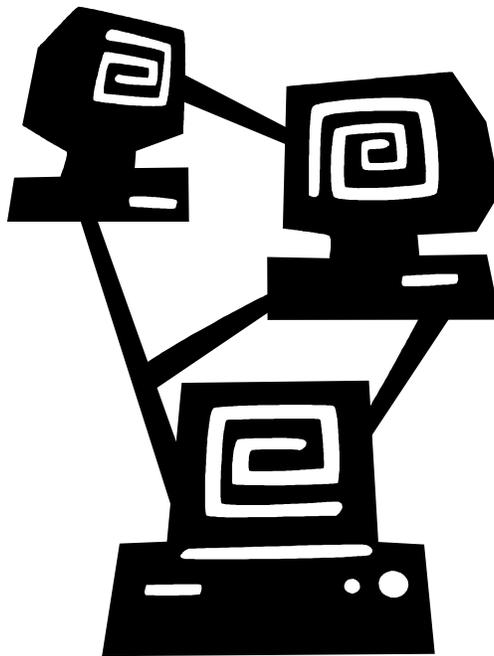


MAUI COUNTY GENERAL PLAN 2030

TELECOMMUNICATIONS ASSESSMENT



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INTRODUCTION

Telecommunication services and underlying infrastructure are significant factors in maintaining modern economic and social life. The telecommunications industry provides direct communications services to consumers, industry, and government which have become an integral element of modern life. Having better access to telecommunication systems and services will mean greater opportunity for business growth and employment and educational opportunities within the County, thus allowing the County to be successful in a competitive economic development climate. Telecommunication systems are also becoming increasingly important for public safety and emergency response.

Located in the middle of the Pacific Ocean between the United States and Asia, Hawaii is in an advantageous location for telecommunications. The Hawaiian Islands are the hub of a diversified network of trans-Pacific fiber optic and analog cable, satellite communications, and cellular and wireless services. Because of this diversified network, Maui offers residents, visitors, and businesses an abundance of telecommunications capacity.

Unlike the other physical infrastructure systems assessed as part of the General Plan update, telecommunications are not a County managed and operated system. Telecommunication services are offered by private industry to individual consumers, businesses, and government. Even though providing telecommunication services is not a County function, assessing the adequacy, limitations, and opportunities relating to the systems and their physical infrastructure is a key element of planning for the County's growth into 2030.

EXISTING SETTING

For the purposes of this assessment, telecommunication services include telephone, wireless, and internet services. The following section identifies telecommunication providers operating within the County, a discussion of technology currently available, and a general summary of coverage areas for each service type.

Telephone Services

Telephone service is the most basic form of telecommunications covered in this assessment. Several providers currently operate within Maui County, offering telephone services to residential and business customers.

⇒ *Providers Operating
Within Maui County*

The Incumbent Local Exchange Carrier (ILEC) is Hawaiian Telcom Communications, Inc., providing local and long distance services to residential and business customers. Pacific LightNet, Inc., and Time Warner Telecom, Inc., are the Competitive Local Exchange Carriers (CLEC), providing local and long distance services to business customers. Several other providers also offer long distance services within the County. Sandwich Isles Communications, Inc., is currently installing infrastructure

to provide connectivity to Hawaiian Homelands. The following list identifies all telephone providers operating within Maui County:

- Hawaiian Telcom Communications, Inc.
- Pacific LightNet, Inc.
- Time Warner Telecom, Inc.
- Sandwich Isles Communications, Inc.
- AT&T
- MCI
- Sprint Hawaii
- Oceanic Time Warner Cable

⇒ ***Technology Available***

Plain old telephone service, or POTS, is the standard telephone service used by most residential and business customers nearly everywhere in the world. Voice over Internet Protocol (VoIP) (digital phone service) is a relatively new technology which routes voice conversations over the internet. Oceanic Cable is the only provider to offer VoIP as a part of their bundle cable service.

⇒ ***Service Coverage***

Telephone service is widely available throughout Maui County. All homes and business have access to telephone service.

Wireless Services

Although not as ubiquitous as the common telephone, wireless telephone services are increasingly becoming a part of everyday life. Multiple companies offer wireless services within Maui County, with service coverage depending on location.

⇒ ***Providers Operating Within Maui County***

Unlike telephone service, wireless service does not have a primary provider; rather, wireless services are offered by multiple companies within the County. Wireless providers include:

- Verizon Wireless
- T-Mobile
- Sprint
- AT&T Wireless (Cingular)
- Ericsson
- Motorola
- Nokia
- Hawaiian Telcom Communications, Inc.

⇒ ***Technology Available***

Wireless services include cellular telephone and personal communication services (PCS). While both analog and

digital wireless services are available in Maui County, according to Rick Colletto, General Manager for Maui County Oceanic Time Warner Cable (personal communication, December 21, 2006) current trends indicate that analog service will be phased out in the near future.

⇒ *Service Coverage*

Wireless service coverage varies by individual service provider; however in general the major urban and residential areas within the County are covered by wireless services.

Internet Services

Similar to wireless, internet services are becoming a standard component of modern life. The internet is increasingly becoming an essential element of everyday home and business activities. With continually evolving technologies, Internet Service Providers (ISP) offer a range of internet services to customers in the County.

⇒ *Providers Operating Within Maui County*

ISPs within Maui County range from locally owned and operated companies to large international corporations. However, according to Mike Perkins, Program Director for the Maui Economic Development Board, Inc., (personal communication, December 19, 2006) current trends indicate a shift toward larger companies and away from small-scale ISPs. ISPs operating within Maui County include:

- Oceanic Time Warner Cable (Road Runner and The Wave)
- Hawaiian Telcom Communications, Inc.
- Pacific LightNet, Inc.
- Time Warner Telecom, Inc.
- Sandwich Isles Communications, Inc.
- AT&T
- Verizon Wireless
- SprintNextel
- MCI Telecommunications
- Earthlink
- Dragon Internet
- Aloha.com
- Lavanet
- Maui Net
- Pacific Information Exchange (Pixinet)
- Dish
- DirectTV
- Clearwire

⇒ *Technology Available*

Internet services are available within Maui County in a variety of forms. Traditional dial-up service, which is available through the telephone companies, is the most basic form of internet service. Broadband technologies, such as cable modems and Digital Subscriber Line (DSL) are also available. High-speed wireless, also a broadband technology, is offered by several ISPs in Maui County. Satellite internet is also available through satellite television companies.

⇒ *Service Coverage*

Internet service coverage varies by type of internet connection and ISP. Generally, all urban and residential areas within the County have access to at least dial-up internet service.

REGIONAL ANALYSIS

The following regional analysis assesses telecommunication services and infrastructure for each community plan area. Service area coverage, capacity availability, and any current deficiencies within each region are identified. Qualitative recommendations to fill service gaps and accommodate 2015 and 2030 population projections are also discussed. Population projections are derived from the *Socio-Economic Forecast; The Economic Projections for the Maui County General Plan 2030*, June 2006, prepared by the Maui County Planning Department.

Wailuku-Kahului

Regional Summary: The Wailuku-Kahului Community Plan Area is the most populous and one of the fastest growing regions within the County. As the commercial, industrial, and civic center of the County, telecommunication services are vital within this region. The Wailuku-Kahului Community Plan Area currently has the most comprehensive coverage for each telecommunication service when compared to the rest of the County. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is very strong throughout the region. Multiple wireless companies offer service within the Wailuku-Kahului Community Plan Area, providing customers strong coverage and a choice of providers. The only current gap in service is in the northwest portion of the region beyond Waihee. Wireless coverage in the northwest portion of the region is nonexistent to poor.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in most areas of the region.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

As one of the fastest growing regions within the County, meeting telecommunication needs in 2015 and 2030 is critical for the Wailuku-Kahului Community Plan Area. As residential and commercial development within the region expands, telecommunication services will also need to expand to service these areas. Additionally, as the population grows within existing developed areas, telecommunication capacity will need to be increased to meet the growing demand.

West Maui

Regional Summary:

As the third largest population center within the County, the West Maui Community Plan Area has relatively comprehensive telecommunications coverage. Telephone, wireless, and internet services are available throughout the urbanized areas of the region with minimal gaps in service. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is strong throughout the region, especially within Lahaina and Kaanapali. Southeast of Lahaina, toward Olowalu and around the Pali, wireless coverage diminishes. Likewise, the northeast portion of the region, including Kapalua, is serviced by fewer wireless providers, making coverage within this portion of the region less reliable and in some areas nonexistent.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

With an average annual rate of increase of approximately 1.5 percent, telecommunication needs of the West Maui resident population will continue to grow. Service deficiencies within the southwest and northwest portions of the region will need to be addressed as these areas become more developed. Telecommunication service capacity will also need to be increased in Lahaina and Kaanapali as demand grows.

Kihei-Makena

Regional Summary: The Kihei-Makena Community Plan Area has the second largest population and is tied with Central Maui for the fastest growing region within the County. Telecommunication services are available throughout the region's urbanized areas with minimal gaps in service. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is strong throughout the central portion of the region. Similar to the West Maui region, wireless coverage diminishes within the northern and southern portions of the Kihei-Makena Community Plan Area. The Maalaea area receives marginal wireless coverage, while the Makena area receives poor wireless coverage.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

Meeting Community Telecommunication Needs in 2015 and 2030: Telecommunication service demand will continue to increase with the growing South Maui population. With continued development of the Wailea and Makena areas, service area gaps will need to be addressed. Additionally, as residential and commercial development expands mauka of the Piilani Highway, telecommunication services will need to be planned for these areas. As with the West Maui and Wailuku-Kahului regions, telecommunication service capacity within the already developed areas of the Kihei-Makena region will need to increase with growing demand.

Makawao-Pukalani-Kula

Regional Summary: As population centers become less urbanized and settlement patterns become more dispersed across the landscape, the quality and choices of telecommunication services decrease. The following five community plan area summaries demonstrate this trend.

Telephone, wireless, and internet services are available throughout the Makawao-Pukalani-Kula Community Plan Area, with gaps in service in the more dispersed areas. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the region. Makawao and Pukalani have good wireless coverage and are serviced by several companies. Wireless coverage becomes less consistent in the Kula portion of the region

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a lesser extent.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

Population projections indicate that the Upcountry region will continue to grow, exuding increased demand on telecommunication services within developed and non-developed areas of the region. Service coverage gaps, especially in the Kula area, will need to be addressed and service capacity will need to be increased.

Paia-Haiku

Regional Summary:

The quality and extent of telecommunication coverage varies throughout the Paia-Haiku Community Plan Area. Gaps in service exist in the more dispersed areas of the region. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the region due to a deficiency in the number of wireless communication towers, particularly in the Haiku area. Wireless coverage is more reliable in the Paia area.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service, such as cable modem, DSL, high-speed wireless, and satellite, are also available in the region, however to a much lesser extent.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

While the Haiku-Paia Community Plan Area is the slowest growing region in the County, addressing telecommunication needs in 2015 and 2030 is still a concern. Telecommunication service areas and capacity will need to be increased to address current deficiencies and meet future demand.

Hana

Regional Summary: Telecommunication services are limited in the Hana Community Plan Area due to the remote location of the region. Gaps in service exist throughout the region. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers the whole region; no deficiencies exist.

Wireless: Wireless coverage is extremely limited throughout the region. Few companies service the area, providing consumers with very limited wireless options. Generally, the best coverage is in the Hana town area. No wireless coverage is available in the southeast portion of the region between Kaupo and Kanaio.

Internet: Since telephone service covers the entire region, dial-up internet service is also available throughout the region. Other forms of internet service are extremely limited in the region.

Meeting Community Telecommunication Needs in 2015 and 2030:

The Hana region population is forecasted to grow at a similar rate as the Makawao-Pukalani-Kula population. As the population grows, current gaps in service will need to be addressed to meet the increasing demand for telecommunication services.

Molokai

Regional Summary: Current telecommunication service areas and deficiencies on Molokai are similar to those in the Hana region due to the dispersed nature of development on Molokai. The urbanized areas of the island have moderate telecommunication coverage while the more dispersed areas have much less comprehensive coverage. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers all residential and commercial areas of the island; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the island with multiple gaps in service. While several companies service the island, coverage areas are limited. Generally, the best coverage is in the Kaunakakai and Hoolehua areas.

Internet: Since telephone service covers the entire island, dial-up internet service is also available throughout the island. Other forms of internet service are extremely limited.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

Molokai is one of the slowest growing community plan areas within the County. However, considering existing service deficiencies, telecommunication service areas and capacities will need to be expanded to meet future demand.

Lanai

Regional Summary:

Lanai's residential and commercial areas have adequate availability to most telecommunication services. The compact nature of development on Lanai within Lanai City is a contributing factor to the level of service received on the island. Coverage areas and current deficiencies for each telecommunication service are briefly described below.

Telephone: Telephone service covers all residential and commercial areas of the island; no deficiencies exist.

Wireless: Wireless coverage is variable throughout the island with multiple gaps in service. While several companies service the island, coverage areas are limited. Generally, the best coverage is in the Lanai City area.

Internet: Since telephone service covers the entire island, dial-up internet service is also available throughout the island. Other forms of internet service are extremely limited.

**Meeting Community
Telecommunication
Needs in 2015 and
2030:**

Population forecasts for 2015 and 2030 indicate that Lanai's population will grow at an average annual rate of approximately 1.3 to 1.6 percent. This population growth will result in an increased demand for telecommunication services. Current gaps in service will need to be addressed and telecommunications capacity will need to be increased to meet future demand.

STRATEGIC PLANNING

Telecommunication services are a key element of ensuring economic vitality, public safety, and social communication within modern society. However, unlike the majority of infrastructure systems assessed for the General Plan 2030 update, telecommunication infrastructure and services are planned and managed by private industry rather than County and State agencies. Because of this factor, the County must be diligent at educating itself on telecommunication issues which may influence the growth and development of the County. The following discussion explores strategic planning issues related both directly to Maui County's telecommunication infrastructure and current operating companies, as well as national trends, technology developments, and regulatory issues.

Existing Gaps in Infrastructure

The Regional Analysis section and Service Coverage Maps identify the current gaps in telecommunications services and infrastructure throughout the County. The following discussion provides a summary of the major infrastructure gaps which limit economic development, service delivery, and quality of life. The Regional Analysis section revealed that throughout Maui County there exists an array of the degree of telecommunication coverage, ranging from comprehensive coverage in Central Maui to minimal coverage in East Maui. The areas within the County which have existing major gaps in telecommunications infrastructure include:

- Hana Region: The remote location of the Hana region significantly impacts telecommunication services within this region. Specifically, areas outside of Hana town experience poor wireless coverage and limited internet coverage options due to infrastructure gaps. The existing gaps impact the region's economic development and quality of life.
- Molokai: Gaps in telecommunications infrastructure significantly affect service delivery throughout the island, especially in rural areas. With limited employment opportunities on the island, the lack of sufficient telecommunications infrastructure further impacts economic development and quality of life.
- Lanai: Similar to Molokai, the lack of sufficient telecommunications infrastructure negatively impacts economic development and quality of life.
- Haiku: The rural and dispersed nature of development in the Haiku area impacts telecommunication services. Most notably, the area lacks sufficient wireless coverage due to gaps in infrastructure.

Industry Plans for Expansion

In general, industry plans for expanding telecommunication services include improving service in existing coverage areas, filling in existing service gaps, and expanding service coverage to newly developed areas. In order to strategically plan for service improvements and expansion, telecommunication providers communicate with customers, private developers, and the County Planning Department. Identifying specific plans for expansion is difficult due to the multitude of telecommunication providers in the County. However, through communication with various industry representatives, a brief summary of possible future expansion plans are provided below:

- Hawaiian Telcom Communication, Inc. - expansion of high speed internet coverage on Maui, Molokai, and Lanai.
- Oceanic Time Warner Cable – service all new developments with high speed internet.
- T-Mobile – addressing gaps in service, particularly in the Haiku area.

- Clearwire – expand capacity in already served areas to strengthen service; provide service to growing areas with high demand such as Kapalua.

Telecommunication providers occasionally encounter regulatory impediments which may delay, or at times halt, plans for expansion of infrastructure. Regulatory impediments may include complying with zoning requirements, and receiving right-of-way permits and building permits.

Opportunities for Partnerships

Opportunities exist for creating partnerships between private telecommunication companies and various levels of government to address areas that are lacking in service. According to Sean Cleveland, Commercial and Public Sector Sales Account Director for the Hawaii Region of Alcatel-Lucent (personal communication, December 20, 2006), state and county governments can work with private industry to address underserved areas by sharing existing infrastructure and frequencies. Sandwich Isles Communications Inc., is currently partnered with the U.S. Department of Agriculture's Rural Utility Service to provide telephone and internet service to Hawaiian Home Lands throughout the State. In Grand Rapids, Michigan, city officials recognized the importance of telecommunications as an economic development tool and partnered with Clearwire to develop a citywide wireless broadband network. Although the County and State governments do not have direct control over the planning and development of telecommunications infrastructure and systems, they can partner together with private industry and strategically plan the expansion of telecommunication services to underserved regions.

New Technology

Telecommunication technology is continually evolving, offering customers improved services and changing infrastructure requirements. Technological advancements and industry trends which the County should be aware of include WiMAX and converged networks. WiMAX, or Worldwide Interoperability for Microwave Access, is the newest form of broadband wireless access which provides an alternative to cable modem service and telephone company DSL service. WiMAX offers a broad range of applications beyond broadband internet access including VoIP, Internet Protocol Television (IPTV), mobile telephone service, and mobile emergency response services. (WiMAX.com, n.d.)

The convergence of a broad range of applications, such as WiMAX offers, is a relatively new trend in the telecommunications industry. The consolidation of voice, data, and video technology simplifies telecommunications for the end user and according to Sean Cleveland, Commercial and Public Sector Sales Account Director for the Hawaii Region of Alcatel-Lucent (personal communication, December 20, 2006), converged networks have the potential to lessen the need for telecommunications infrastructure in the future. With converged networks, the need for new telephone and cable infrastructure will decrease as telecommunications become increasingly wireless. However, according to Daniel Wedemeyer, professor in the School of Communications, UH Manoa (personal communication, December 19, 2006), as telecommunications become increasingly dependent on wireless broadband technology, the need for additional antennas and wireless communication towers will also grow. The potential

increasing need for wireless communication towers will have implications regarding tower siting, building permits, and community concerns which the County will need to plan for.

Wireless Communication Towers

Widespread use of wireless telecommunications has led to the placement of wireless communication towers in many suburban and rural communities throughout the County. Many communities are concerned about the health and aesthetic impacts of the placement of these towers in residential areas. The Telecommunications Act of 1996 preserves local authority over wireless communication tower siting decisions, with some limitations. Therefore, the balancing of the need for towers and the desire of some citizens to limit the number of towers is a responsibility of the County of Maui. The following discussion summarizes the health, aesthetic, and safety concerns of wireless communication towers and their placement near residential areas.

⇒ *Health Concerns*

The primary concern most communities articulate regarding the placement of wireless communication towers near residences are potential health effects, particularly the development of cancer. The Federal Communications Commission (FCC) establishes radiofrequency (RF) emissions and safety guidelines which wireless companies are required to comply with. (FCC, 2000) The Telecommunications Act of 1996 prohibits local authorities from basing siting decisions on health concerns as long as the tower complies with FCC guidelines. (Brose, 1997) The only regulatory action local governments can take regarding health effects is to verify that the companies are meeting FCC guidelines. However, regardless of this limit placed on local authority, many communities remain concerned about the placement of towers in residential areas. Since wireless technologies are relatively new, complete information on health effects is unavailable. However, animal studies of RF have not suggested a risk of cancer and several theoretical reasons exist to explain why towers would not be expected to increase cancer risk. (ACS, n.d.)

Public exposure to harmful RF emissions from wireless communication towers is very minimal due to several factors. Powers levels are relatively low, the antennas are mounted high above ground level, and signals are transmitted intermittently, rather than constantly. (ACS, n.d.) The FCC's maximum permissible exposure level for RF to the general public is approximately 580 microwatts per square centimeter, a level which is many times greater than RF levels generally found near the base of wireless communication towers. Additionally, public exposure levels near towers are similar to background levels of RF radiation in urban areas from other sources such as radio and television broadcast stations. (FCC, n.d.)

- ⇒ *Aesthetic Concerns* Communities are also often concerned about the potential aesthetic effects of wireless communication towers in residential areas. Residents dislike the appearance of the towers and are concerned that they could reduce property values. Unlike health concerns, local governments can take action to address this community concern. Through planning and zoning, the County can, within certain guidelines, influence the placement of towers. (Courret, 1999) Additionally, stealth, or camouflage techniques can be use to disguise towers as other less obtrusive structures such as windmills or trees.
- ⇒ *Safety Concerns* Finally, some communities are concerned about the possibility of falling towers. While not a major concern due to the structural integrity of the towers, it is a concern that is often raised by communities which the County should be prepared to address. The establishment of height restrictions and setbacks requirements specific to wireless communication towers should address safety concerns regarding falling towers.

As previously discussed, increased use of wireless technology will most likely be accompanied by a decreasing need for telecommunication wires and cables, and a growing demand for wireless communication towers. Considering the community concerns which exist regarding the towers, and the prominent role the County plays in the placement of the towers, the County would be wise to develop a comprehensive wireless communications tower ordinance to guide the permitting of future towers.

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