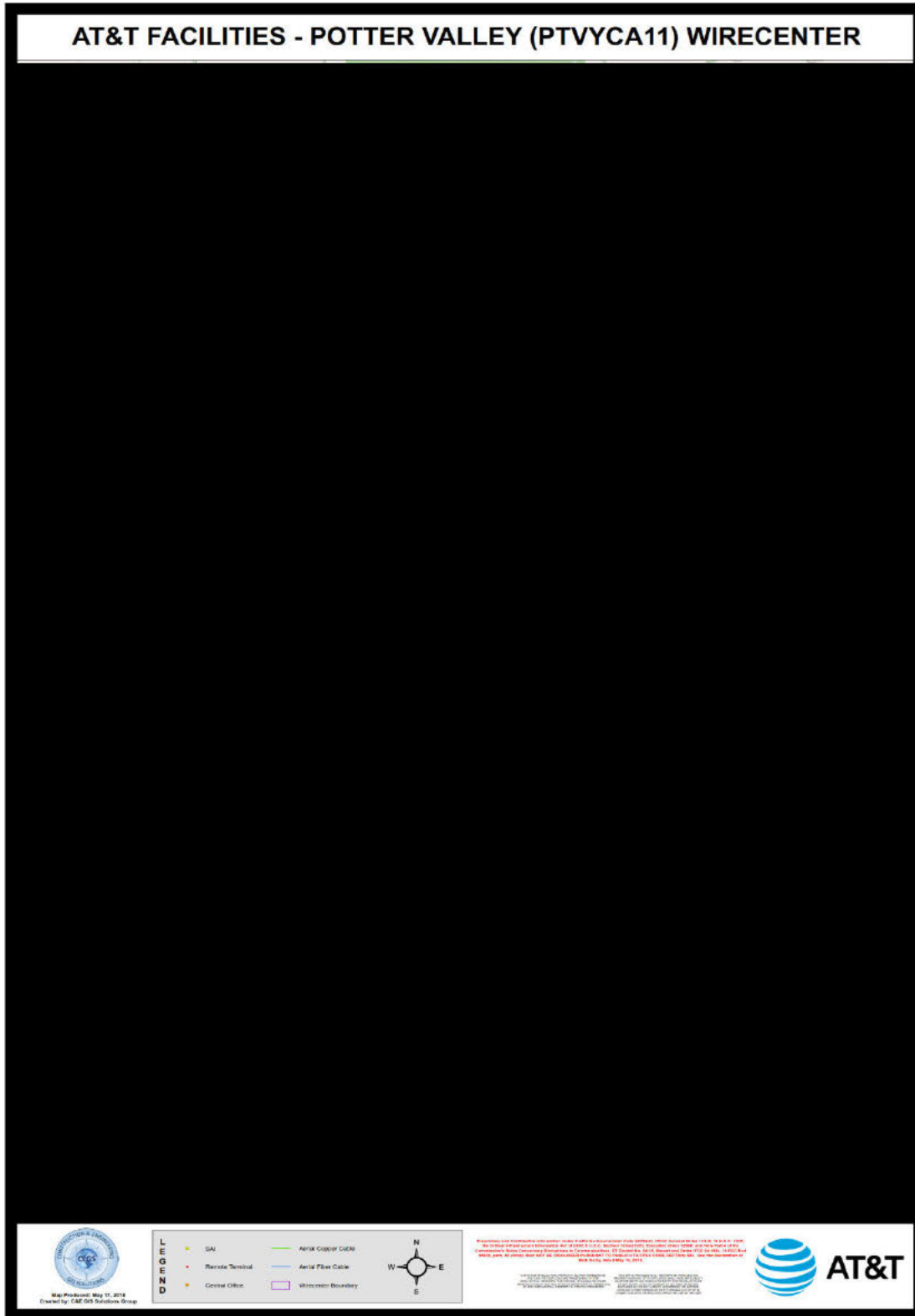


Figure 12.12. Map of Potter Valley Exchange

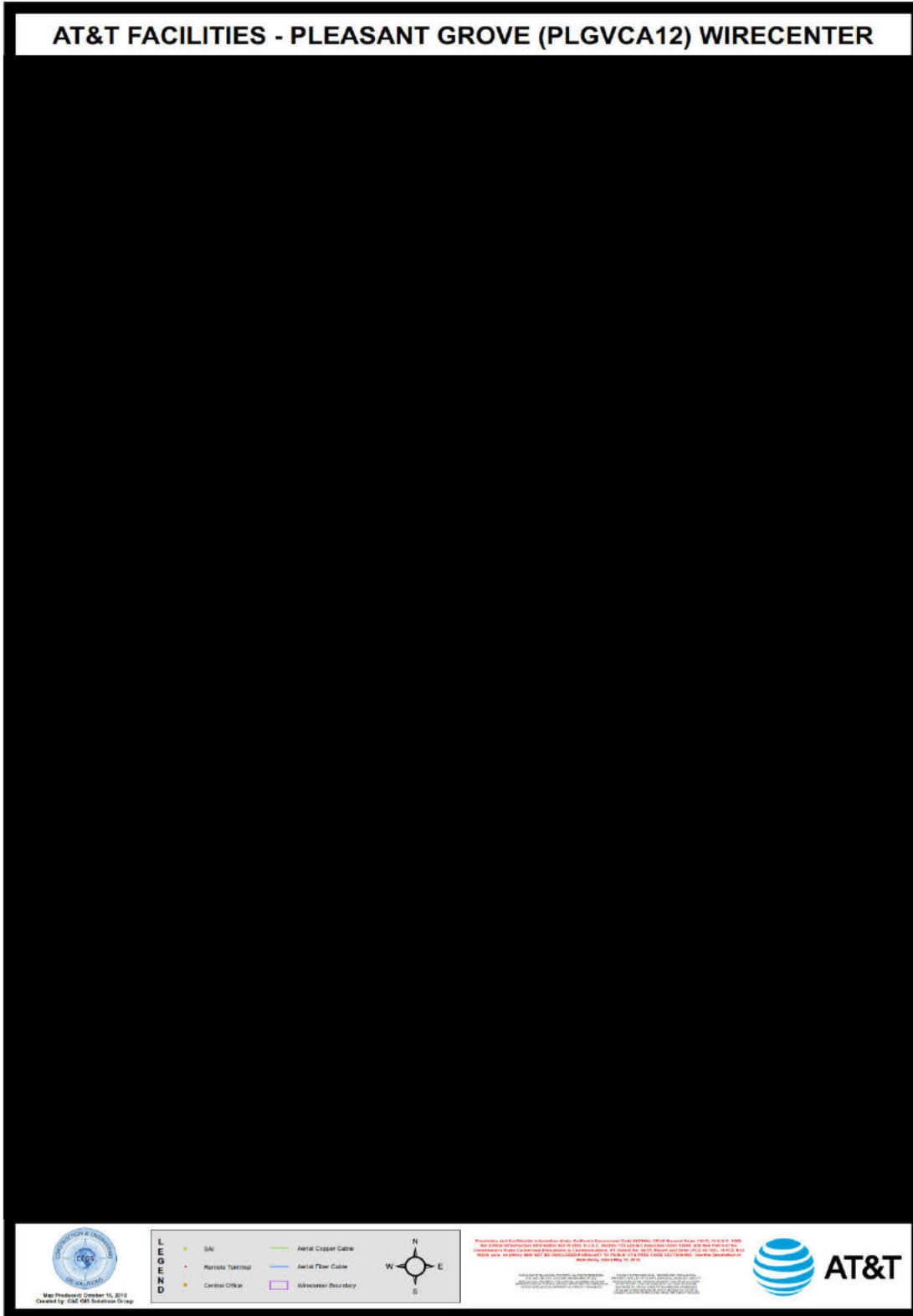


Figure 12.13. Map of Pleasant Grove Exchange



Figure 12.14. Map of Nicolaus Exchange

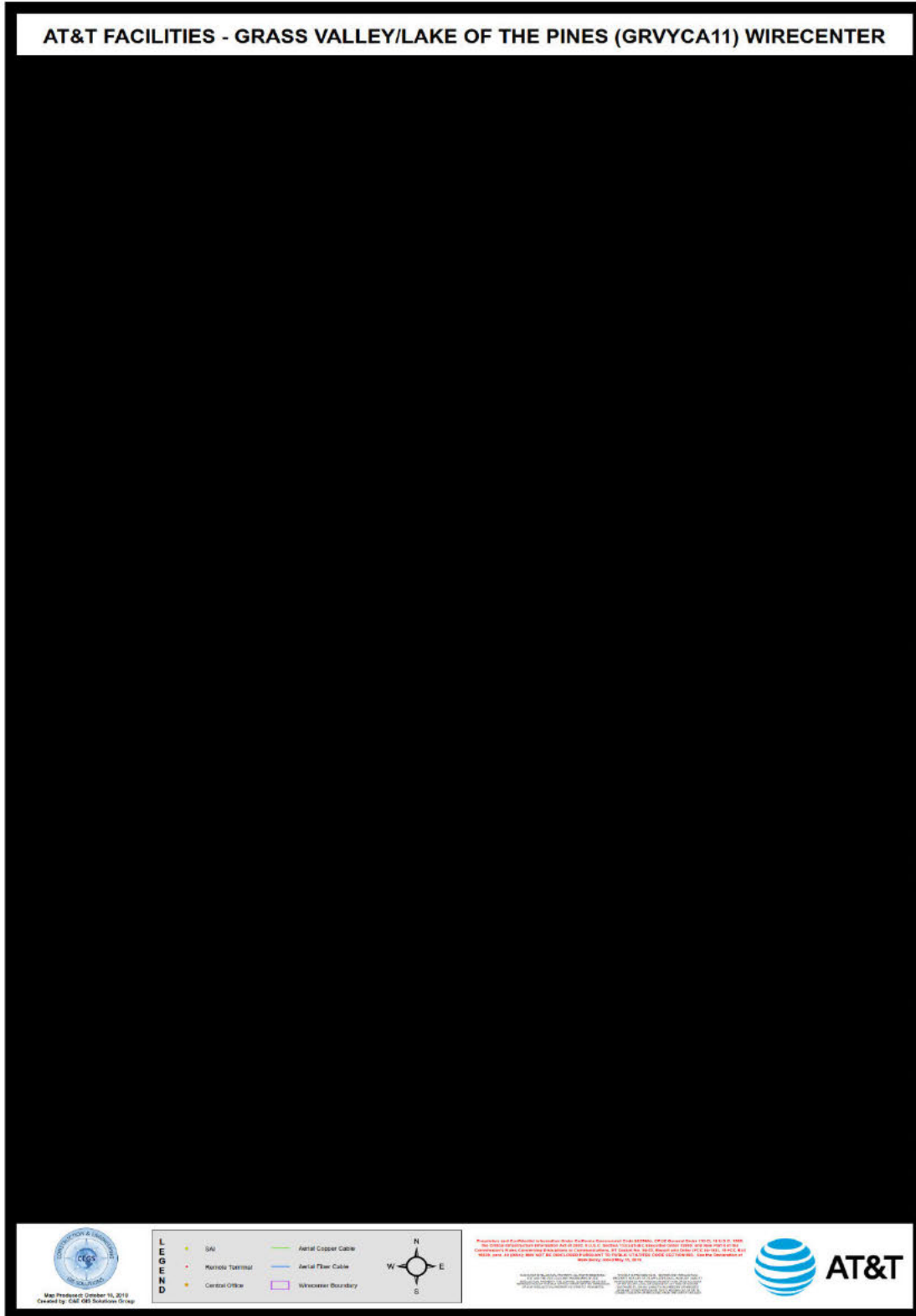


Figure 12.15. Map of Lake of the Pines Exchange

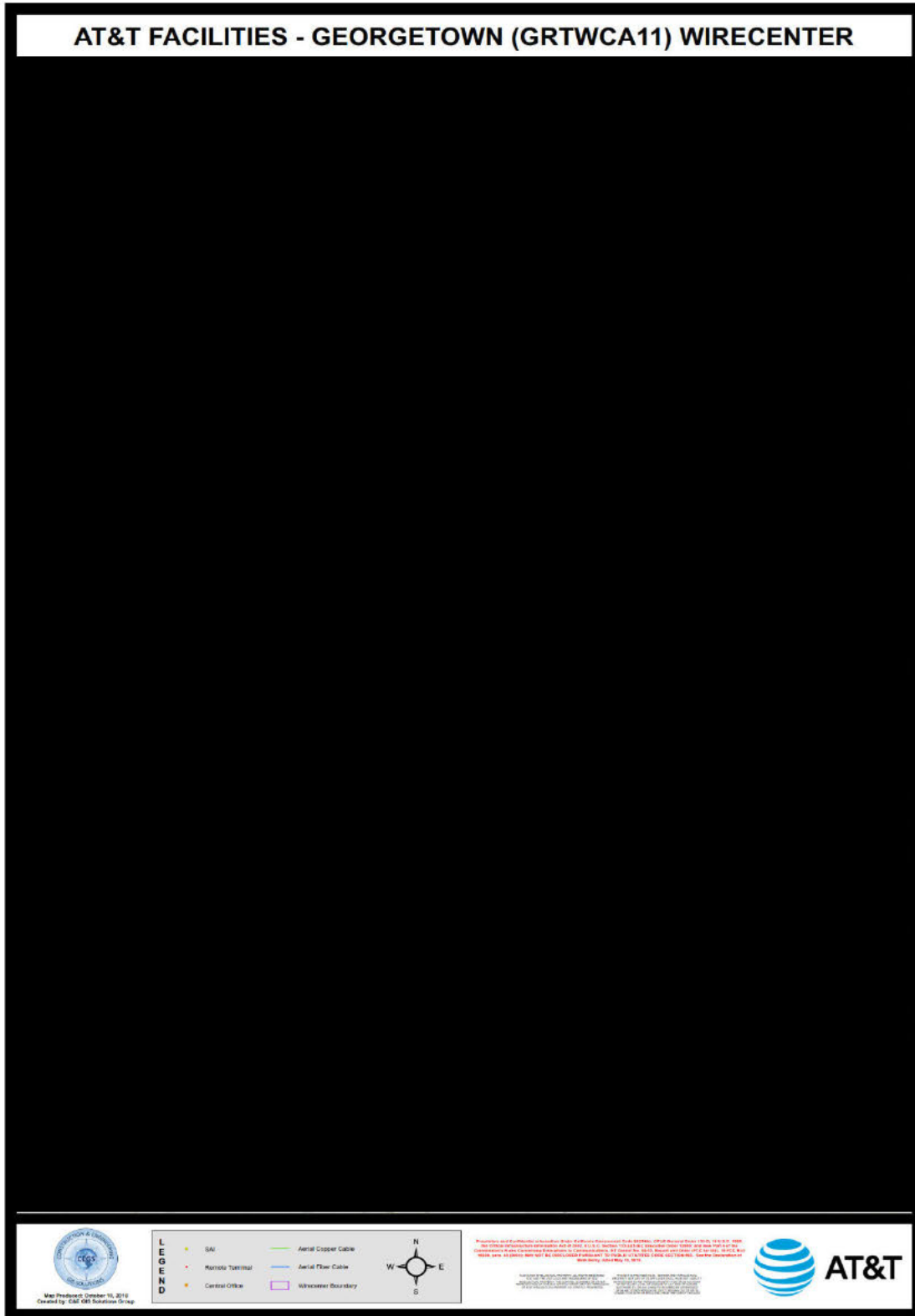


Figure 12.16. Map of Georgetown Exchange

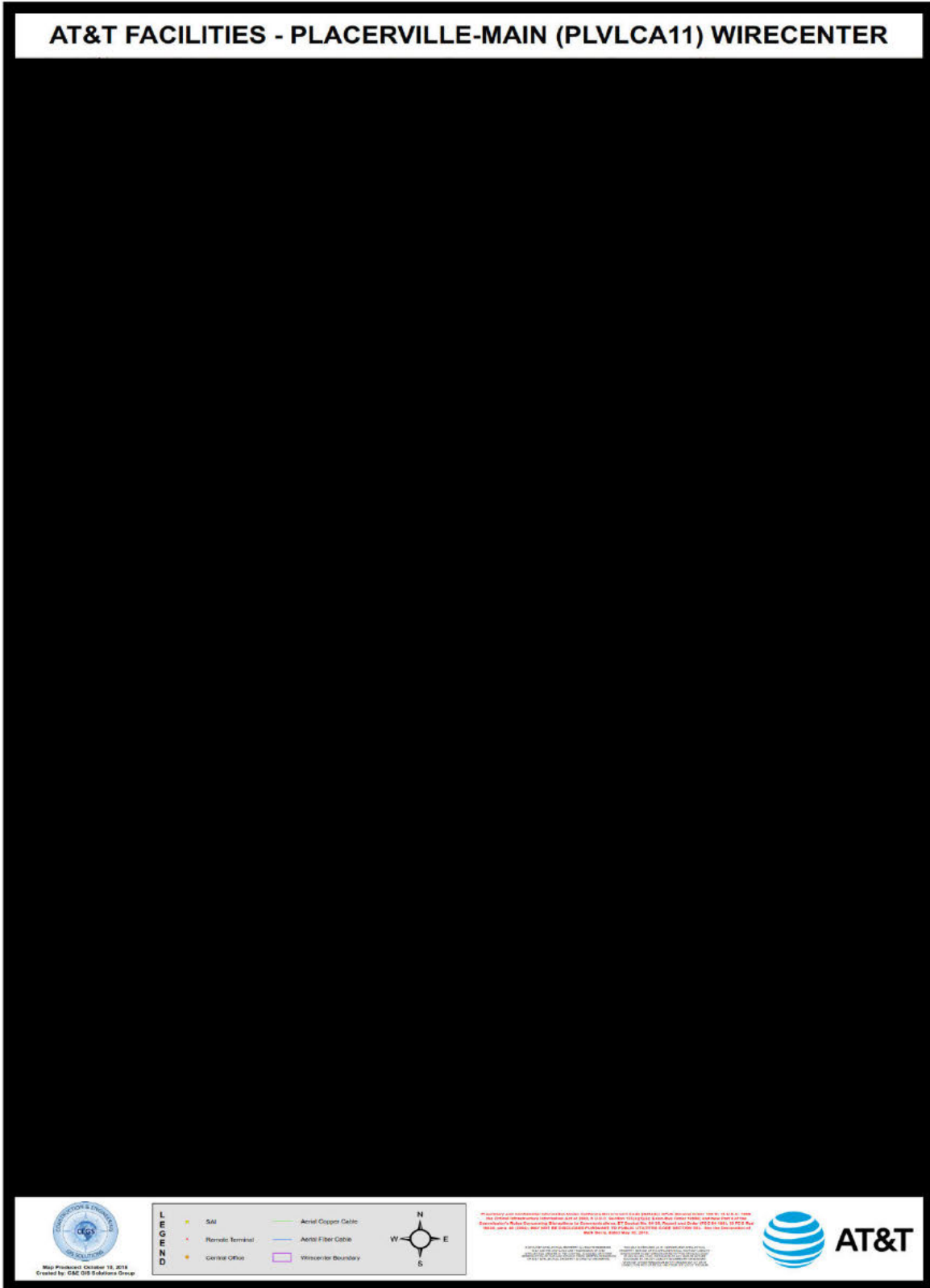


Figure 12.17. Map of Placerville Exchange

Exchange Maps from AT&T – Menlo Park and Los Altos

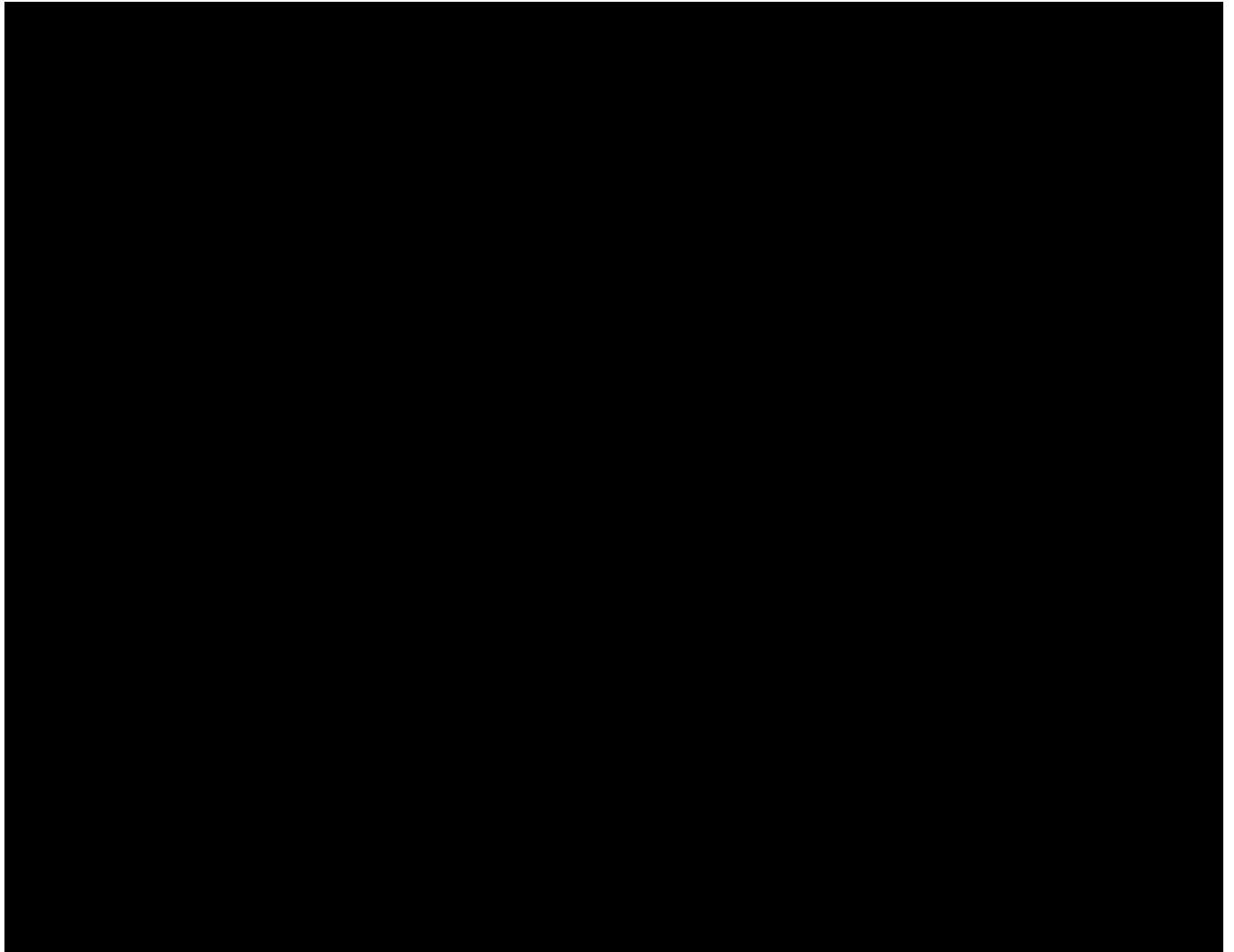


Figure 12.18. Map of Menlo Park Exchange

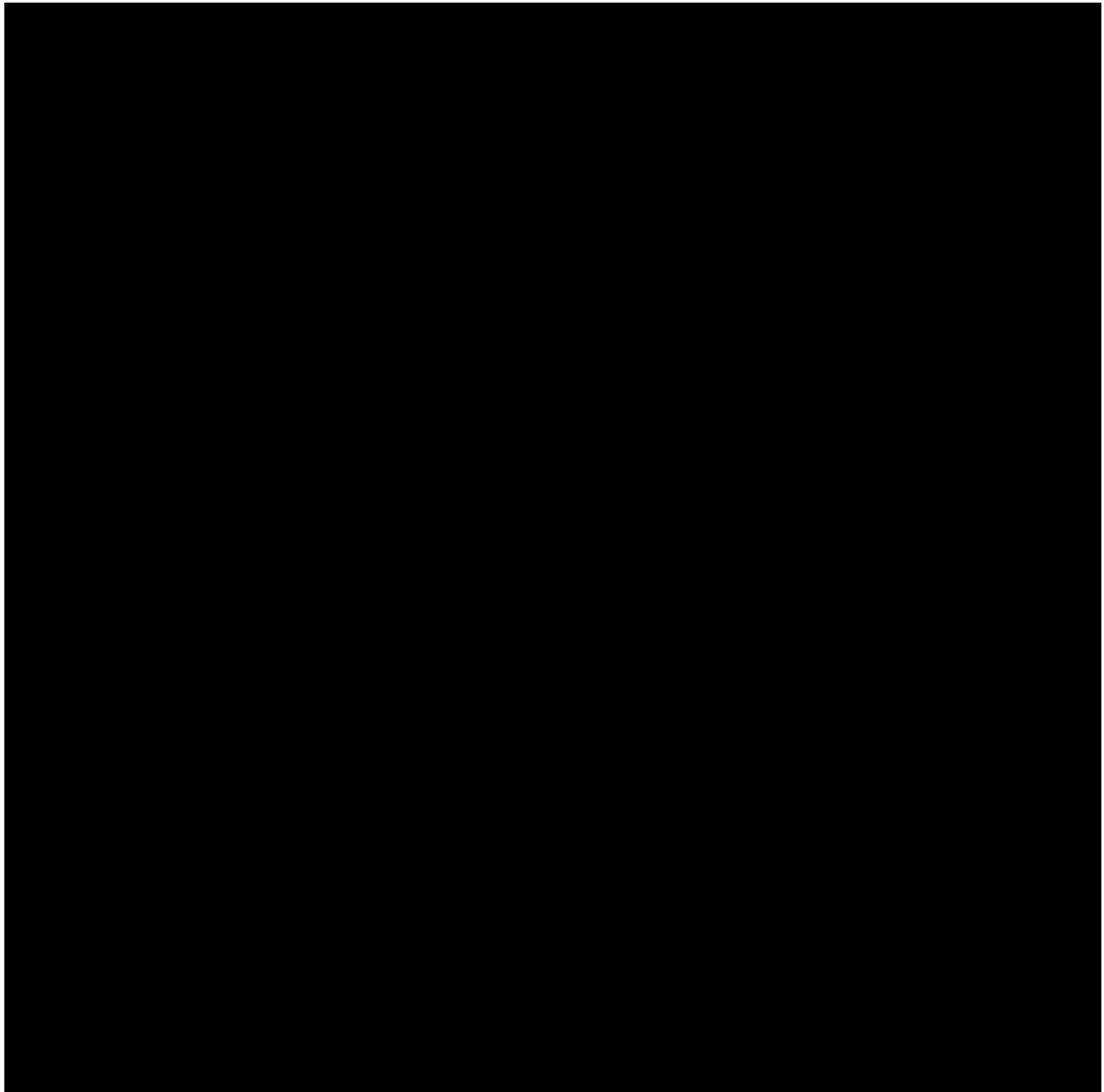


Figure 12.19. Map of Los Altos Exchange

Exchange Maps from Frontier - Montebello and Blossom Hill (Los Gatos)

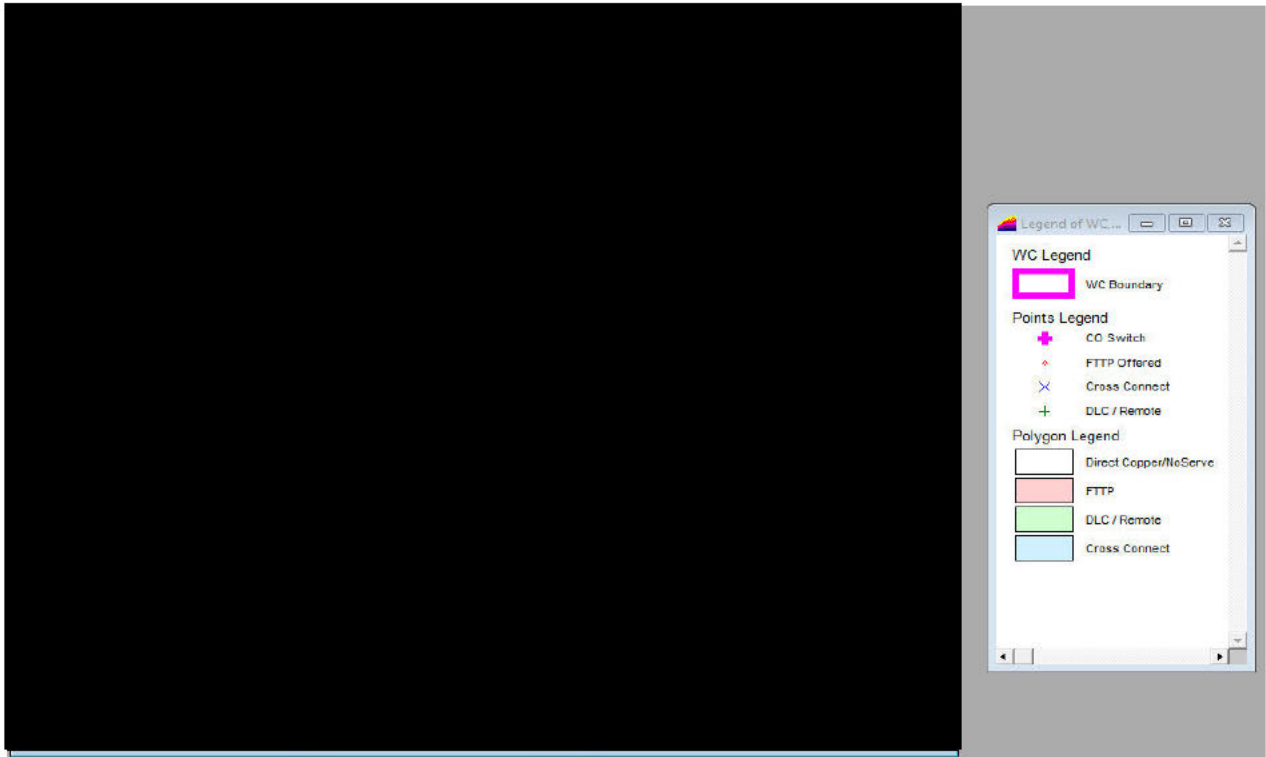


Figure 12.20. Map of Montebello Exchange

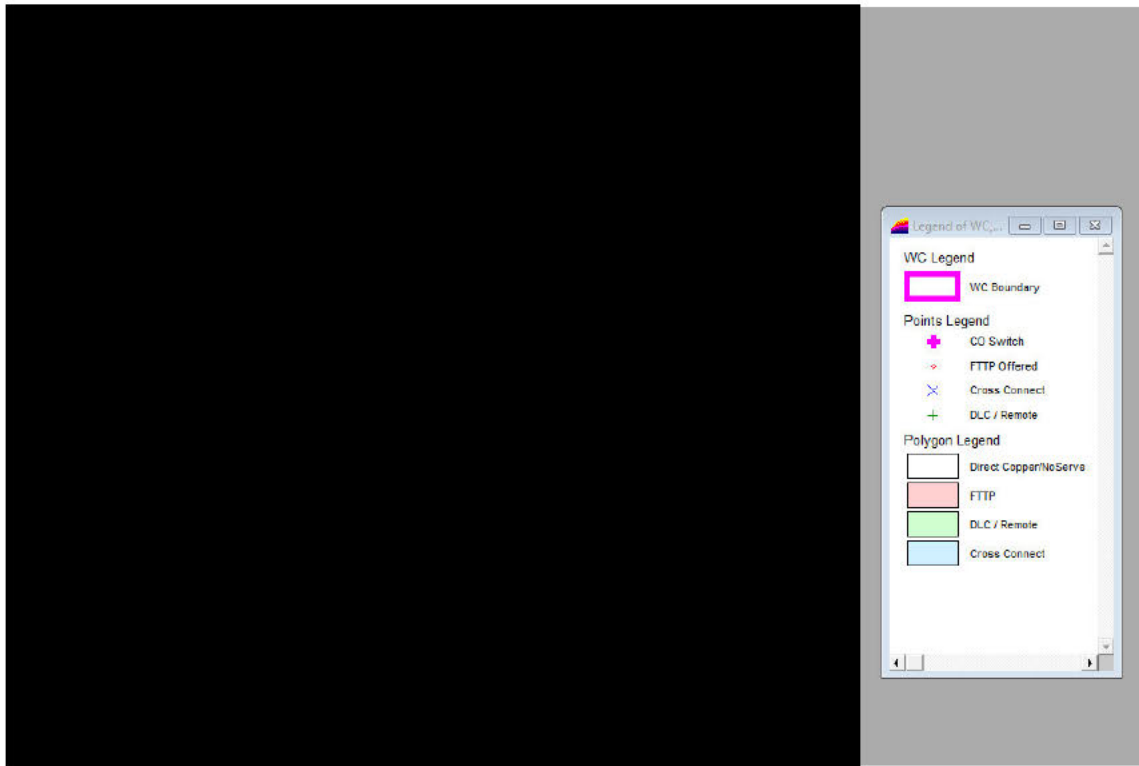


Figure 12.21. Map of Blossom Hill Exchange