

Wireless Network Strategic Plan



Prepared for:
Eric Brumm
Chief Information Technology Architect
City of Glendale
EBrumm@GlendaleCA.gov

Prepared by:
Jory Wolf
Magellan Advisors
jwolf@magellan-advisors.com
818-312-7768
www.magellan-advsors.com



Cover Letter

April 13, 2021

Eric Brumm
Chief Information Technology Architect
City of Glendale
Information Services Department

Dear Eric,

Magellan is pleased to submit this proposal to the City of Glendale for development of a Wireless Strategic Plan which will create strategies for the City to leverage its existing network infrastructure to provide wireless services and support Smart City applications in locations throughout the City. Building wireless components and capabilities into the City's network will allow more mobile high-speed access in key areas, building off the City's existing and proposed fiber-optic network investments.

This process requires a carefully designed strategic plan that incorporates the needs of the Glendale community and determines how the City's investments in wireless infrastructure will support these needs. We will focus our planning efforts on locations that will provide the most benefit to Glendale's community including dense neighborhoods that are currently unserved and underserved, sites close to the City's existing fiber infrastructure, and parks and in parks facilities with buildings such as community centers. Additionally, we will evaluate options for expanding to additional locations in the future to support Smart City applications and mobile workforce to provide efficient delivery of public safety, transportation, utilities, and other critical services.

Magellan will guide you through the process of determining which technology and policy options are most feasible for the City and provide you the decision support tools so you can decide on the best path forward. We will provide a detailed investment roadmap with actionable steps to begin immediately expanding wireless capabilities across the City.

Our team looks forward to continuing our partnership with the City of Glendale and GWP to realize your broadband and technology goals. If you have any questions or we can be of assistance in any way, please feel free to contact me with any questions or comments. You can reach me directly at 818.312.7768 or jwolf@magellan-advisors.com.

Sincerely,

A handwritten signature in cursive script that reads "Jory Wolf".

Jory Wolf
VP of Digital Innovation, Magellan Advisors

About Magellan Advisors

Magellan Advisors, LLC is a Denver-based firm with local offices in Miami, Los Angeles, and Kansas City. Magellan's primary address is 999 18th Street, Suite 3000 Denver, CO 80202. Magellan Advisors, LLC was founded in January of 2004 and has been in operation as a Florida Limited Liability Company since inception. Our Federal EIN is 65-1218484. Magellan maintains a staff of 40 full and part time employees.

Magellan provides leading wireless, broadband, Smart City, turnkey design and engineering, and project and construction management to public and private organizations. We are a full spectrum planning and implementation firm that brings together technology, communications, and utility consulting to create smart gigabit cities of tomorrow.

Our professionals bring years of experience from the broadband, telecom, information technology and government sectors. We are thought leaders and real-world implementers of broadband and smart city networks that keep communities competitive in the digital world.

Unlike most consulting firms, we partner with our clients every step of the way, whether they are deploying institutional fiber networks, developing broadband public-private partnerships or deploying Smart City networks. We are a "hands-on" firm with strong project management abilities and implementation skills to see our clients' projects through from concept to completion.

We are only successful when our clients are successful. Our goal is to deliver practical broadband and technology solutions that our clients are capable of implementing in their communities. Our combination of unmatched broadband, telecom, business, and operational experience creates actionable strategies that communities use to realize their broadband and Smart City objectives. We have led the planning, funding, construction, and management of over 50 fiber-to-the-premise networks passing over 1 million homes and connecting more than 1,000 schools, hospitals, government offices and community organizations. Our work has resulted in over \$1 billion in new broadband investments nationwide. Magellan has helped more communities successfully plan, implement, and manage gigabit broadband networks than any other firm in the market.



MAGELLAN ADVISORS

Portfolio of Services

BROADBAND FEASIBILITY STUDIES

Community Needs Assessments
Business Models & Financial Planning
Market Analysis & Current Environment
Design & Engineering
Network Analysis & Inventory
Opportunity, Risk & Benefit Analysis

BROADBAND DESIGN ENGINEERING

FTTH, FTTP, Metro & Long-Haul Fiber
Routing, Switching & MPLS
Fixed Wireless, Microwave & Wi-Fi
Internet, Voice & Video Integration
GPON Active Ethernet & WDM
BSS/OSS Network Management Systems

SMART CITY PLANNING

Asset Assessments
Smart City Solutions Needs Assessments
Strategic Smart City Planning
Vendor Selection
SCADA Consulting
IT Governance

NETWORK IMPLEMENTATION

Standards & Specifications
Sales & Marketing
Vendor Selection & Management

NETWORK IMPLEMENTATION (CONT.)

Construction Management & Inspections
Installation & Activations
Operations & Customer Service

PUBLIC POLICY & GOVERNANCE

Right-of-Way Management Ordinance
Dig Once & Joint Trench Policies
Wireless Ordinance & Guidelines
Telecommunications Master Funding
Fiber Ordinance & Guidelines
Internal & External Working Groups

BUSINESS MODELS & PARTNERSHIPS

Dark Fiber, Open Access, Triple Play
Partner Recruitment & RFQs
Feasibility Analysis of Business Models
Advocacy & Negotiation in Partnerships
Public-Private Partnership Development
Opportunity, Risk & Benefit Analysis

PROJECT MANAGEMENT

Procurement & Contract Negotiation
Construction Management
Network Commissioning & Certification
Content Acquisition & Agreements
Sales, Marketing & Business
Development
Business & Operations Management

SERVICE OFFERINGS

Magellan’s West Coast Clients

 Key West Coast Clients			FEASIBILITY STUDY	FIBER MASTER PLAN	BROADBAND BUSINESS PLAN	GRANT DEVELOPMENT	PARTNERSHIP DEVELOPMENT	BROADBAND POLICY	ENGINEERING DESIGN	PERMITTING	PROCUREMENT	CONSTRUCTION MANAGEMENT	INSPECTIONS & CLOSE-OUT	STARTUP & LAUNCH	OPERATIONS & MANAGEMENT	SALES & MARKETING	BROADBAND EXPANSION
CUSTOMER	STATE	TYPE	BROADBAND PLANNING						ENGINEERING			TURNKEY IMPLEMENTATION					
Alameda County	CA	County	•														
City of Carlsbad	CA	City			•			•									
City of Chula Vista	CA	City	•						•								
City of Concord	CA	City	•						•								
City of Davis	CA	City	•						•								
City of Fairfield	CA	City	•						•								
City of Fremont	CA	City		•			•										
Ferry County & Colville Tribes	WA	County			•												
City of Glendale	CA	City	•						•								
Grays Harbor PUD	WA	Utility	•														
City of Hayward	CA	City	•						•								
City of Hidden Hills	CA	city					•										
City of Hillsboro	OR	City							•	•	•	•					
City of Huntington Beach	CA	City	•														
City of Inglewood	CA	City	•						•								
Jefferson Public Utility District	WA	Utility	•	•	•	•			•								
City of La Mesa	CA	City	•						•								
City of Lodi	CA	Utility	•			•		•	•								
City of Manhattan Beach	CA	City	•						•								
Marin County	CA	County			•		•										
Marion County	OR	County	•	•	•	•			•		•						
City of Mission Viejo	CA	City	•						•								
Napa County	CA	County	•			•			•								
Navajo Nation	NM	Organization	•			•			•								
Navajo County	AZ	County		•		•											
Northern AZ Council of Gvt	AZ	Organization		•		•											
City of Oxnard	CA	City	•						•								
City of Paso Robles	CA	City					•										
Pierce County	WA	County	•	•	•	•			•								
Pima Association of Gvts	AZ	Organization	•														
City of Rancho Cucamonga	CA	City	•	•					•	•	•	•		•			
City of Rancho Santa Fe	CA	City	•						•								
City of Sacramento	CA	City						•									
City of San Leandro	CA	City	•						•								
City of Santa Ana	CA	City	•						•								
City of Santa Clarita	CA	City	•				•		•								
Town of Skykomish	WA	Town	•			•	•										
Sonoma County	CA	County	•			•			•								
South Bay COG	CA	Organization		•		•			•		•	•		•		•	
City of Stockton	CA	City						•									
City of Ventura	CA	City	•						•								
Ventura County	CA	County	•			•			•								
City of Walla Walla	WA	City	•			•			•								
City of West Hollywood	CA	City	•					•	•								
City of West Sacramento	CA	City	•						•								
Whitman County	WA	County	•			•			•								
City of Winters	CA	City	•						•								
Yolo County	CA	County	•			•			•								

Key Personnel

JORY WOLF

VP of Digital Innovation: Project Executive

Jory joined Magellan after 22 years as CIO of the City of Santa Monica, CA where he launched Santa Monica City Wi-Fi, which provides free internet services to the public through a network of 32 hot zones and wireless coverage in most major commercial and transit corridors throughout the city. He created Santa Monica City Net, a 100-gigabit broadband initiative to support an environment for local businesses to compete in the global economy with cutting edge network solutions. Jory has over 35 years of experience in Information Technology, including broadband, FTTH and Smart City initiatives. Jory and his teams have received over 50 awards for information technology projects during his career and in 2012 he received the CIO Lifetime Achievement Award from the Los Angeles Business Journal. Since joining Magellan Advisors in July 2016, Jory has led teams that have worked on 60+ government projects in broadband master planning, feasibility studies, wireless strategic planning, 5G small cell policies, dig once policies and smart city.

PRESTON YOUNG

Senior Broadband Consultant

Preston Young has many years of experience in the telecom industry, specializing in program management of large-scale fiber optic construction over builds. He has experience managing many projects of all sizes, working with major telecom and wireless providers in managing all aspects of the projects including contract management, budget analysis, high-level design, low-level design, construction, milestone reporting, and government and municipality management. Preston is a very detailed program manager with a tenacious quest for success and learning, results driven leadership and analytical thinking. He thrives on efficient on-time projects that meet or are under budget.

MIKE JOHNSON

Senior Broadband Consultant – Policy & Regulatory

David has decades of experience in the telecommunications industry from an extensive array of telecommunications engagements in the U.S. and internationally. This experience provides depth and capability in the subjects of broadband trends and planning, market analysis and surveillance, telecommunications stakeholder engagement, wireless and wireless broadband trends and developments, industry financial reporting and analysis, telecommunications company operations, back office systems and business plans, interconnection and unbundled network element pricing, telecommunications service costing and universal service goals and objectives.

AL KAMUDA

Design Team Lead

Al Kamuda is a seasoned telecommunications and GIS professional with over 20 years' experience in telecommunications engineering, mapping, design and outside plant construction. Prior to joining Magellan, Al was the Senior Design Manager for the Central Florida region at Spectrum (Charter Communications), where he led the planning, project management and implementation of outside plant design for various company growth projects including residential, commercial, cellular backhaul and metro WIFI. His extensive experience with the telecommunications industry, CAD platforms and geospatial expertise along with his strategic forward thinking provides an extremely diverse skill set that allows him the valuable insight needed to understand the client's objectives in all aspects of telecommunications construction and design processes.

MATTHEW SOUTHWELL

Associate Project Manager – Design

Matthew Southwell has over 13 years in the telecommunications field. Matthew's career began as a U.S Army Sergeant where he worked on tactical communication systems, Sat-Com radio systems, and deploying weekly COMSEC key changes OTAR (Over the Air Rekeying) with newly deployed radio systems during two Operation Enduring Freedom deployments. Matthew's private sector work includes work with a Motorola radio distributor and contractor where he supported many Federal, State, and local County entities to include: Department of Homeland Security, Immigration and Customs Enforcement, Drug Enforcement Administration, Florida Highway Patrol, Greater Orlando Airport Authority, Orange County Sheriff's Office, and the Lake County Sheriff's Office. Matthew joined Magellan Advisors in 2016 as a telecommunication analyst where he has contributed his knowledge and technical expertise to over 65 broadband projects. Matthew's current role within Magellan includes analysis of client GIS data and mapping, creating conceptual network designs and costing estimates for future fiber builds. Matthew is a Certified Fiber to the Home Professional (CFHP) and holds a Business Management Degree with High Honors from Keiser University in Orlando, FL.

MELANIE DOWNING

Project Management Analyst

Melanie has a background in technical communication and has extensive experience coordinating, researching, and implementing projects across a variety of fields from defense contracts to small business plans. Prior to joining Magellan in 2018, she worked in healthcare management and consulting and was a graduate student at the University of Central Florida studying technical communication in technology and public policy. In her current role as Project Management Analyst, she supports Magellan's West Coast team, assisting more than 40 local governments across California, Oregon, and Washington with broadband initiatives. Melanie coordinates project-related data including the development and completion of scopes of work, timelines, milestones, deliverables, project tasking, and quality control, helping to ensure the success of our clients' communities.

Scope of Work

TASK 1. WIRELESS NETWORK NEEDS ASSESSMENT

Magellan will begin by evaluating Glendale’s needs for future wireless infrastructure and documenting the potential wireless applications that will allow the City to better serve its constituents while reducing costs and improving municipal efficiencies. We propose to hold interviews with your departments to understand their current and future needs for connectivity to support departmental operations. The assessment will focus on current and future programs that the City will deploy and that rely on wireless infrastructure supported by City-owned fiber backhaul.

We will also analyze the needs of the City and match them with the range of Smart City Technologies that are being deployed by cities around the US. We will identify the fit for Glendale and help you determine what critical infrastructure is required to support the Internet of Things (“IoT”) in Glendale. We believe that cities positioned with the infrastructure needed to support Smart City Technologies will be well positioned to meet their constituents’ needs long into the future while providing a foundational communications system to support long-term community sustainability. Our advisors will help you assess the benefits gained by equipping your infrastructure assets with wireless connectivity to support many growing municipal and community needs. Applications may include:

Public WiFi

- Location Aware Launch Pages
- Session Management
- Income from Advertising
- Business Promotion
- Secure Municipal Networks

Smart Parking

- Wireless Meters
- Real-time Parking Availability
- Pay-on-Foot Devices
- Smart Mobile Parking Apps
- Parking Navigation
- Directional Signs
- Real-time Signs
- Credit Card Transactions

Emerging Technologies

- Drones
- Advanced Robotics
- Mobile Hotspots

- Video Streaming
- Point of Sale Applications

Smart Transportation

- Traffic Signal Synch
- Transit Priority
- HD Traffic Cameras
- Transportation Management Center
- Smart Bike Lanes
- Wayfinding
- Smart Buses and Next Bus

Smart Public Safety

- 4G, 5G, & WiFi Data
- Mobile Streaming Video
- HD Public Safety CCTV Cameras

Smart Resources

- Sanitation
- Water Monitoring
- Rubbish Disposal

We will focus attention on those City Departments with mobile staff who could benefit from improved wireless such as Public Safety, Building Inspectors, Parking, Events Services, Recreation Staff, Engineers, Inspectors, Code Enforcement, Transportation, and Field Services. Our team has vast experience leading strategic planning exercises including Advanced Metering Infrastructure, Traffic Management, Intelligent Transportation and Real-Time Parking technologies.

We will also identify unserved and underserved locations within Glendale that do not currently have access to robust broadband connections, focusing on economic development, business and entertainment corridors and dense neighborhoods that have needs for additional options to support remote work, telehealth, and online learning.

TASK 2. WIRELESS NETWORK DESIGN

Based on mapping data and the outcome of the needs assessment, Magellan's team will identify sites for wireless access points to support the needs of the City and its community, with a focus on:

- Dense neighborhoods with limited access to broadband
- Sites close to City's existing fiber infrastructure
- Parks, with special emphasis on those that have other facilities such as community centers
- Business, economic and entertainment corridors

We will create a master site list of locations for wireless access based on the needs of departmental operations and services as well as the community for supporting economic growth and quality of life measures. Our advisors will then prioritize that list and categorize sites based on feasibility and prioritization including proximity to existing fiber infrastructure, government service priorities and community needs.

The site identification and prioritization will be used to inform the design of the wireless network, including a phased implementation plan and models for deployment. Our team will map each of the categorized locations in Magellan's GIS software to gain an understanding of where wireless infrastructure can be deployed to have maximum impact and to assess the level of investment that will be required.

We will then create a wireless network design for serving the needs of the City, its residents, businesses, and anchor institutions. We propose to utilize any existing conduit, fiber, facilities and other assets including, street light poles, traffic signal poles, utility poles and traffic signal cabinets as a foundation to develop the network. The network design will include an in-depth evaluation of wireless coverage.

TASK 3. WIRELESS TECHNOLOGY OPTIONS

Based on the network design, we will evaluate a range of wireless technology options for the network. This determination will be based on the user group interviews and specific technology requirements such as secure networking features, on prem and cloud solutions. In addition, supporting components, software and third-party solutions will be presented based on the range of uses identified. The evaluation will include considerations for the cost and level of

effort that would be required should Glendale decide to include or move away from its current Meraki WiFi applications.

We will review all available City-owned assets and infrastructure to support the attachment of antennae's and other supporting equipment. These will include potential use of the right-of-way, conduit and fiber-optic systems (current and planned), status and space on traffic signal, streetlight and utility poles.

Our team will evaluate and recommend network architecture (private and public networks) and technology choices based on the City's overall wireless goals and in support of the findings identified from the user group meetings. Any network the City invests in must be scalable and must meet the City's immediate objectives while providing significant upgrade capabilities. The core network should provide 1Gb to the edge, 10Gb and beyond core backhaul capacity to all wireless components and the technology selection must support a range of uses.

We will identify all required hardware, software and professional services costs and provide a timeline for investment based on the size and length of buildout. Our consulting team will identify and recommend potential project vendors that could assist in the implementation and operations of the City's wireless network. All cost estimates will include capital expenses and operational expenses for the ten year life of the Plan.

We will recommend network security criteria and requirements based on use, i.e., public safety, and will make appropriate policy and network configuration recommendations. The Plan will outline all operational and technical requirements to operate and support the network over its lifespan. We will also identify key roles and skill sets required to oversee an operational Glendale wireless network by City and contracted resources.

Our team will also identify any options to provide network resilience and survivability into the design. This could include options for solar power or other emergency backup power options. The City has stated the ability to maintain operations for at least seven days with no power grid. Through this discussion, we will interview Public Safety to understand their requirements and to solicit any demands that could impact use of the network. While survivability and network resilience options are available, they are not inexpensive. We will outline all options, and identify cost estimates so Glendale can make an informed decision on the feature and functionality requested. In addition, we will outline any special circumstances that should impact the network design, including VLAN strategies, security, Quality of Service and Class of Service requirements and security restrictions based on potential users.

TASK 4. BUSINESS MODELS & COST EVALUATION

Magellan will assist Glendale in evaluating various business models it should consider for deployment of a wireless network that supports the City's documented needs. We will address operational and management options including in-house or outsourced resources for managing the network. Some of the key questions that we will address in this section include:

- Should the City expand wireless services throughout the community and if so, where?
- What level of investment will be required by the City of Glendale to build and operate the wireless network?

- What legal and operational structures should be considered by the City for maintenance and use of the wireless infrastructure?
- How will future system expansion be handled and what contributions will be required to deploy additional infrastructure?
- How might the City commercialize the network for use by private sector providers, promoting a competitive environment that benefits the City's broadband user base?

We will evaluate the near-term and long-term costs of the network, providing Glendale with realistic estimates for operating and capital cost structures, as well as any projected revenue, cost sharing, and other financial assumptions. The costs will align with a phased deployment plan, with specific year-by-year investments and potential revenue that could benefit the City should it commercialize the network.

We will also provide recommendations for related policies and operational procedures which may include considerations for security, open data, video retention, captive portals, launch pages, privacy, monetization, citizen engagement, session management and similar wireless and Smart City-related concerns.

TASK 5. WIRELESS STRATEGIC PLAN DEVELOPMENT & APPROVAL PROCESS

Having analyzed the various opportunities, business models and financial implications with the City team, Magellan will develop a Wireless Network Strategic Plan for the City that has the following attributes:

- Addresses City, business, and residential use cases
- Phased approach for deployment identifying near- and long-term benefits for the community
- Options for deploying wireless technologies and infrastructure that is supported by Glendale's existing assets
- Operational and business approach based on the needs and capabilities of Glendale
- Financially prudent and designed for success

We will provide a year-by-year phased implementation plan that includes benchmarking information forecasting what Glendale can expect from the investments in wireless broadband across all facets of the community.

Magellan will deliver its final report and recommendations that will provide an investment-ready Plan to connect wireless technology throughout the City. All information gained throughout the project will be utilized to support the recommendations of developing a sustainable wireless initiative in Glendale. Our report will address each area of the study and provide information, benchmarks, and analyses that support the recommendations for the wireless expansion. We will also be available to present our findings and recommendations to leadership for adoption of the Plan.

PROJECT MANAGEMENT & MEETINGS

Magellan's project team will meet on a bi-weekly basis with your project team to discuss the status of the project, major milestones and deliverables, and ensure alignment on project goals.

***Due to the COVID-19 pandemic, Magellan Advisors will be limiting onsite visits in adherence to CDC guidelines. Magellan’s team will work with Glendale’s team to conduct meetings remotely and will inform the City’s team of any updates to this policy as the situation progresses.**

Project Timeline

Based on projects of a similar nature, we estimate that Glendale’s Wireless Master Plan process would take approximately seven (7) months to complete.

- ◆ Ongoing Task
- Final Deliverable

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
Wireless Network Needs Assessment	◆	◆	◆	◆	◆		
Wireless Network Design	◆	◆	◆	◆			
Wireless Technology Options		◆	◆	◆	◆		
Business Models & Cost Evaluation			◆	◆	◆	◆	
Wireless Strategic Plan Development & Approval Process					◆	◆	□
Project Management & Meetings	◆	◆	◆	◆	◆	◆	◆

Estimated Costs

The total cost to the City of Glendale for the Wireless Strategic Plan and Policy is \$134,400 and includes all work to be completed by Magellan as stated in this Proposal. Magellan will bill the City in seven (7) equal monthly payments of \$19,200. Magellan will bill on the first day of the month for the current month's services. Travel and incidental expenses will be billed as incurred at a not-to-exceed rate of \$5,000. Invoices are payable on net 30 terms from the date of invoice.

Description	Hours	Cost
Wireless Network Needs Assessment	100	\$21,000
Wireless Network Design	150	\$31,500
Wireless Technology Options	80	\$16,800
Business Models & Cost Evaluation	125	\$26,250
Wireless Strategic Plan Development & Approval Process	100	\$21,000
Project Management & Meetings	85	\$17,850
Total for Services	640	\$134,400
Travel & Incidentals		\$5,000
Total Not-to-Exceed		\$139,400