General Services Agency

Information Technology

Fiber Optic Strategic Plan

Revised
June 2012

Introduction

This strategic plan aligns the County's optical fiber infrastructure and the County's data network with the County-Wide Information Technology Strategic Plan. The strategic plan offers a means to utilize the unique fiber optic resources available to the County and thus address the County's and General Services Agency's missions. This document presents the actions needed to expand and evolve the County's optical fiber infrastructure over the next several years to benefit all County departments.

As of 2012, most of the populous county work sites are connected using fiber-optics. However, there are 38 remote County sites throughout the county that are still using copper telephone wire or the internet for data communications. This strategic plan offers a means to utilize the County's existing fiber optic resources to extend fiber-optics to 15 of these 38 remote sites and lists these sites in order of priority for construction.

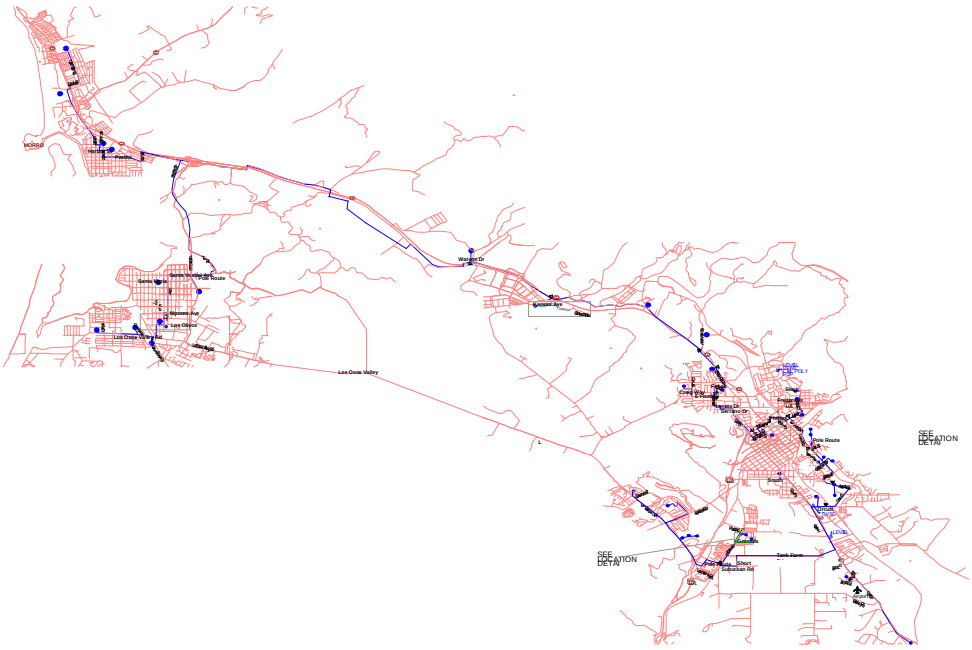
This document has three parts:

1. Optical fiber available for use by the County
2. Remote County sites readily eligible for fiber connectivity
3. Proposed optical fiber projects and estimated costs

County Optical Fiber

Unified Metropolitan Area Network (UMAN)

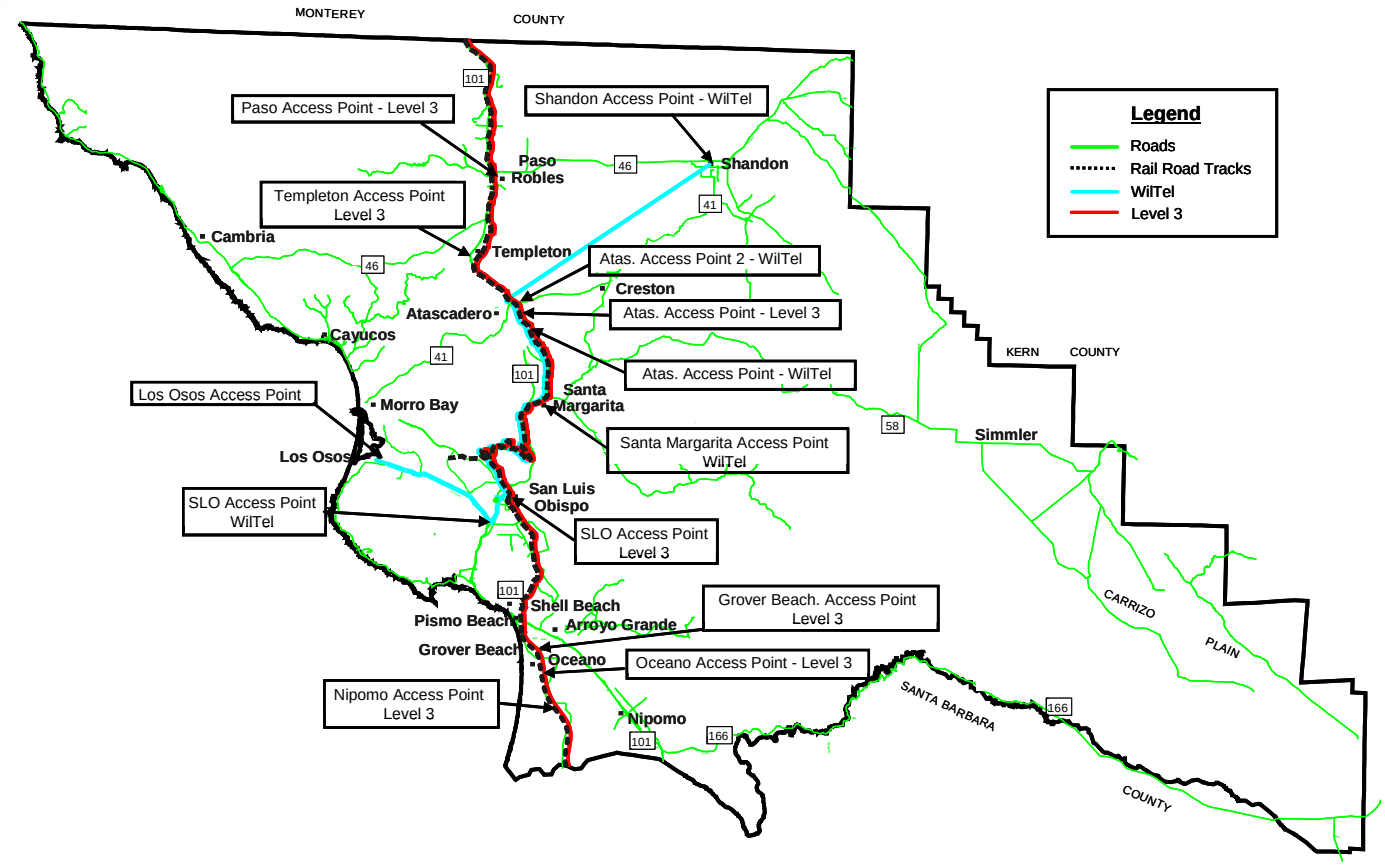
In the late 1990s, San Luis Coastal Unified School District (SLCUSD) took the lead in constructing an optical fiber system. Both the County and California Polytechnic State University (Cal Poly) participated in development and construction of the UMAN. Construction was completed in 1999. The UMAN is an extensive fiber network running



throughout the cities of San Luis Obispo, Los Osos and Morro Bay connecting all SLCUSD school sites, San Luis Obispo County Office of Education (SLOCOE), many County sites and the Cal Poly campus. About 35% of the all County employees use the UMAN to connect to the County network. As of 2011, the County uses 51% of the UMAN, SLCUSD uses 48%, and Cal Poly uses1%. The blue line on the map above presents the path of the UMAN.

Level 3 and WilTel Dark Fiber Agreements

Several years ago, the County entered into a dark fiber agreements with William Telecommunications (WilTel) and Level 3 Communications (L3) in exchange for granting those companies access to County right of ways. These agreements provided the County with optical fiber at thirteen specific locations from Nipomo to Paso Robles. The map below shows all thirteen access points available to the County.



The County, working with L3, built the thirteen access points extending the L3 and WilTel fiber into access points (AP) on County or public right of ways in 2008. The table below shows the specific strands long each segment of the fiber between each of the thirteen access points depicted in the map above.

Level 3/WilTel Fiber

Fiber Strands	Fiber Type	Location From	To
6	LEAF	Nipomo AP	Oceano AP
6	LEAF	Oceano AP	Grover Beach AP
6	LEAF	Grover AP	SLO AP – Level 3
6	LEAF	SLO AP	Atascadero AP - L3
6	LEAF	Atascadero AP – L3	Templeton AP
6	LEAF	Templeton AP	Paso Robles AP
2	LEAF	Los Osos AP	SLO AP - WilTell
12	SMF-28	SLO AP – WilTel	Santa Margarita AP
12	SMF-28	Santa Margarita AP	Atas. AP – WilTel
12	SMF-28	Atas AP - WilTel	Atas. 2 AP - WilTel
6	SMF-28	Atas. 2 AP -WilTel	Shandon AP

The County, working the San Luis Coastal Unified School District (SLCUSD), extended the WilTel fiber at both the Los Osos AP and SLO AP-WilTel towards the end of 2008. The two strands of fiber at the Los Osos AP were extended and terminated into the Los Osos Sheriff sub-station. The fourteen strands (2 to Los Osos, and 12 to Santa Margarita) at the SLO AP-WilTel were extended into DSS building on Higuera St. Using optical multiplexing the two fiber strands between Los Osos and DSS Higuera made an alternative path for the UMAN network, creating a ring for use by both the County and SLCUSD.

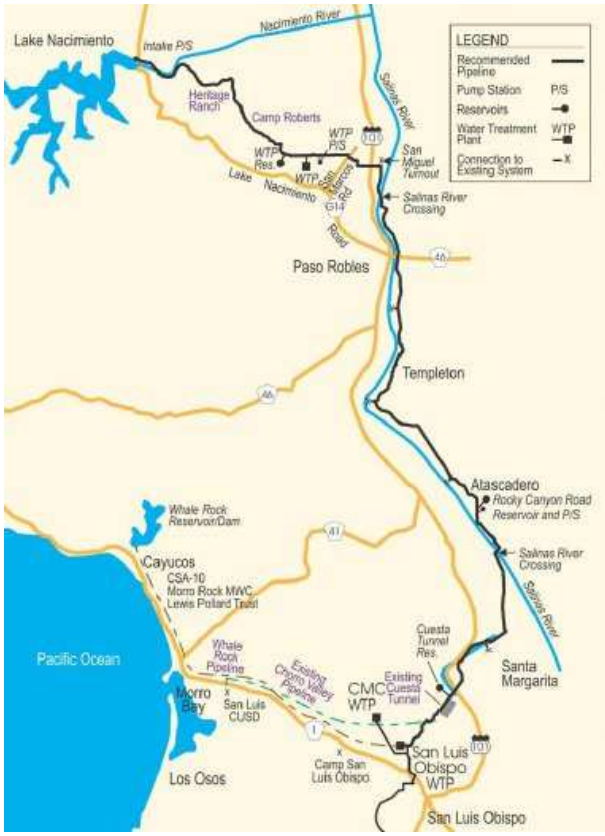
In 2010, the County extended 12 stands of optical fiber from the Templeton AP into the North County Regional Center connecting that campus into the County's data network. At the same time, 12 strands were extended from the Oceano AP into the Oceano Sheriff's sub-station connecting that site into the County's network.

Nacimiento Water Project Fiber

In 2007, the San Luis Obispo County Flood Control and Water Conservation District (the District) started construction on the Nacimiento Water Project (NWP) to bring Lake Nacimiento water to communities within the County. As part of the project, 96 strands of single mode fiber were run along the entire pipeline route.

The pipeline runs from Lake Nacimiento to San Luis Obispo City water treatment plant on Stenner Creek Road. The black line in the map below shows the path of the pipeline and associated optical fiber. The County and the District shared the construction cost of the fiber and thus share the fiber per the terms of the Memorandum of Understanding (MOU) signed in June, 2012. The District uses 24 strands in support of the pipeline. The remaining 72 strands of optical fiber are for County use.

Both the UMAN and NWP fiber have access points along their paths. For both these systems access is possible at nearly any point along the fiber path. However, the Level 3 fiber is only available at the thirteen access points noted above.



Remote County Sites – Fiber Connectivity

Given the optical fiber infrastructure described above, all of the County's current work sites that are not connected by optical fiber were reviewed for possible fiber connectivity. Based on each site's proximity to optical fiber and the number of employees and frequency of use of the site, a determination was made for each site as to whether or not to connect that site to the existing County's optical fiber infrastructure. This plan identifies and estimates costs to extend fiber to twenty three (23) of the unconnected seventy one (71) sites. To reduce costs, each site is to be connected to the closest existing County optical fiber.

To aid in the analysis and presentation, the County is segmented into four geographic regions: San Luis Obispo City, Coastal, South County and North County.

San Luis Obispo City

For the past twelve years, most County facilities in the San Luis Obispo City area have been connected to the network using the Unified Metropolitan Area Network (UMAN). Nonetheless, there are six sites within the San Luis Obispo area not connected to optical fiber. This plan proposes connecting three of the sites. In addition, to improve redundancy and ensure full use of the NWP fiber, an extension of the NWP is proposed.

Public Health - MTU	Grand Ave., SLO	on UMAN
Extend NWP to Data Ctr	976 Osos St., SLO	extend NWP
GSA El Chorro Park	Hwy 1, SLO	connect to UMAN
GSA Dairy Creek Golf	Hwy 1, SLO	connect to UMAN
Sheriff/Coroner	Aerovista Dr., SLO	connect to UMAN
Mental Health – MHSA	277 South St., SLO	no plan to connect
APCD	3433 Roberto Ct.	no plan to connect
SLO Housing Authority	487 Left St.	no plan to connect

Note: APCD and SLO Housing Authority are not County departments.

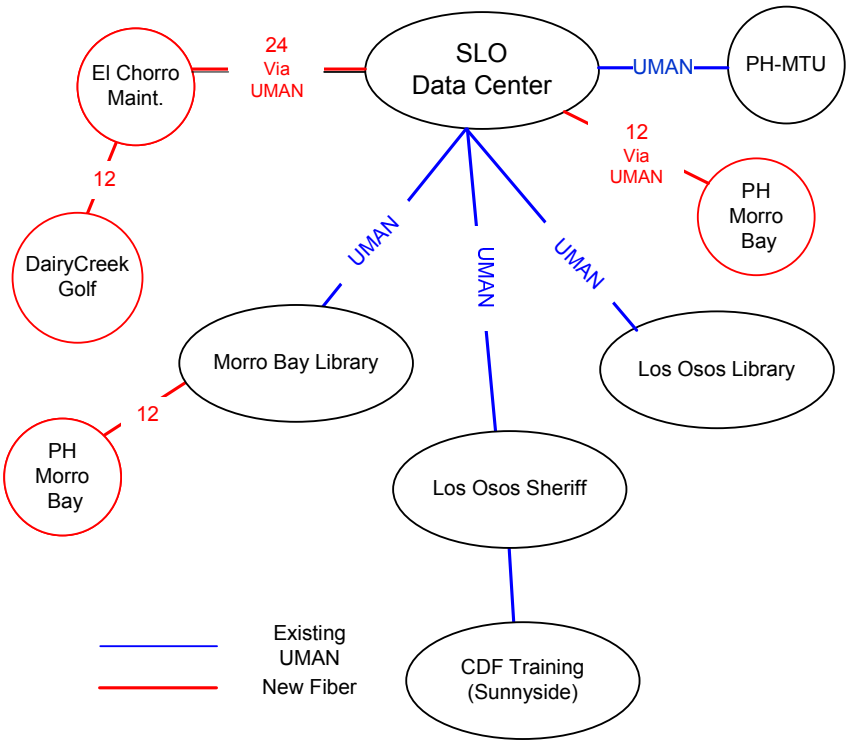
Coastal Region

Currently, the County's fiber infrastructure is limited in the Coastal area of the County making the extension of fiber to some County sites complex and expensive. The UMAN fiber network extends only to the eastern portion of both Los Osos and Morro Bay. Thus, not all County sites are connected via UMAN optical fiber. The following list describes the sites currently fiber connected, the sites proposed for future fiber connectivity and those sites not planned for connectivity at this time.

County sites in the Coastal region are:

Los Osos		
Sheriff Sub-station	2099 10th St.	on UMAN
Library	2075 Palisades Ave.	on UMAN
CDF (Sunnyside)		on UMAN
Morro Bay		
Library	625 Harbor St.	on UMAN
Public Heath	760 Morro Bay Blvd.	connect to UMAN
Police Dept.*	850 Morro Bay Blvd.	connect to P. Health
(* not a County department but may be beneficial to the County)		
Golf Course	State Park Rd.	no plan to connect
Cayucos		
Public Works WTP	1670 Cabrillo Rd.	no plan to connect
Library	310 B Street	no plan to connect
Cambria		
Public Health WIC	1000 Main St.	no plan to connect
Public Works Yard	2000 Rodeo Grnds Rd.	no plan to connect
Library	900 Main St.	no plan to connect

The diagram below shows the existing and proposed logical fiber connectivity.



South County Region

In 2010, one South County Region site was connected to fiber: the Oceano Sheriff's sub-station. The only fiber in the South County is the L3 fiber. Fortunately, there are concentrations of County staff at the facilities on Longbranch in Grover Beach, the DSS site on Grand Ave. in Arroyo Grande, and the South County Regional Center in Arroyo Grande. This plan proposes to connect the County facilities at Longbranch and 16th St. to the L3 fiber. Then extend optical fiber down Grand Ave. to DSS; and from there extend optical fiber to the South County Regional Center. Selected other sites are then connected to either Longbranch or DSS Arroyo Grande as shown in the list below.

Farther to the south in Nipomo, no County sites are planned to be connected to the L3 fiber as the distances from the L3 fiber access point to the County sites are large and the staff sizes relatively small, so the costs are too high to justify extending optical fiber at this time.

County sites in the South are:

Grover Beach

Drug & Alc Serv.	1523 Longbranch	connect to L3
Public Health	216 S. 16th St.	connect to Longbranch
Police Dept.*	711 Rockaway	connect to Longbranch

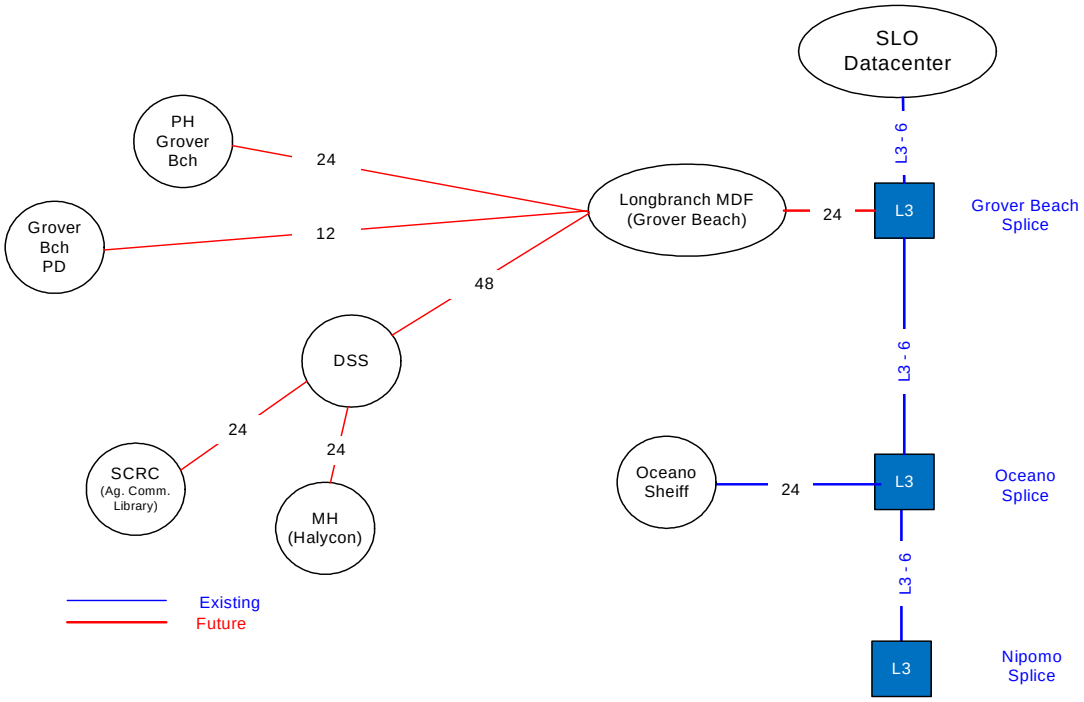
(* not a County department but may be beneficial to the County)

Arroyo Grande

DSS	1086 E. Grand	connect to Longbranch

Ag. Comm.	530 Traffic Way	connect to DSS
Library	800 W. Branch	connect to DSS
Mental Health	354 S. Halcyon	connect to DSS
Police Dept.*	200 N. Halcyon	connect to DSS
(* not a County department but may be beneficial to the County)		
Lopez Lake	6800 Lopez Dr.	no plans to connect
PW - Lopez WTP	2845 Lopez Dr.	no plans to connect
Oceano		
Sheriff Sub-station	1681 Front St.	on Level 3
GSA – Coastal Dunes	1001 Pacific Blvd.	no plans to connect
Public Health - MTU	1510 19th Ave.	no plans to connect
Library	1551 17th St.	no plans to connect
Airport		no plans to connect
Nipomo		
DSS	681 W. Teft	no plans to connect
Library	1681 Front St.	no plans to connect
Public Health – WIC	200 E. Dana St.	no plans to connect
Other Sites		
Pismo Beach PD		no plans to connect
Shell Beach Library		no plans to connect

South County Logical Optical Fiber Design



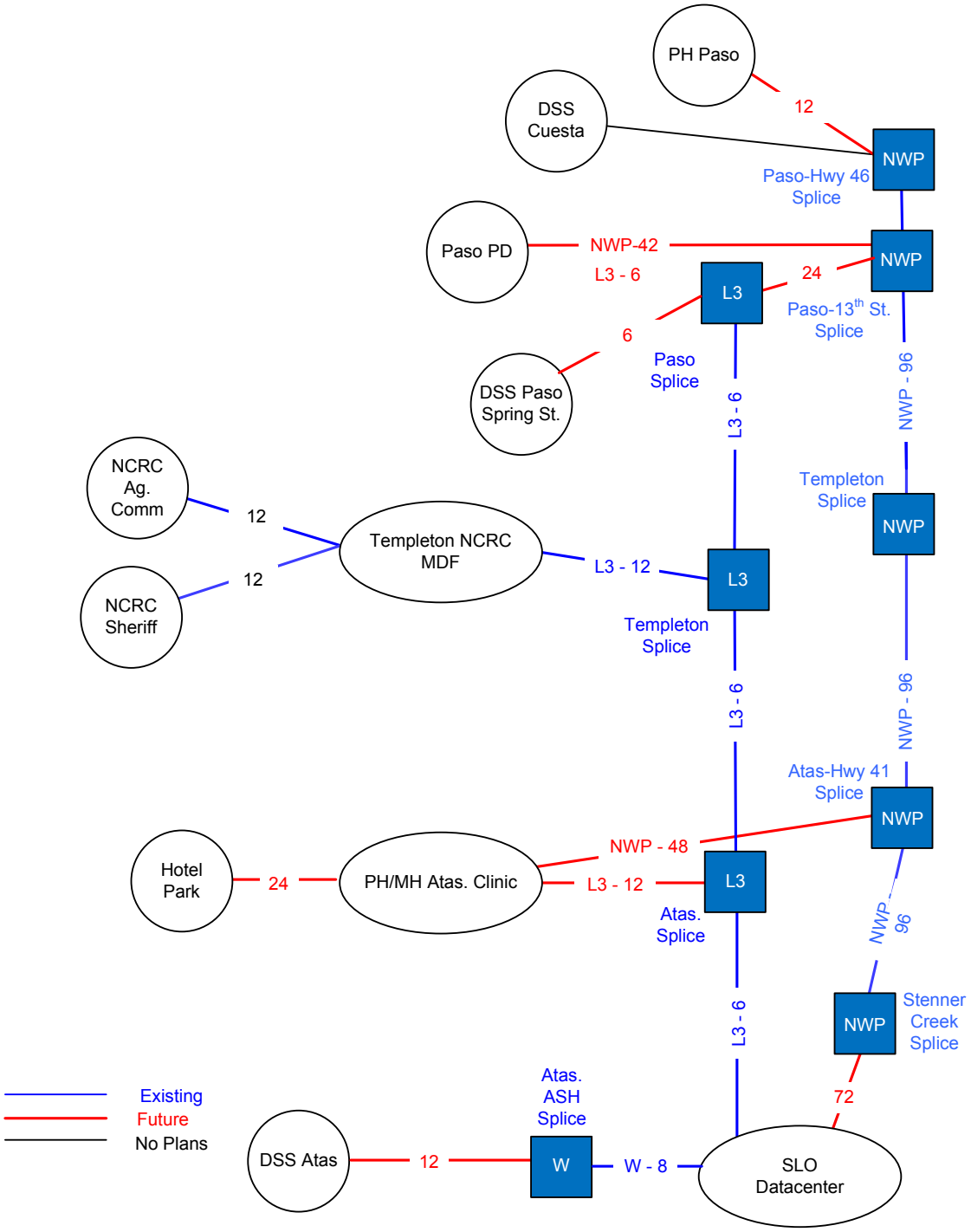
North County Fiber

In the north, there are both the Level 3 and NWP fiber backbones (see maps above). This relative plethora of fiber and the large number of County sites make for a complicated optical fiber strategic plan but provides redundancy which is unavailable in other regions. The overall approach is to extend Level 3 and/or NWP fiber to key sites and then extend fiber from these key sites to other County locations as appropriate. As proposed in the San Luis Obispo City region, in order to create redundancy in the fiber plan and ensure the most efficient use of fiber assets, connectivity between the two fiber backbones is proposed.

County sites in the North are:

San Miguel		
Public Works Yard		no plans to connect
Library	254 13th St	no plans to connect
Paso Robles		
N. County Ring* Paso Robles		connect Level 3 to NWP
(* not a County facility, but beneficial to the County)		
Public Health	722 Walnut St.	connect to NWP
Police Dept.*	840 10th St.	connect to NWP
(* not a County department but may be beneficial to the County)		
DSS – Spring St.	406 Spring St.	connect to L3
DSS – S.A.F.E..	1802 Chestnut.	no plans to connect
DSS – One Stop	2800 Buena Vista	no plans to connect
Public Health-MTU	2503 Beechwood	no plans to connect
Public Works Yard	1734 Paso Robles	no plans to connect
Templeton		
Ag. Comm NCRC	350 N. Main	on Level 3
Sheriff	356 N. Main	on Level 3
Atascadero		
Health Clinic (old Hosp.)	5575 Capistrano	connect to L3 and NWP
Hotel Park Building	6555 Capistrano	connect to Health Clinic
DSS	9415 El Camino R.	connect to WilTel
NCGC	5595 Capistrano	no plans to connect
Drug & Alc. Serv.	5905 Capistrano	no plans to connect
Police Dept.	5505 El Camino R.	no plans to connect
Drug & Alc. Serv.	3556 El Camino R.	no plans to connect
Public Health - MTU	6495 Lewis Ave.	no plans to connect
Library	6850 Morro Road	no plans to connect
Santa Margarita		
PW Booster Sta.*	18655 Hwy 101	on NWP
(* however, NWP fiber is not yet connected to the County network)		
Library	9630 Murphy Ave.	no plans to connect
Other Sites		
Creston, Shanndon, Simmler Libraries		no plans to connect
Creston CDF Fire Station		no plans to connect

North County Optical Fiber Design



Recently the County purchased the building at 6555 Capistrano, Atascadero which will be the new library and north county "One Stop Shop" site for county services. As of June 2012 the project to extend fiber from the Level 3 access point to the PH/MH clinic and to the new County building is underway.

Proposed Optical Fiber Projects

Based on the County's optical fiber infrastructure and the review of each County site not currently using fiber, the following lists all of the proposed fiber projects, estimated cost of the fiber projects, and a relative rank among projects.

Estimate costs are based on all $85,000/mile of aerial fiber and $225,000/mile of underground fiber. All fiber is assumed to be aerial except where underground fiber is required by ordinance or there is no aerial path. A fifteen percent (15%) factor is applied for hardware and contingencies and a 20% factor for project management.

The relative rank among projects is based on predecessors (e.g. connecting fiber to DSS Arroyo Grande depends on the fiber connection at the Grover Beach County site on Longbranch), cost, and current staff size and estimated use of the existing network.

Completed Projects		Date Completed
Connect L3 to UMAN in SLO		June, 2010
Extend L3 to Templeton Sheriff sub-station		June, 2010
Extend L3 to Oceano Sheriff sub-station		July, 2010
Connect PH-MTU, SLO to UMAN (a SLEPA project)		June, 2012
Proposed Project Description	Rank	Est. Costs
Extend L3 to Longbranch site & connect PH GB to Longbranch *	1	$125,000
Connect L3 Fiber to Atas. Health Clinic (old Hospital) *	1	$80,000
Connect Hotel Park building to Atas. Health Clinic *	1	$65,000
Create initial North County fiber ring - Connect L3 to NWP in Paso	1	$130,000
Connect DSS AG to Longbranch	2	$155,000
Connect NWP fiber at Stenner Creek into SLO Data Center	2	$505,000
Connect El Chorro to UMAN	3	$90,000
Connect Dairy Creek Golf Course to El Chorro	3	$20,000
Connect South County Regional Center to DSS-AG	3	$140,000
Connect DSS Paso to L3	3	$95,000
Connect DSS Atas. To Level3/WilTel fiber	4	$200,000
Extend NWP fiber to Public Health Paso	4	$105,000
Connect MH AG to DSS AG	5	$75,000
Connect MH SLO to Hawthrone school	5	$285,000
Extend NWP fiber into Atas. Health Clinic	5	$160,000
Connect Morro Bay DSS-Public Health to UMAN	5	$55,000
Extend NWP fiber to DSS Cuesta North Campus	5	$135,000

* These top three projects are underway as of June, 2012.

The overall timeline for the seventeen fiber projects is directly dependent on the County's resources available to fund the above projects. Some of the projects probably are not cost effective unless the project costs are shared with other partners such as extending NWP fiber to Cuesta College north campus.

Conclusion

The demand for high-speed, broadband, data communications continues to grow. In spite of reduced budgets the County continues to invest in its fiber infrastructure with In 2009, Congress charges the Federal Communications Commission with creating a national broadband plan. Currently, 22%, over 80 million people, in the United States have broadband internet access and thus benefit from services such as video conferencing, video on demand, internet protocol television (IPTV), peer-to-peer file sharing.

As the County's information systems mature and expand, demand for high speed and large bandwidth access to the County's computing services will increase. It is expected that in the future all County sites will require broadband connectivity and that optical fiber will be needed at most County sites to provide the data communications capacity necessary to support future information systems. This strategic plan helps to identify the County sites that will benefit the most.