

Kitsap 911 Executive Committee Meeting
November 28, 2018 ~ 1:00 PM to 3:00 PM
Kitsap 911

A G E N D A

1. Call to Order (Chair)
2. Additions to Agenda (Chair)
3. Approval of Minutes (November 14, 2018) (Chair)
4. Public Comment (limited to 2 minutes per speaker) (Chair)
5. 2016 & 2017 audit results by the State Auditor's Office (Rogers/Anthony)
6. Approval of Payment of Claims- Fund 89822 (Operating Fund) (Kirton)
 - a. A/P Warrant Numbers 2403 through 2413 Total \$23,697.55
 - b. Payroll Dated 11/16/2018
Total: \$291,026.29
 - c. Electronic Payments: Dates 10/31/18 through 11/26/18
Total: \$136.03
7. Ratification of Executed Contracts (Kirton)

None
8. Action Items
 - a. Resolution #2018-007 Adopting Salary and Wage Range for Unrepresented Administrative, Management, and Extra-Help Employees
 - b. Long Range Technical Plan
 - c. Technical Budget
9. Discussion Items & Reports
 - a. Staffing Report (Jameson-Owens)
 - b. Goals and Tech Project Updates (Kirton/Wecker)
 - c. December 4th Board Meeting (Kirton)
 - i. Charter Amendment
 - ii. Bylaw Amendment
 - iii. Long Range Technical Plan
 - iv. Adoption of Technical Budget
 - v. Approval of Budget Resolution
 - vi. Reports
10. Additional Agenda Items (*If any*)
 - a. _____
 - b. _____
 - c. _____
11. Good of the Order
12. Adjourn



Kitsap 911 Executive Committee Meeting of November 14, 2018

The Kitsap 911 Executive Committee met in the Conference Room at Kitsap 911 in Bremerton. Present were: Director Dusty Wiley (Chair), Director David Ellingson, Director Greg Wheeler, Strategic Advisory Board Chair Chief Matthew Hamner, Strategic Advisory Board Vice Chair Chief Steve Wright Executive Director Richard Kirton, Deputy Director Maria Jameson-Owens, Finance Manager Steve Rogers, and Administrative Specialist Stephanie Browning. Absent: Director Rob Putaansuu and Director Gary Simpson

Call to Order. Chair Dusty Wiley called the meeting to order at 1300

Additions to Agenda: None

Public Comment: None

Approval of Minutes:

Director David Ellingson moved to approve the minutes from October 10, 2018. Motion was seconded by Director Greg Wheeler. Motion Passed.

Approval of Payment of Claims-Fund 89822:

Director David Ellingson moved approval of A/P 2311 through 2402 Total \$287,661.19, Payroll dated 10/19/18 and 11/02/18 Total \$582,209.99, Electronic Payment dates 09/30/18 through 10/25/18 Total \$39.52. Motion was seconded by Director Greg Wheeler. Motion Passed.

Ratification of Executed Contract:

Director Greg Wheeler moved to ratify contract K911-025 Interagency Agreement with Washington Traffic Safety Commission and contract K911-026 City of Bremerton Law Enforcement off Duty Service Agreement. Motion was seconded by Director David Ellingson. Motion Passed.

Discussions and Reports:

Thurston County Sales Tax Proposal-

An email was provided in the agenda packet from the Director of Thurston County 911 Center Keith Flewelling with information that they are pursuing Legislative change to the 911 sales tax to allow for 2/10th. If the Legislature approves it would not automatically raise our rates. Kitsap 911 would have to go back to the voters to raise the rate. Thurston County 911 would like to know if other 911 centers support this effort. The bill has been drafted and one of their legislatures is sponsoring it. Discussions took place relative to what it would look like if Kitsap 911 did this as well. Once the bill number is assigned, Mr. Kirton will provide this information.

Finance Report-

Finance Manager Steve Rogers reviewed the budget reports for end of October 2018. He reported revenues continue to look good and as expected. Expenditure are ahead of year to date budget. There were higher fluctuations in expenditures for software but no current risks were reported.

The State Auditors will be attending the next Executive Committee meeting. They will be delivering their audit report. Preliminary Mr. Rogers believe we should be receiving a good report.

Staffing Report-

Deputy Director Jameson-Owens reported there 12 vacant positions. The Telecommunicator position is posted and will be open until November 19th. To date there are more than 180 applicants. The applicants hired will start in January.

Goals and Tech Projects Update

Technical Systems Manager Brandon Wecker and Executive Director Kirton reviewed the Goals and Projects.

*Technical Plan-The draft plan was sent to the Chiefs and Mr. Kirton will collate the feedback and have the consultant update. This will be ready for Executive Review at the next meeting and presented to the Board in December. If the plan is adopted the next step will be to turn it into a work plan and look at funding strategies.

*Multifactor Authentication- The technician who is responsible for this project is a reservist and has been deployed. A junior technician is taking the lead on this project while he is gone so it is still on track.

*Fire Station Alerting- The workgroup recommendations went back to the Chiefs. They reviewed the top three options and narrowed it down to two. We are now asking the two vendors to give us design documents. Once those are received, the Chiefs will make a final decision on which product they want. The costs are still as expected.

*ASAP to PSAP- This interface allows alarm companies to send information electronically and then populates into CAD. The software used for this is called Edge Frontier. The hardware is being configured and once that is completed, we will move forward with implementation. Additionally, South Sound 911 is still interested in doing a CAD to CAD with Kitsap 911 using this software. While there is not a timeline at this point, they are also looking at doing CAD-to-CAD interface with their neighbors to their north and sound. Once Kitsap 911 is closer, they will evaluate where South Sound is with the other agencies.

*Closest Unit Dispatch-This project uses AVL locations to recommend units for call. South Kitsap Fire and Rescue closest unit dispatch was turned on a few weeks ago; a few problems were identified so it was turned off for a short period. It was reconfigured and turned back on. The Fire OPS group met today and everything is working as directed. The next step will be to start the process with Bainbridge Island Fire in the first few weeks in December.

*ESI Net Implementation-This project is complete.

*ACOM Replacement-This project replaces the radio equipment the dispatchers use due to a failing component. Zetron is manufacturing the system and should have it ready for roll out first quarter of next year. They were able to repair a few failing components This is not as critical but there is still the Keyport option if needed.

*Power Redundancy- Awaiting for one more component and this project will be completed.

*Replace the UPS- Department of Emergency Management (DEM) has found a grant that looks favorable and they are supporting Kitsap 911 in submitting that grant. The match will be 5%.

*Gold Mountain Tower- The support beams that were bowing have been replaced and the tower is back to spec.

*Backup Center- There is no new update.

Additional Agenda Items-

None

Good of the Order:

Mayor Wheeler thanked Director Kirton for the needle information he had requested in a prior Executive Committee Meeting.

Adjournment 13:28

The next regular meeting of the Kitsap 911 Executive Committee is scheduled on November 28, 2018 from 13:00-15:00 at the CENCOM facility.

Kitsap 911
MCAG #: 3179

ACCOUNTS PAYABLE
warrants 2403-2413
As Of: 12/31/2018

Time: 13:38:11 Date: 11/14/2018
Page: 1

| Accts Pay # | Received | Date Due | Vendor | Amount | Memo |
|---------------|------------|------------|--|--------------------|--|
| 1878 | 11/06/2018 | 11/16/2018 | 165 - BUSINESS TELECOM PRODUCTS, INC. - | 61.84 - | 18-0906/C |
| 1880 | 11/08/2018 | 11/16/2018 | 191 - DEPARTMENT OF NATURAL RESOURCES - | 18,364.93 - | KC37410 12/01/18-11/30/19 |
| 1879 | 11/13/2018 | 11/16/2018 | 192 - DISH DBS CORPORATION - | 103.02 - | 11/16-12/15/18 |
| 1881 | 11/08/2018 | 11/16/2018 | 204 - HOLADAY PARKS, INC. - | 836.03 - | 18-0823 |
| 1882 | 11/08/2018 | 11/16/2018 | 315 - LAW OFFICE OF KENNETH W. BAGWELL - | 390.00 - | K911-006 10/01/18-10/31/18 |
| 1883 | 11/14/2018 | 11/16/2018 | 226 - OLYMPIC PRINTER RESOURCES, INC. - | 784.80 - | 18-1113B |
| 1888 | 11/14/2018 | 11/16/2018 | 228 - ORKIN - | 122.54 - | Nov Service DEM R |
| 1884 | 11/13/2018 | 11/16/2018 | 243 - RECOGNITION PLUS - | 150.31 - | |
| 1885 | 11/07/2018 | 11/16/2018 | 253 - SUQUAMISH INDIAN TRIBE - | 2,355.77 - | KC056306 November 2018 Tower Lease |
| 1887 | 11/14/2018 | 11/16/2018 | 246267 - UNGREN , TERESE L - | 473.81 - | Hexagon Public Safety Users Group In Colorado 11/03/18-11/07/18 |
| 1886 | 11/07/2018 | 11/16/2018 | 267 - WCP SOLUTIONS - | 54.50 - | 18-1030A |
| Report Total: | | | | <u>23,697.55</u> - | |

STATE OF WASHINGTON - COUNTY OF KITSAP

I, the undersigned, do hereby certify under penalty or perjury that the materials have been furnished, the services rendered, the labor performed as described herein, and that the claims are just, due and unpaid obligations against Kitsap 911, and that I am authorized to authenticate and certify said claims.

APPROVED BY
AUDITING OFFICER
ATTACHED DOCUMENTS ARE ORIGINALS
AND CERTIFIED BY
EXECUTIVE COMMITTEE CHAIR

[Signature] 11/15/18
Stacy Rogers 11/14/2018
[Signature] 11/14/18

Washington State Department of Revenue Combined Excise Tax Return

604-008-144

KITSAP 911 PUBLIC AUTHORITY

KITSAP 911 PUBLIC AUTHORITY

Filing Period: October 31, 2018

Filing Frequency: Monthly

Due Date: November 26, 2018

State Sales and Use

| Tax Classification | Gross Amount | Deductions | Taxable Amount | Tax Rate | Tax Due |
|---------------------------|--------------|------------|----------------|----------|---------|
| Use Tax | 1,511.45 | | | 0.065000 | 98.24 |
| Total State Sales and Use | | | | | 98.24 |

[Find Location by Address](#)

Local City and/or County Use Tax/Deferred Sales Tax

| Code | Location | Taxable Amount | Tax Rate | Tax Due |
|------|------------------|----------------|----------|---------|
| 1801 | 1801 - BREMERTON | 1,511.45 | 0.025000 | 37.79 |
| | | 1,511.45 | | 37.79 |

Return Totals

| | |
|-------------------|--------|
| Total Tax | 136.03 |
| Less Credits | 0.00 |
| Total Amount Owed | 136.03 |

Submitter Information

| | |
|----------------|-----------------------|
| Prepared By | Steve Rogers |
| Phone Number | (360)-307-5802 |
| Extension | |
| E-Mail Address | srogers@kitsap911.org |
| Submitted Date | Nov-15-2018 |
| Confirmation # | 0-005-501-801 |

Payment Info

Payment Type Selected: ACH Debit/E-Check

| | |
|----------------|-------------|
| Amount | 136.03 |
| Effective Date | Nov-26-2018 |

Prepared by: Steve Rogers Date: 11/15/2018
Steve Rogers, Finance Manager

Reviewed by: _____ Date: _____
Richard Kirton, Executive Director

Approved by: _____ Date: _____
Executive Board Committee Member

Sales Tax Due

Kitsap 911
MCAG #: 3179

Time: 13:50:26 Date: 11/15/2018
Page: 1

10/01/2018 To 10/31/2018

| Date | Account | Vendor | Remark | Line Amt | Tax | Credit | Tax Due |
|------------|----------------------|----------------------------|----------------------|----------|--------|--------|---------|
| 10/05/2018 | 001 - 528 32 48 0002 | MAGNUM ELECTRONICS, INC | | 1,511.45 | 136.03 | 0.00 | 136.03 |
| | | | 001 - 528 32 48 0002 | 1,511.45 | 136.03 | | 136.03 |
| | | | Location: | 1,511.45 | 136.03 | | 136.03 |
| | | | | 1,511.45 | 136.03 | | 136.03 |



Kitsap 911

AFFIDAVIT FOR PAYROLL ISSUE

Pay Date: 11/16/2018
Pay Period: 10/29/2018 to 11/11/2018

| Pay Detail - 89822 | |
|---|----------------------|
| Item | Amount |
| Net Payroll | \$ 142,125.32 |
| 941 Tax (Withholding, Social Security & Medicare) | 51,345.88 |
| Unemployment | 2,538.56 |
| Labor & Industries | 1,262.69 |
| PERS 2 & PERS 3 | 41,932.75 |
| Washington State Deferred Comp | 888.87 |
| ICMA Deferred Comp | 1,097.94 |
| AFLAC | 1,343.66 |
| Guild Dues | 1,752.50 |
| Use Tax | 136.03 |
| Total Payroll | \$ 244,424.20 |

| Healthcare & Other Benefits/Deductions - Paid from Accounts Payable | | | |
|---|------------------|--------------------|---------------------|
| Item | Employee Portion | Kitsap 911 Portion | Total |
| PPO 100 | \$ 3,356.81 | \$ 22,536.19 | \$ 25,893.00 |
| Kaiser HMO | 1,992.52 | 14,612.43 | 16,604.95 |
| Delta Dental | 510.51 | 2,647.73 | 3,158.24 |
| Life Insurance | 91.05 | 304.85 | 395.90 |
| DSHS | 550.00 | - | 550.00 |
| Total Health Care & Other Benefits/Deductions | | | \$ 46,602.09 |

I, the undersigned, do hereby certify that the payroll for the period listed above is just, true and correct; that the persons whose names appear thereon actually performed labor; that the amounts are actually due and unpaid, and the salary warrants and related benefits warrant shall be issued.

| | |
|---------------------------------------|----------------------|
| Payroll Amount Approved: | \$ 291,026.29 |
| Transferred to Payroll Account | \$ 244,424.20 |

| | |
|--|-------------|
| Authorized Signature - Kitsap 911 | DATE |
| Executive Committee Chair | DATE |

Kitsap 911 Public Authority

Resolution 2018-007

Adopting Salary and Wage Range for Unrepresented Administrative, Management, and Extra-Help Employees.

WHEREAS, on April 25, 2016 the Board of County Commissioners adopted ordinance 532-2016 enacting chapter 2.110 of the Kitsap County code (the “Ordinance”), creating the Kitsap 911 Public Authority; approving a charter therefor; establishing a Board of Directors to govern the affairs of Kitsap 911; and providing how Kitsap 911 shall conduct its affairs; and

WHEREAS, Kitsap 911 (the “Authority”) is a public corporation organized pursuant to RCW 35.21.730; and

WHEREAS, the Board of Directors has appointed an Executive Committee and delegated certain powers and authority to the Executive Committee in accordance with article VI of the Bylaws; and

WHEREAS, The Kitsap 911 Board of Directors recognizes the need to establish fair and competitive wages and salaries for unrepresented administrative, management, and extra-help employees.

NOW, THEREFORE, BE IT RESOLVED by the Kitsap 911 Executive Committee as follows:

Section 1. The Kitsap 911 Unrepresented Administrative Wage Scale and Management Wage Range Resolution 2017-005 is repealed and replaced with the wage scale and range in the attached Exhibit, which reflects a 2.0% increase and is hereby adopted. All wage and salary compensation of Kitsap 911 unrepresented Administrative and Management employees shall be in accordance with this Salary and Wage Scale Schedule and any future amendments thereto.

Section 2. Extra Help Wages. Unrepresented Extra Help employees will receive a 2.0% wage adjustment on the effective date of this resolution.

Section 2. Severability. If any provision of this Resolution or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Resolution which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this agreement, and to this end the provisions of this Resolution are declared to be severable.

Section 3. Effective Date. This resolution shall become effective January 7, 2019.

MOVED AND PASSED at a regular meeting of the Kitsap 911 Executive Committee on November 28, 2018 of which all Directors were notified and a quorum was present.

**KITSAP 911 EXECUTIVE COMMITTEE
OF THE BOARD OF DIRECTORS**

DUSTY WILEY, CHAIR

ATTEST:

Ken Bagwell, General Counsel

| UNREPRESENTED ADMINISTRATION WAGE SCALE | | | | | | | | |
|---|--------------|----------|----------|------------------|----------|----------|----------|----------|
| | | | | | | | | |
| | | | | 5% BETWEEN STEPS | | | | |
| | | | | | | | | |
| | Steps | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| ADMIN1-U | | \$ 25.12 | \$ 26.38 | \$ 27.70 | \$ 29.08 | \$ 30.54 | \$ 32.06 | \$ 33.67 |
| Administrative Specialist | | | | | | | | |
| | | | | | | | | |
| ADMIN2 | | \$ 26.38 | \$ 27.70 | \$ 29.08 | \$ 30.54 | \$ 32.06 | \$ 33.67 | \$ 35.35 |
| | | | | | | | | |
| ADMIN3 | | \$ 27.70 | \$ 29.08 | \$ 30.54 | \$ 32.06 | \$ 33.67 | \$ 35.35 | \$ 37.12 |
| | | | | | | | | |
| ADMIN4 | | \$ 29.08 | \$ 30.54 | \$ 32.06 | \$ 33.67 | \$ 35.35 | \$ 37.12 | \$ 38.97 |
| | | | | | | | | |
| ADMIN5 | | \$ 30.54 | \$ 32.06 | \$ 33.67 | \$ 35.35 | \$ 37.12 | \$ 38.97 | \$ 40.92 |

| | Management | | | |
|--------------------------------|-------------|--------------|--|---------------|
| | Monthly | | | Annual |
| | Minimum | Maximum | | Minimum |
| M1 | \$7,196.00 | \$9,643.00 | | \$86,352.00 |
| HUMAN RESOURCES MANAGER | | | | |
| FINANCE/BUDGET MANAGER | | | | |
| | | | | |
| M2 | \$7,555.00 | \$10,124.00 | | \$90,660.00 |
| TECHNOLOGY MANAGER | | | | |
| | | | | |
| M3 | \$7,933.00 | \$10,632.00 | | \$95,196.00 |
| | | | | |
| | | | | |
| M4 | \$8,329.00 | \$11,162.00 | | \$99,948.00 |
| DEPUTY DIRECTOR | | | | |
| | | | | |
| EXECUTIVE DIRECTOR | \$ 9,686.00 | \$ 13,029.00 | | \$ 116,232.00 |

| |
|----------------|
| |
| |
| |
| Maximum |
| |
| \$115,716.00 |
| |
| |
| \$121,488.00 |
| |
| |
| \$127,584.00 |
| |
| |
| \$133,944.00 |
| |
| |
| \$ 156,348.00 |

ADCOMM Engineering Company

Bridging the Gap Between Operations and Technology®

September 25, 2018

Mr. Richard Kirton, Executive Director
Kitsap 911
911 Carver Street
Bremerton, WA 98312

RE: Long-Range Planning Document

Dear Richard:

Thank you for allowing ADCOMM to assist Kitsap 911 with their long-range planning effort. This report is the summary of a series of meetings held during the first half of 2018.

This report is based on the presentation material and the input from the users. Please let me know if you have any questions

Sincerely,

ADCOMM Engineering Company



Joe P. Blaschka, Jr., P.E.
Principal



Final Report

Summary of Kitsap 911 Long-Range Planning

Prepared for
Kitsap 911

Prepared by
Joe Blaschka, Jr., P.E.
ADCOMM Engineering Company

Date Prepared
September 25, 2018

ADCOMM Engineering Company
Bridging the Gap Between Operations and Technology®



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Acronyms and Abbreviations

| | |
|---------|--|
| AC | alternating current |
| AI | artificial intelligence |
| APCO | Association of Public Safety Communications Officials |
| CAD | computer aided dispatch |
| DEM | Department of Emergency Management |
| DMR | digital mobile radio |
| FCC | Federal Communications Commission |
| FDMA | frequency division multiple access |
| FOIA | Freedom of Information Act |
| HVAC | heating, ventilation, and air conditioning |
| IOT | Internet of Things |
| IP | Internet Protocol |
| ISSI | inter RF subsystem interface |
| LED | light-emitting diode |
| LTE | long-term evolution |
| Mbps | Megabits per second |
| MCPTT | mission critical push-to-talk |
| NG9-1-1 | Next Generation 9-1-1 |
| NTIA | National Telecommunications and Information Administration |
| OTAP | over-the-air reprogramming |
| OTAR | over-the-air rekeying |
| P25 | APCO Project 25 |
| PTT | push-to-talk |
| RF | radio frequency |
| RMS | records management system |
| SWAT | special weapons and tactics |
| T1 | 24 voice channel time division multiplex |
| TDM | time division multiplex |
| UHF | ultra high frequency |
| UPS | uninterruptible power system |



VHF very high frequency
VoLTE Voice over LTE
VRLA valve regulated lead acid
WSP Washington State Patrol

Introduction

ADCOMM Engineering Company facilitated a series of long-range planning sessions with the Kitsap 911 staff and selected users over a period of 3 months in the first half of 2018. This report is a summary of those planning sessions.

The planning sessions consisted of both an educational element describing some of the current technologies available and future technologies expected to be available in the near future. Technologies that might be available over the next 10 years or so were also briefly discussed.

The Kitsap 911 staff and users provided input regarding their current and anticipated needs for the various subjects. This process was intended to be driven by Kitsap 911 and the represented users, not by ADCOMM staff. The results are based on this process and user and staff input.

Planning Horizon

Long-range planning – it is one of those topics everyone one understands what it is – sort of. What is long range? If you are a mosquito, long range is a few days. If you are a pyramid, long range is a few millennia. Long-range planning in today’s rapidly changing technology and society can be difficult given typical funding constraints. Policy makers often want to implement systems with a 10 to 15 year or longer life. In today’s technology environment, that is difficult or impossible. The equipment or system may still be functional but is no longer relevant.

If we open a quarrel between past and present, we shall find we have lost the future

– Winston Churchill

For the purposes of the Kitsap 911 long-range planning sessions, the following terms were used.

- Facility Planning – 20 to 30 years
- Radio Network – 10 to 15 years
- Computer Systems – 5 to 10 years
- Telephone Systems – 5 to 10 years
- Kitsap 911 Services – 5 to 10 years

As outlined in this report, technology is rapidly changing. Decisions or directions taken as a result of this planning effort should be reviewed every 2 to 3 years to determine if they are still relevant.

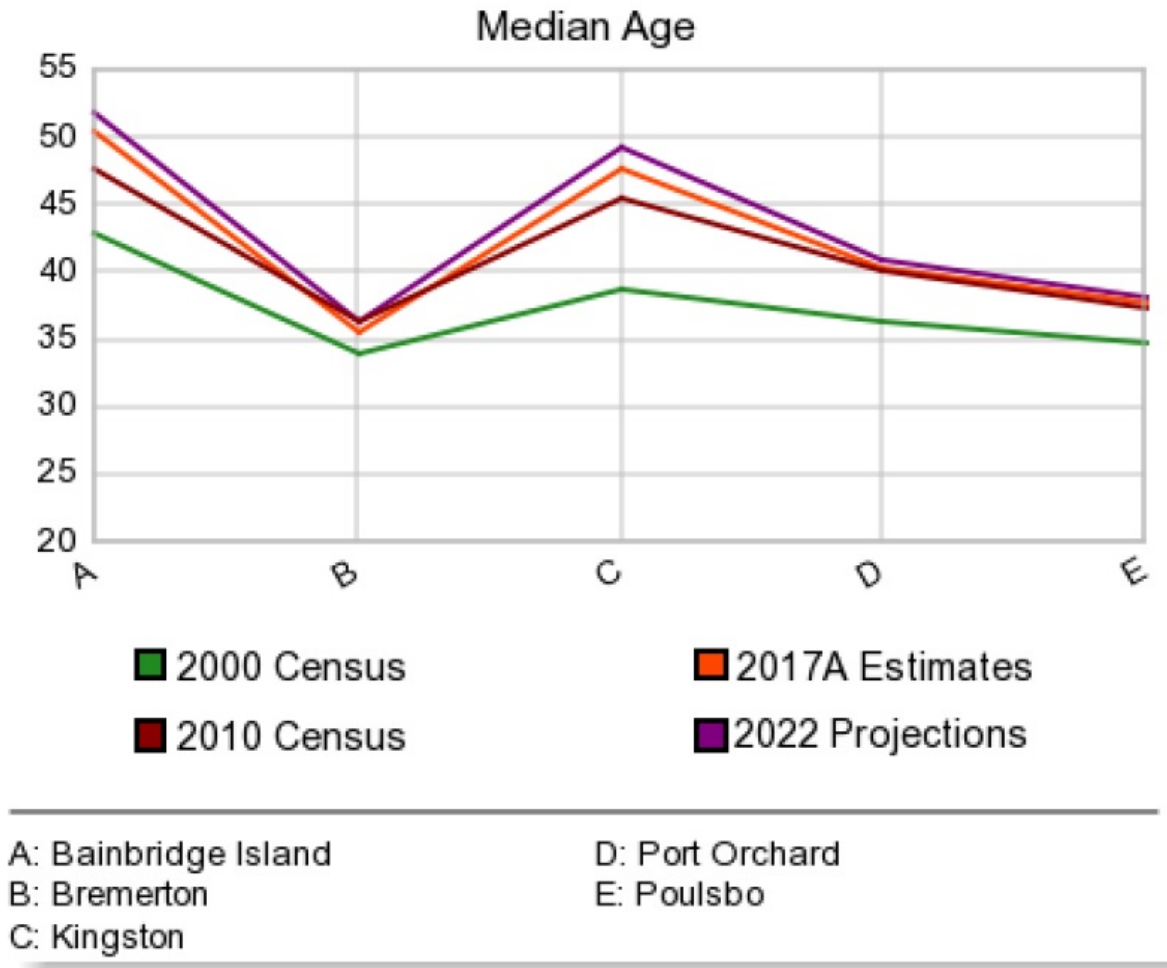
While the planning horizons are out a few years, the microwave network in particular needs to be replaced within the next 2 to 3 years due to it being manufacturer discontinued and out of support by 2021.

County Demographics

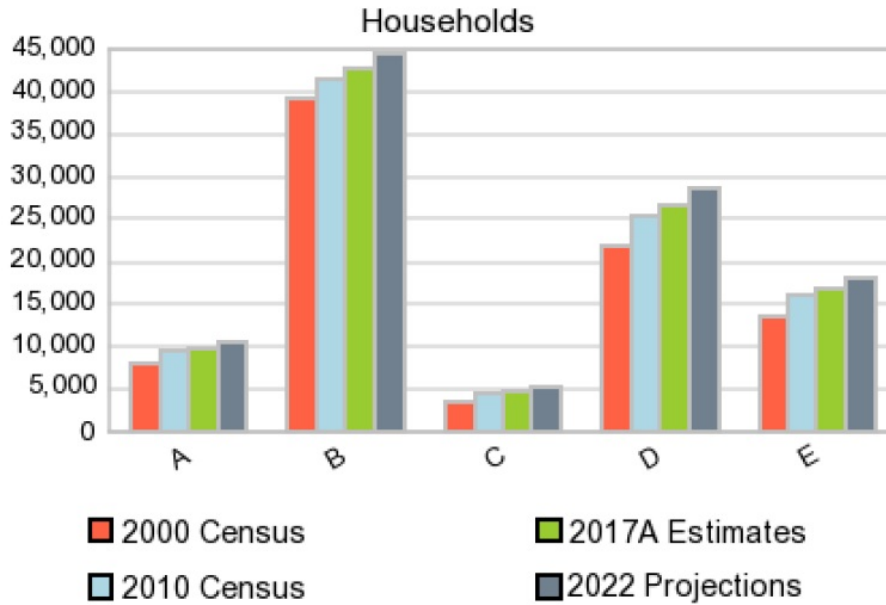
Changes in the county population and financial demographics will affect the ability to pay for future technology and also drive the need for services.

Kitsap County is projected to have moderate growth between 2010 and 2036 believed to be about 1.3 percent per year. Note there are several different sources predicting population

growth with varying quantities. Generally, Kitsap County has been growing at a slower pace than many counties in Washington. However, given the high cost of housing in King, Pierce, and Snohomish Counties, it is reasonable to expect some growth will occur due to people moving to Kitsap County to reduce their housing costs. The following information provides a view into what the demographics in Kitsap County might look like over time.

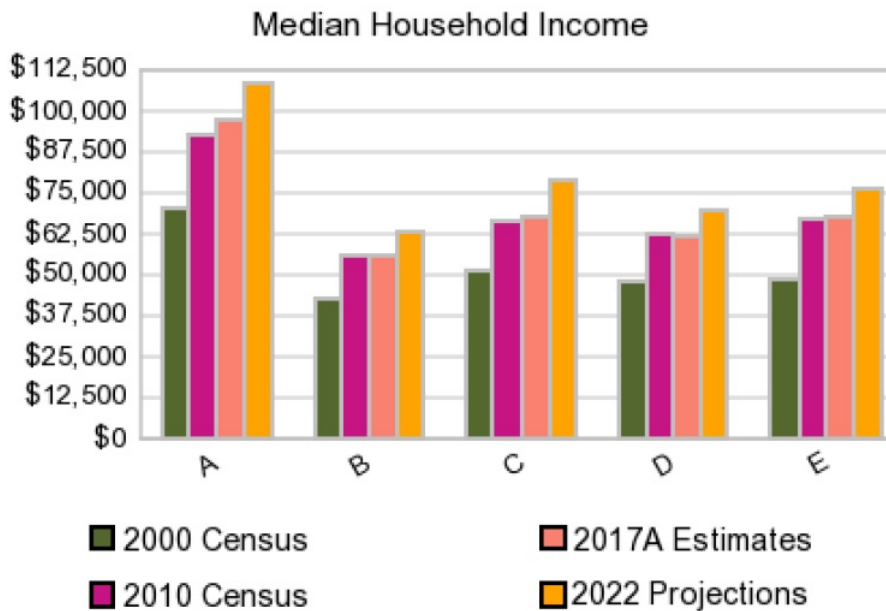


As with many places, the changing age demographics results in differing expectations regarding how services are delivered and the use of technology. This applies not only to the citizens but also to public safety and public service personnel who expect their public safety systems to have many of the features of their personal electronics devices.



A: Bainbridge Island
 B: Bremerton
 C: Kingston

D: Port Orchard
 E: Poulsbo



A: Bainbridge Island
 B: Bremerton
 C: Kingston

D: Port Orchard
 E: Poulsbo



Report Organization

This document contains the following sections.

Future Technology

A brief discussion about where technology may be heading over the next 10 years. This focuses on technologies most likely to affect Kitsap 911.

Communications Infrastructure

This section focuses primarily on the microwave backhaul network and land mobile radio systems.

Telephone Network

This section focuses primarily on the Enhanced 9-1-1 network and the conversion to Next Generation 9-1-1 (NG9-1-1).

Data Network

This section focuses primarily on the computer aided dispatch (CAD), records management systems (RMS), and related technologies.

Facility

This section focuses primarily on the existing Kitsap 911 facility at 911 Carver Street and radio system facilities.

Kitsap 911's Role

This section focuses on possible mission changes for Kitsap 911 as technology changes moving forward.

Summary

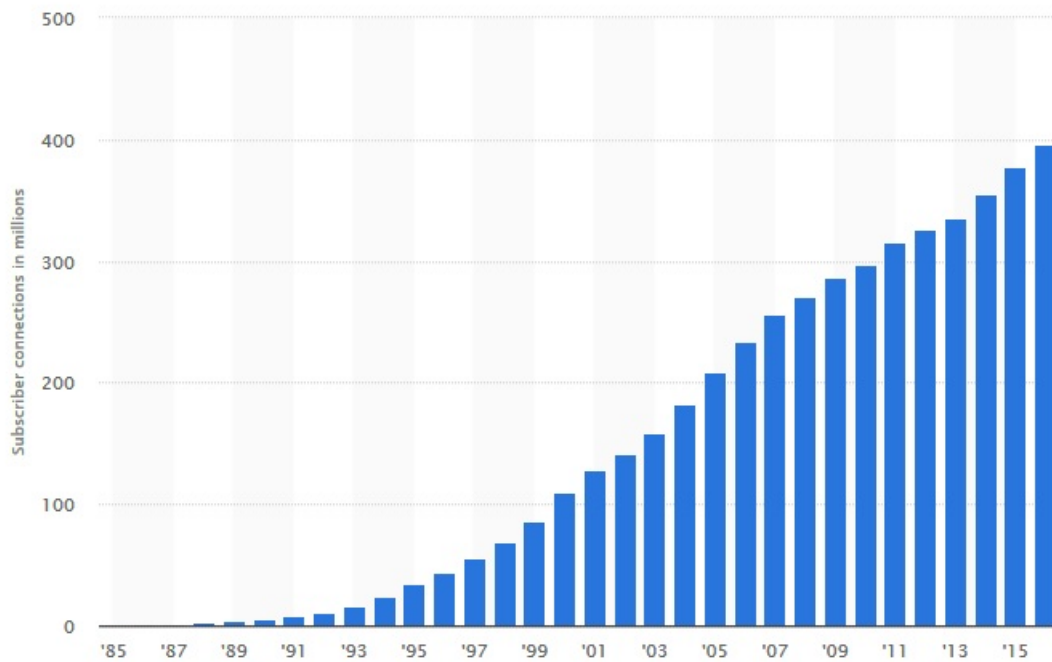
This section is a high-level summary of the report.

Future Technology

Technology is rapidly changing all around us. This is not new news! Advances in the synergy between low power microprocessor technology and communications technologies have dramatically shaped all our lives. Almost no one is untouched by the unprecedented advances in communications and computing horsepower.

Here are a few facts to put it into perspective.

- Between 1995 and 2017, the Internet has gone from 16 million users to 3,885 million users or from 0.04 percent to 52 percent of the population.
- Internet devices have moved from being primarily fixed devices to primarily mobile devices.



Data visualized by  + a b | e a u

© Statista 2018

- Qualcomm is currently shipping 1 million Internet of Things (IOT) computer chips per day.
- Virtually everything has a WiFi¹ chip for intercommunications with the Internet or at least local networks. This includes home appliances, vehicles, electrical switches, alarm systems, watches, and the list goes on.

¹ <https://en.wikipedia.org/wiki/Wi-Fi>

Increasing Interconnectedness

The latest buzz word along with Smart Cities is “5G” communications and technology. While there is a lot of media and industry hype about 5G technologies, 5G has not been fully defined yet. However, it is known this technology will transform much of what we know today as communications. It is easy to think 5G is just another in a long line of cellular technologies. Remember, first there was 2G, then 3G, and now the industry is at 4G. Is 5G just another cellular technology so cat videos can be watched faster? Well, maybe cat videos will be able to be watched faster but 5G is a dramatic change in how things and people will be interconnected. It includes not just the wireless portion of communications but the underlying intelligence in the network and connections to fixed locations as well. Here are some of the main points.

- Mobile communications will be 10 to 100 times faster and maybe more, depending on location.
- There will be significantly greater interconnectedness between fixed and mobile devices including vehicles, street signs, highway messaging, traffic management, and many more things.
- Gigabit speeds to home and businesses will become more common with increased expansion of fiber to the home or at least the neighborhood with the last ¼-mile being served by fixed wireless.
- Traditional cable television services where one gets blocks and groups of channels could change so “television” media is delivered to wireless devices on demand and based on what the viewer wants as opposed to a block of channels.

There is considerable work being done on developing Smart Cities. Smart Cities is a concept where infrastructure items such as streetlights, traffic signals, utilities, buildings, etc., traditionally providing a single non-interconnected function are not only being interconnected but are also have computing power added to them. These devices then provide information for better management of the available resources. For example, there is currently a manufacturer who is selling a “smart streetlight²” where traffic can be monitored, CCTV cameras can view the situation on the ground, gunshot monitors can be installed, and they can serve as WiFi hotspots. There is significant development work being done and significant funding available. This infrastructure is often connected together using wireless technology, either WiFi or cellular.

These technologies could have profound effects on how 9-1-1 and public safety communications evolve in the future. Here are some examples.

- Live video from the field both by citizens, fixed cameras, and first responders will be possible but what to do with that data and how the dispatch center or others will manage the data are still open questions.
- There are large amounts of data being received and processed by commercial entities. For example, Fitbit computers recorded people waking up in the middle of the night after an earthquake in the San Francisco Bay area. From this data, they could determine how long it took the earthquake to propagate by looking at when people woke up. Given that Fitbit

² <https://www.engadget.com/2017/02/27/atandts-smart-streetlights-can-smooth-traffic-detect-gunshots/>

units monitor a person's health, could these be used to identify if people are trapped in a building?

- Who will be responsible for storing, managing, and processing all of this data? How are public records laws and Freedom of Information Act requests going to be handled?

Artificial Intelligence

Artificial Intelligence (AI) is often portrayed in popular media as a malevolent force trying to destroy or control life as we know it. While this future is possible, anyone who works with computers knows it will be a long time before they can take over the world in the movie sense. However, computers can sometimes make life miserable when they do not operate correctly but that is a different problem. All that aside, over the last decade, there have been advances in computing technology that have largely gone unnoticed by most people. For example, there currently is a desktop PC computer graphics card with more computing horsepower than the total of the top 500 supercomputers in 1997.

However, the real effects of computers will continue to be felt in citizens' daily lives. More computers in cars will provide for better warnings to drivers; intrusion alarms in homes, smart appliances, and smarter telephones are all here in some form today and will continue to evolve. Some of these will have significant social policy issues. For example, cars with the ability to communicate with other cars and possibly with street signals could be controlled and told to stop if the light is red and the vehicle is not stopping. Is this a good thing? Maybe yes but there may be cases where some other situation on the ground requires the vehicle to enter into the "stop zone" but cannot because the street light has told the vehicle to stop.

One potential benefit of using AI for the management of all of this data is the computer can look for problems or data that is outside the normal operating range. This includes facial recognition, vehicle plate tracking, and many others. These, of course, also have public policy implications.

Currently, most of the development effort is being done in the "Focused Artificial Intelligence" area, for example:

- Video analysis is being used in areas like facial recognition, traffic flow, medical imaging review, security camera monitoring, and similar areas.
- Audio analysis is being used for detection and location of gun shots, review of 9-1-1 caller audio, voice recognition, integrated voice response, and voice commands
- Social media analysis is where computers can monitor many streams of social media to derive information. This can be for things ranging from potential threats based on Facebook or Twitter postings to monitoring neighborhood chat groups for local information about road conditions in the winter.



- The trend is to move the intelligence from central computing locations such as servers out closer to the edge of the network. For example, a law enforcement body-worn camera could provide facial recognition capability. This could be done by streaming the live video back to some large server where the images are processed but it can also be done in the body camera directly by downloading the facial information for subject individuals into the cameras and having the cameras do the calculations in real-time.

All of these technologies will have a tremendous effect on public safety communications and operations. They also have significant social policy issues to be considered with the implementation of the technology.

Mr. Bill Schrier who now works for FirstNet but used to be the City of Seattle Chief Technology Officer had the following comments in the on-line magazine called Geek Wire. His vision for a city like Seattle would be:

- Make Seattle an Alexa showcase; have government services available on Alexa
- Develop Alexa-like capability for public safety
- Integrate Microsoft's Cortana and Alexa for things like permits, etc.
- Use augmented reality for tasks like locating people in buildings, 9-1-1 callers, etc.
- Implement Next Generation 3-1-1
- Fully implement NG9-1-1
- Foster entrepreneurs in city government

Capabilities like this are being talked about in many major cities. There will be spillover effects into the surrounding counties and cities.

Security

All of the advanced security can be used to benefit the users and provide improved quality of life. However, many times these technologies can also be used by bad actors who try to exploit these technologies for nefarious purposes. Often security is not given high enough priority in the design and implementation of the individual equipment or the overall systems.

Security should be built into the design of a system or network and not thought of as a patch or something to be added later. Here are a few things we know about managing security now and in the future:

- Designing and implementing secure systems is difficult and can be expensive. There are always operational tradeoffs between security and ease of use.
- There have been critical flaws in the fundamental hardware that makes up the computer systems. One of the chips in the vast majority of the computer in the world has a significant flaw in the remote management portion of the chip.³ This is not something any user or most manufacturers of computers would have had any knowledge about or could fix themselves.
- Complex software and complex networks are more prone to security issues simply because of the network complexity. It is harder to test or consider all of the possible security entry points.

³ <https://www.reuters.com/article/us-cyber-security-microchips-explainer/explainer-how-chip-flaws-spectre-meltdown-work-and-whats-next-idUSKBN1F102X>



- The human interface is almost always the weakest link. Users do not like complex passwords or to change their passwords. How many times has the password remained “password” or has been put on a Post-It note on the computer monitor?
- How does anyone know if the network is really secure? Complex networks with hundreds and thousands of locations, nodes, interconnection points, along with hundreds of pieces of equipment can be impossible to fully test or understand.
- There are state-sponsored actors on both sides of the security business. These entities have extensive resources to try to break into target networks.
- It appears only the easy portions can really be fixed. As long as Microsoft and other companies are still finding security flaws in decade old core software, the end users and operators of networks can only do so much. The key is to be vigilant and watch for network or system behavior indicating an attack.

The future is here. It is continuing to evolve and many of the items discussed above are already affecting how public safety works and they will continue to evolve. Public safety dispatch and 9-1-1 call receiving should be carefully monitoring these technology changes so public policy and operations policy can be developed as the technology is being implemented.

Communications Infrastructure

Kitsap 911 implemented a new communications system and infrastructure approximately 13 years ago. This system dramatically improved public safety communications in the County. As a result, there is a good foundation upon which to continue to build in the future.

The system consists of the following elements:

- Radios sites including the towers, equipment shelters, backup generators, and associated plot of ground. These all need regular maintenance and Kitsap 911 has been maintaining the sites. These should not need to be replaced in the foreseeable future.
- Microwave backhaul network, which interconnects all of the radio sites using redundant and loop technologies. All of the sites are connected back to the Kitsap 911 facility using microwave.⁴ The microwave equipment has been manufacturer discontinued and will be out of support in 2021 so it needs to be replaced within the next 2 to 3 years.
- VHF radio base stations and related equipment that provide the communications to the individual public safety user (see Figure 1). The manufacturer of this equipment has published a manufacture discontinued date for the base stations of 2021 and an end of support date of 2028.
- Ancillary equipment such as DC power systems, alarm systems, and similar items, which will need to be replaced as the equipment goes out of support over the next decade or so.



FIGURE 1
Kitsap VHF Base Station Equipment

The existing system uses frequencies in the 150 MHz band known as the VHF band. The current system uses analog technology. While the only urgent equipment replacement need is for the microwave network, in less than 10 years the existing base station equipment will need to be replaced. The users of the system provided input regarding the need for additional coverage and additional channels. These needs are expected to increase over the next decade. Given the long lead time to plan, fund, and implement a major system replacement, this effort should begin in the next 3 to 4 years, if not sooner. One of the major considerations will be if or how to interface to FirstNet in the future.

FirstNet

FirstNet is an independent authority within the National Telecommunications and Information Administration (NTIA) of the Federal Government, created under the Middle Class Tax Relief and Job Creation Act of 2012. The purpose of FirstNet is to establish, operate, and maintain a

⁴ Kitsap 911 has some voting auxiliary receivers that are connected using point-to-point land-based cables.

nationwide interoperable public safety broadband communications network. To fulfill these objectives, Congress allotted \$7 billion and 20 MHz of radio spectrum in the 700 MHz band to build the network. It is widely recognized, however, that significant additional funding, with varying estimates between \$10 billion and \$50+ billion, will be needed to fully construct the network.

The FirstNet network is intended to be a standards-based *Long-Term Evolution* (LTE) network – the same technology employed in many commercial "4G" cellular networks. Initially, the LTE network will provide wireless data service only; there will be no standards-based voice or PTT capability. The vision, however, is to be able to support mission critical push-to-talk (MCPTT) and other voice traffic, using technology such as *Voice over LTE* (VoLTE). FirstNet is essentially a public safety cellular system that would provide similar coverage as commercial cellular systems provide. There is considerable development effort being done on bringing MCPTT into FirstNet.

AT&T was selected by FirstNet to be the contractor to build and operate the FirstNet network. The initial coverage provided by FirstNet will be the same as AT&T's commercial coverage is today. Due to efficiencies of scale and usage demand, it is anticipated that the network will first be constructed in larger cities, followed by smaller cities and eventually rural areas. Note this applies to the dedicated network for public safety. FirstNet's initial services are currently available using the existing AT&T cellular network.

Initial FirstNet discussions about voice interoperability with existing radio systems point to the use of the P25 trunking standard inter RF subsystem interface (ISSI). This interface has been used successfully by existing vendors of cellular push-to-talk services geared for public safety such as ESChat®. The interface to conventional systems becomes more complex as there is no standard ISSI interface for conventional systems except through an ISSI compatible console system.

Kitsap County's system, because of the use of simulcast, would be easier to interface to FirstNet when it becomes available because a FirstNet user could access one of the simulcast channels such as Law 1 and talk to a VHF user anywhere in the County. However, FirstNet coverage will be limited primarily along the major highways and populated areas for the foreseeable future. This means a FirstNet user would still have to retain the use of a VHF radio for all the locations where there is limited cellular coverage.

The other complication is Verizon, and possibly other cellular carriers, either currently provides, or will shortly provide, some of the advanced features provided by FirstNet such as pre-emption and priority access. The addition of multiple cellular carriers competing for public safety's business may be good for competition but it may hinder interoperability over the long term.

Manufacturers are working on and some have products that allow access to the cellular network for PTT services as well as standard land mobile radio features. This technology should continue to be monitored as it has the potential to significantly change the communications infrastructure industry. At this time, however, it is not clear if FirstNet or similar services will replace traditional land mobile radio. Funding a FirstNet based system would change the model from a higher capital cost system with lower ongoing costs to a subscription-based system where every radio pays possibly \$70 per month or so for access to the system. It is not yet clear how mobile radios would be supported. This could mean every

patrol unit would cost \$140 per month for an officer's portable radio and mobile radio. This would not include the cost of the equipment.

Regulatory Changes

The Federal Communications Commission (FCC) has indicated the radio frequency channels will be narrowbanded a second time.⁵ The first narrowbanding was completed in 2012 where the existing channels were split from 25/30 kHz channels to 15/12.5 kHz channels. This required many pieces of existing equipment to be replaced. However, while there were some performance reductions, analog equipment could still be used. The FCC's proposed next narrowbanding process will move the existing channels from 15/12.5 kHz to 7.5/6.25 kHz bandwidth. This change will require a move from analog technology to digital technology. The conversion to digital technology will require significant changes to the existing system design and how the users perceive the operation of the radio system. While the FCC has not set a specific date for start of the next narrowbanding process, it is expected to be within the next 10 years.

Backhaul Network

The existing Kitsap 911 radio site interconnection technology uses microwave equipment from Aviat. This equipment is no longer manufactured and will be out of support in 2021. The existing system will support 45 Mbps capacity and is configured to provide time division multiplex (TDM) in a T1 format.⁶ The network is essentially at capacity and can support only a small amount of growth. ADCOMM recommends the network be replaced with a higher capacity network of a minimum of 155 Mbps and from a TDM format to an all data format using Internet protocol (IP) technology. The conversion from TDM to IP will also require the addition of a robust data network to support the routing and management of the associated IP network.

The schedule for this should assume a 1-year planning period and a 1-year procurement and implementation period. The estimated cost is \$1,500,000. DC power systems should also be reviewed at the same time to determine if they should also be replaced. The estimated cost for DC power systems is \$20,000 to \$25,000 per site.

The use of County/City/PUD fiber could be an option in some locations if these networks are reliable enough and will survive during windstorms and earthquakes. There could be a mix of microwave and fiber, which could be designed to provide additional redundancy. These options could be reviewed during the planning period.

Mobile Data Network

Kitsap 911 used to operate a private mobile data network. However, the limited bandwidth available for private networks severely limits performance to the point private data networks

⁵ The FCC required all equipment licensed under FCC Part 90 rules, which includes public safety, to be "narrowbanded" by January 1, 2013. This required replacing much of the existing equipment in service. The industry and licensees were given over 10 years' advanced notice. The FCC currently requires any new radio designs be compatible with a second undefined phase to operate in a 6.25 kHz channel or provide two voice conversations in a 12.5 kHz channel. The intended goal is for virtually all equipment to already be compatible with the FCC rules when the FCC determines it will narrowband again. Unfortunately, the three modes meeting the new requirements are all digital and they are not compatible with each other.

⁶ <https://en.wikipedia.org/wiki/T-carrier>

on public safety channels are limited to speeds similar to old “dial-up” telephone lines. Kitsap County users have moved to commercial cellular data networks to obtain much faster data speeds and generally good coverage. The advent of FirstNet for public safety data also brings along features like priority access so data speeds will remain high during emergency conditions. Kitsap 911 should continue to use commercial mobile data services in the future and evaluate moving to FirstNet when the service in Kitsap County is adequate.

Radio Network

The Kitsap 911 radio network is a VHF analog conventional simulcast⁷ network providing reasonably good coverage over most of Kitsap County. The equipment is manufactured by Tait and will have support until 2028. The current equipment will no longer be manufactured after 2021.

The following factors play a significant role in planning for a replacement radio system:

- The FCC will likely require an additional channel narrowbanding within the next decade and that will force the conversion to digital.
- The noise floor⁸ on VHF is getting worse. It is to the point in many places VHF radio coverage is significantly degraded. The VHF noise floor is the lowest level signal that can be received. The proliferation of electronic devices such as computers, smartphones, LED lighting, etc. have all contributed to the noise levels at VHF increasing over time. If the noise floor increases above the radio signal level, the radio signal can no longer be heard. This primarily affects communications in and around buildings but can also affect rural areas where street lights have been replaced by LED lights, which often cause interference. The same applies to residential lighting being replaced by LED lights. These can and often do raise the noise floor hindering communications.
- The existing system is nearing or at capacity and additional radio channels are needed. Certainly, over the next 10 years, additional capacity will be needed. Radio spectrum is extremely limited in the Kitsap County area due to the proximity to Canada, which shares the same spectrum and the proximity to the urbanized Puget Sound areas. Kitsap County may need to implement advanced technologies to maximize the use of the existing spectrum.
- Given the noise floor on VHF, Kitsap 911 should explore other frequency bands where there is less noise such as UHF (450 to 470 MHz) or the 700/800 MHz band.⁹ Currently, Kitsap Transit operates on the 800 MHz band. One alternative might be to develop a joint system providing service to both public safety and Kitsap Transit using the Kitsap Transit channels. Obviously, Kitsap Transit would need to agree to such an arrangement but may be willing if Kitsap 911 funds the replacement system.

⁷ Simulcast is a technology where all of the base station transmitters on a single radio frequency transmit at the same time using special technology to manage the interference between transmitters. To the user, the system looks like a big transmitter covering the whole service area. The user does not need to change channels when moving around in the service area.

⁸ Noise floor is the ambient radio frequency noise in the area where a receiver is trying to operate. An analogy would be comparing someone who lives next to a freeway and someone who lives in a remote area. The person in the remote area has a lower noise floor than the person who lives near the freeway. The higher the ambient radio noise floor, the harder it is to receive a radio signal.

⁹ All of the radio frequency bands are congested. Finding available frequencies is difficult and would need to be an essential part of any early engineering work done on a replacement system in a new frequency band.

- FirstNet services may advance to the point they provide a real alternative to providing MCPTT services in lieu of rebuilding the entire VHF network. However, recent experience over the last couple of years in California and Eastern Washington during major fire events have shown the cellular network resilience to be less than what is needed for public safety as their primary communications tool.
- The funding for the new system will likely require a funding measure to be presented to the citizens of Kitsap County. This will require additional lead time and planning.

Channel Narrowbanding

Kitsap 911 and their users may want to consider adopting narrowband technologies prior to the FCC mandate as they provide some additional capability and capacity (see Figure 2). This should be part of the long-range planning process.

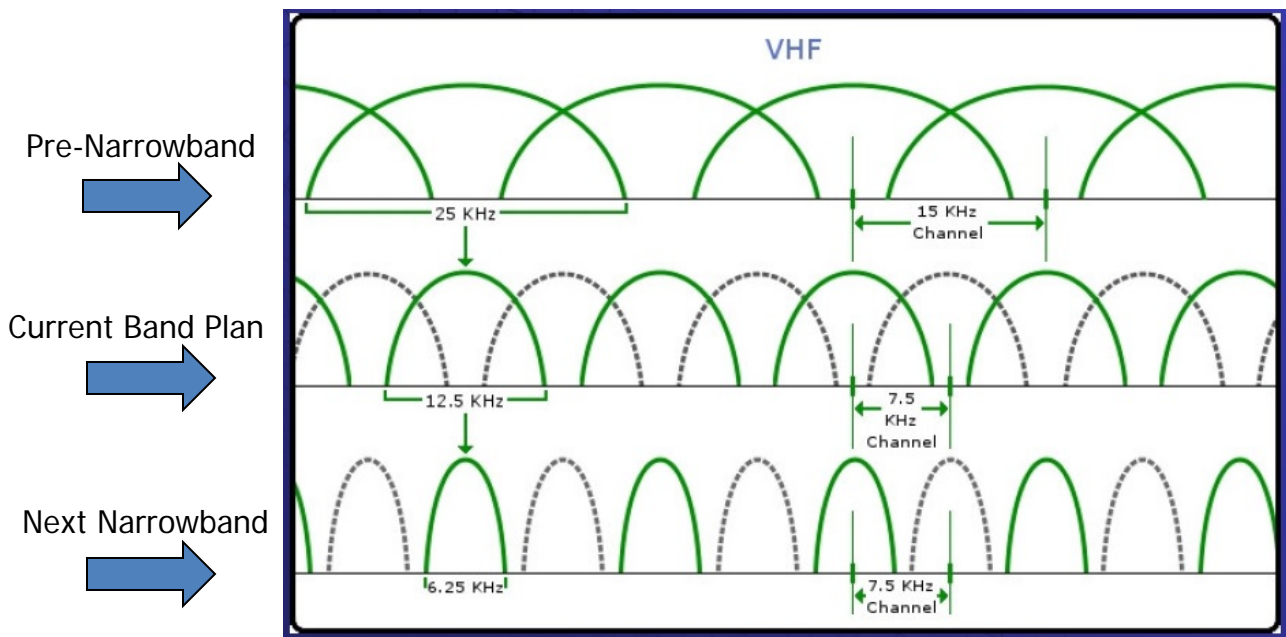


FIGURE 2
Narrowbanding Channel Width Changes

The final configuration will require digital modulation. This can either be:

- TDMA (two timeslots per 15 kHz channel)
 - P25 Phase 2 – public safety standard – expensive
 - DMR – public service, international standard, – inexpensive
- FDMA – NXDN® – one digital signal per 7.5 kHz channel – proprietary

Virtually all public safety systems have been implemented using APCO Project 25 (P25) standards; the systems are very expensive. An alternative used by many public service agencies called digital mobile radio (DMR) is significantly less expensive ranging from 40 to 60 percent the cost or less. The largest single impediment to using DMR technology is interoperability with P25 systems as radios that support both DMR and P25 are not widely available. This may change in the future however.

Trunking Technology

Another significant decision will be whether or not to implement trunking technology. The current Kitsap 911 system has specific channels assigned for specific users or uses. For example the LE1 channel (North) is dedicated to that function. Fire 1 is dedicated to Fire dispatch. This means any time there is not LE1 or Fire Dispatch activity, that channel resource is being unused. In a trunking system, the channels are shared between users and the system infrastructure and computer network manages the assignment of the channels.

While trunked systems can be implemented on VHF channels, it is difficult because there is not a well-defined band plan where the transmit and receive frequencies are spaced to make it possible to use repeaters. In addition, trunked channels must be granted exclusive use in the area where they are licensed for trunking. This can be difficult to do. Therefore, most trunked systems operate at either UHF or 700/800 MHz channels where there is a defined band plan and exclusive use is easier to obtain.

Should Kitsap 911 decide to move to a trunking system, this will mostly like require a change in the frequency band being used.

Trunking systems also allow additional virtual channels to be used for special events, SWAT, fire ground, and other related items without adding RF infrastructure.

VHF Noise

The VHF frequency band has been the mainstay for communications in Kitsap County for decades. However, increasing VHF radio noise has caused reduced coverage. This factor may make moving to either UHF or 700/800 MHz a requirement for the next Kitsap 911 radio system. Radio noise masks desired signals resulting in loss of radio range and system performance. Figure 3 below shows lower level signals being masked by the high noise level.

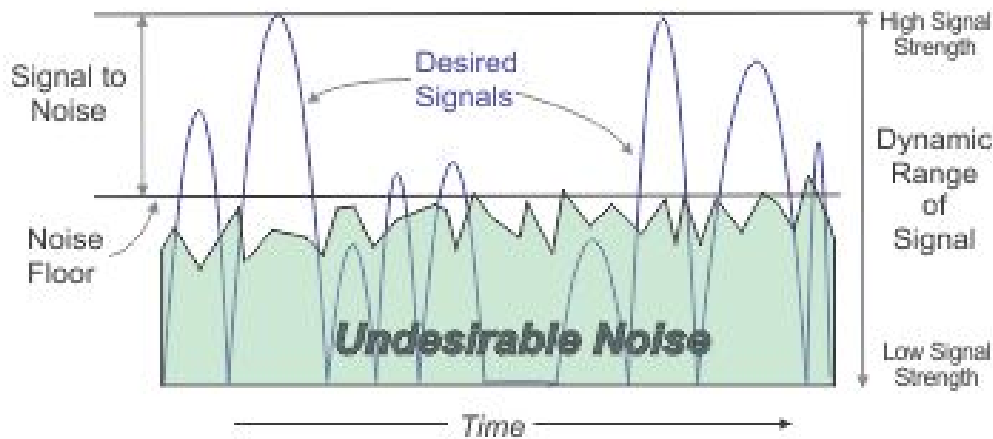


FIGURE 3
Noise Floor Example

This noise is caused by computers, car electronics, Point-of-sale terminals, smartphones, LED lights and traffic signals, and many Internet of Things devices.

This noise will only get worse over time. As the noise floor goes up, additional transmit and receive sites may be needed. Any system replacement should seriously consider moving to a different frequency band.

Advanced Features

Newer radio systems can support advanced features users may want to implement in the future. It is important to determine user requirements and needs for future technology so the underlying radio infrastructure will support advanced features desired by the users.

Some of these advanced features are:

- **Personal area networks:** this is many of the users' electronic devices connected together. For example, a body camera may be connected to the radio emergency alert button so when the emergency button is pressed, the camera automatically starts recording. There are systems that can send dispatch a message if an officer has removed their weapon or Taser.
- **Encryption:** the ability to encrypt analog radio communications is difficult and generally does not work well. Encrypting digital radio communications has become a standard part of the digital radio system feature set.
- **Over-the-air rekeying (OTAR):** this capability allows the encryption keys to be changed by transmitting the new key to the radios in the field without their having to be returned to a central location for reprogramming.
- **Over-the-air reprogramming (OTAP):** this capability allows the radio programming to be changed by transmitting the new template information to the radios in the field without their having to be returned to a central location for reprogramming.
- **Authentication:** this feature allows only radios whose serial numbers match those authorized to be in the system to have access to the system.
- **Inter RF subsystem interface (ISSI):** this allows two trunked systems to be interconnected so units travelling say between Kitsap County and Pierce County can continue to use their land mobile radios.
- **Interconnection to cellular networks:** trunked systems can relatively easily be interconnected to cellular networks so command staff and others can access the land mobile network using applications on their smartphones. This allows those not familiar with traditional radio operation the ability to communicate directly with units in the field. This also allows units who are outside the range of the land mobile system to access the network remotely.

Radio Coverage

The existing system implemented 13 years ago provided a dramatic improvement in radio capacity and coverage from the previous system. In addition, sites have been added to further enhance coverage. However, there are still areas in the county that do not have adequate coverage. These are defined by the maps shown in Figures 4, 5, and 6. The white areas on the map show the primary areas where coverage needs to be improved.¹⁰

Additional engineering work will be required to locate sites in the correct areas and determine how they will fit into the overall network. These areas should be included for improvement in any new system design.

¹⁰ The initial engineering such as identifying the sites, evaluating the coverage from those sites, and determining the site feasibility can be done for relatively low cost. The cost of actually implementing a site can be in the \$500,000 to \$1,000,000 range and typically takes 18 to 24 months to accomplish.

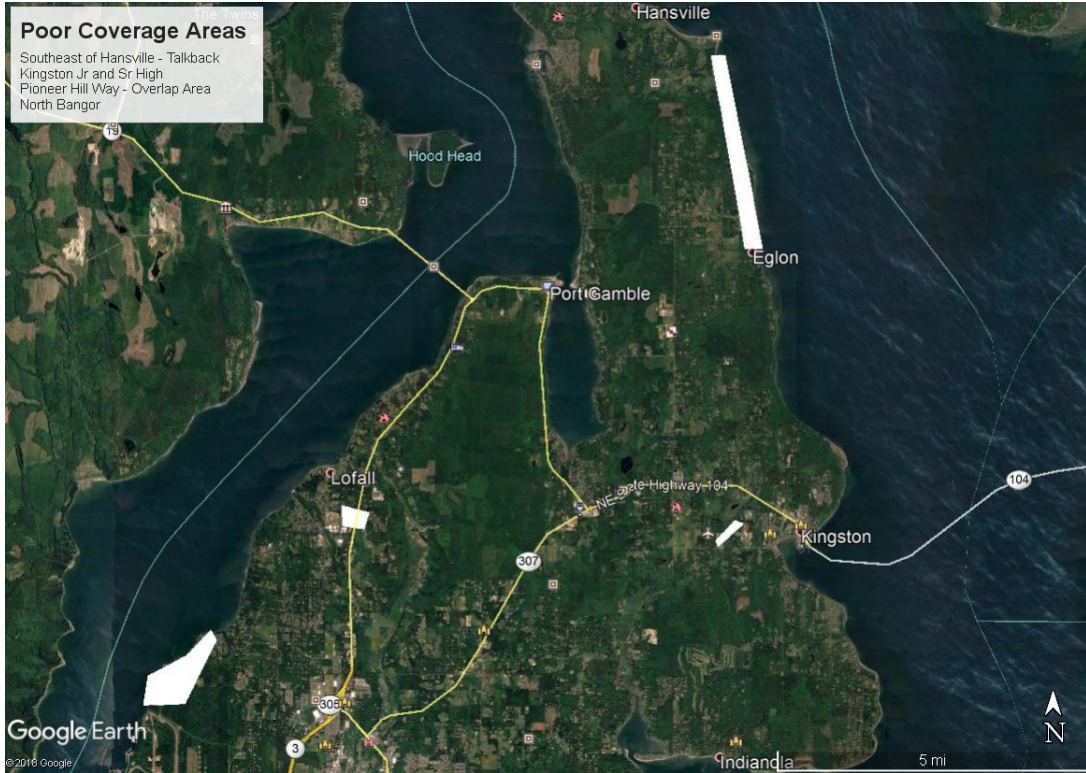


FIGURE 4
Mid-Kitsap County Poor Coverage Areas

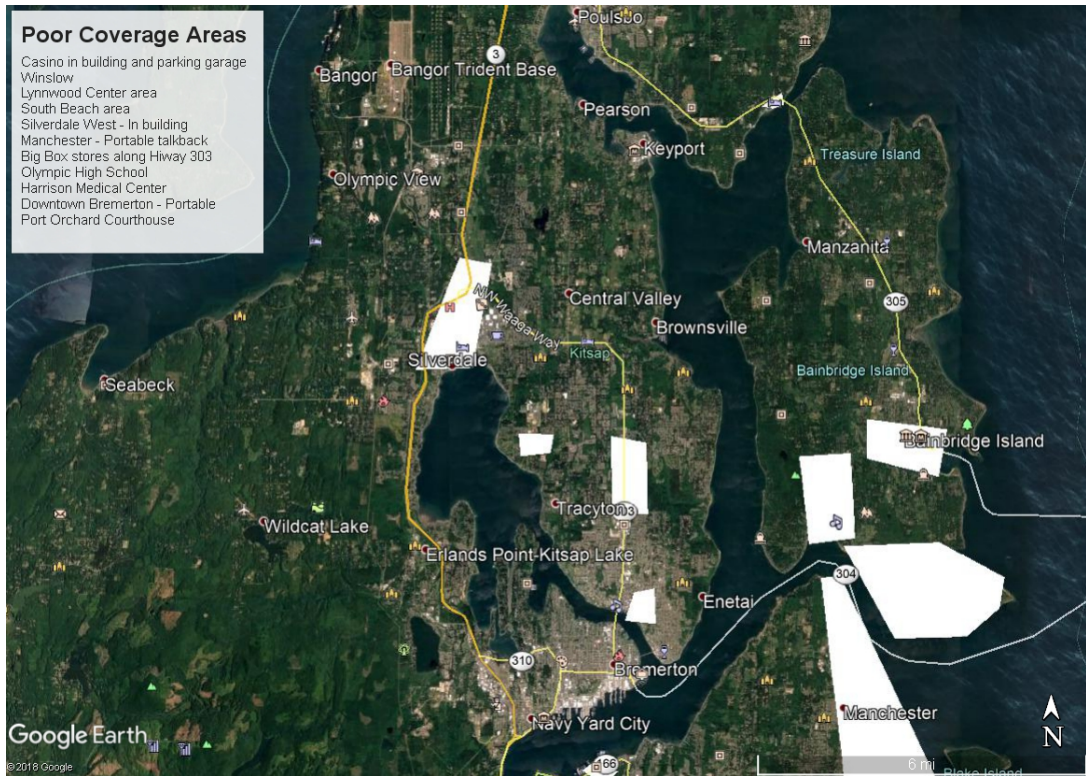


FIGURE 5
North Kitsap County Poor Coverage Areas



FIGURE 6
South Kitsap County Poor Coverage Areas

Specific Input from the Users

The following items were specific items provided by the users of the system and discussed by the planning group.

Need for backup system plan should there be a major system failure so some communications are still possible. It is possible to reprogram the existing base stations so a major failure at the dispatch center would not render the communications infrastructure unusable. This will require discussions about how this minimum configuration might look, which channels would need to be installed where, and how dispatch would interact during this failure mode. Depending on the final configuration chosen, ADCOMM estimates this could be done for less than \$100,000 possibly for less than \$50,000 depending on the final associated operations plan.

Radio interoperability with other counties operating on a different frequency band is needed. This includes Mason and Jefferson counties who operate on VHF. Investigate using the old MCT channels for a cross-band repeater, one for the north end for Jefferson County and one for the south end for Mason County. This would require engineering, FCC licensing, equipment procurement, and installation.

Implement AVL for closest unit dispatch. This would allow the CAD system to recommend units based on their actual location for the fastest response time.

The audio in the system seems to have degraded. The cause of this is unclear. It could be caused by increased noise floor or something else changing in the system. This will require concentrated system analysis and definition of the areas where the degraded audio is occurring.

The need for encryption is increasing. There are smartphone applications that allow citizens and nefarious characters to listen to the Kitsap 911 dispatch and other radio audio. Law enforcement reports they often find criminals listening to dispatch channels to determine where law enforcement units are. The implementation of encryption will require converting to a digital system. In addition, there are some public policy issues related to adding encryption.

FirstNet

As discussed previously, FirstNet is currently just being deployed. It is unclear how good the service will be in Kitsap County over the next 5 to 10 years. It is also unclear how well public safety users will respond to FirstNet's MCPTT service offerings. Using FirstNet for MCPTT will be a radical departure for public safety radio users. However, that does not mean the technology should not be monitored or considered in the future.

One possible application for using FirstNet would be to implement a hybrid system where portions of the service area are served by FirstNet and others by a traditional LMR system. Manufacturers have developed radios and are continuing further development of radios that operate in a fashion similar to existing public safety radios, which will also work on cellular infrastructure. The goal of these products and systems is to allow essentially seamless switching between the traditional LMR network and the cellular network. It is not clear yet if these products and this system approach will be accepted by public safety users. However, this technology should rapidly progress within the next 4 to 5 years if public safety accepts it.

One of the biggest issues with public safety moving to FirstNet will be the network survivability and restoral during natural and man-made disasters. As evidenced in the California wild fires and certain hurricanes, the cellular networks often fail due to the failure of commercial power and/or connectivity to the site. Cellular sites are generally designed to cover smaller areas than a typical LMR site so a wildfire through an area may result in the loss of several cell sites and the corresponding loss of coverage. In many cases, cell sites have only a few hours of battery backup and do not have generator power. As a result, longer term power loss can also cause the loss of a site or several sites.

The decision to move to FirstNet for MCPTT involves complex factors and will need to be carefully analyzed but should be part of the Kitsap 911 new system evaluation process.

New Radio System Planning Process

It is recommended Kitsap 911 have a new radio system in place by the time the existing system is no longer manufacturer supported. This will be 2028. Given the length of time to fund, design, procure, and implement a new system, the recommended new system replacement process is:

- Start initial planning and develop requirements years 2020 to 2021
- Develop initial system design concept and develop budget years 2022 to 2023



- Continue design efforts and obtain funding for possible site acquisition development 2023 to 2024
- Develop specifications and move forward with system procurement and implementation 2024 to 2027

This schedule could be accelerated should the users decide to move forward faster. However, realistically, the process from initial planning, obtaining funding, and implementation is likely a 5-year timeline.

Short-Term Improvements

There is also a need for short-term improvements. These are:

- Coverage improvements in the most critical areas.
- Develop an interoperability cross-band system with MACECOM to allow KCSO units to communicate with MCSO units along the Kitsap-Mason county border.
- Consider a MACECOM console to Kitsap 911 console connectivity (a form of patching) for future deployment. This could be done using telephone circuits, IP circuits, or a microwave connection.

Telephone Network

The State of Washington is in the process of implementing an upgrade to the existing Enhanced 9-1-1 network as the start to move to an NG9-1-1 network.¹¹ This network is called ESINet II. The goal of this network will be able to support texting, video, photographs, and other media in the future.

Kitsap 911 recently upgraded its telephone equipment to support this connection. Kitsap 911 will convert to the new state network in September of 2018.

The major issues related to the move to NG9-1-1 are related to how the location data is stored and processed in the network. The old network was based on data in a flat-file text-based database. The new network will migrate to a layered database that is geographically oriented (see Figure 7).

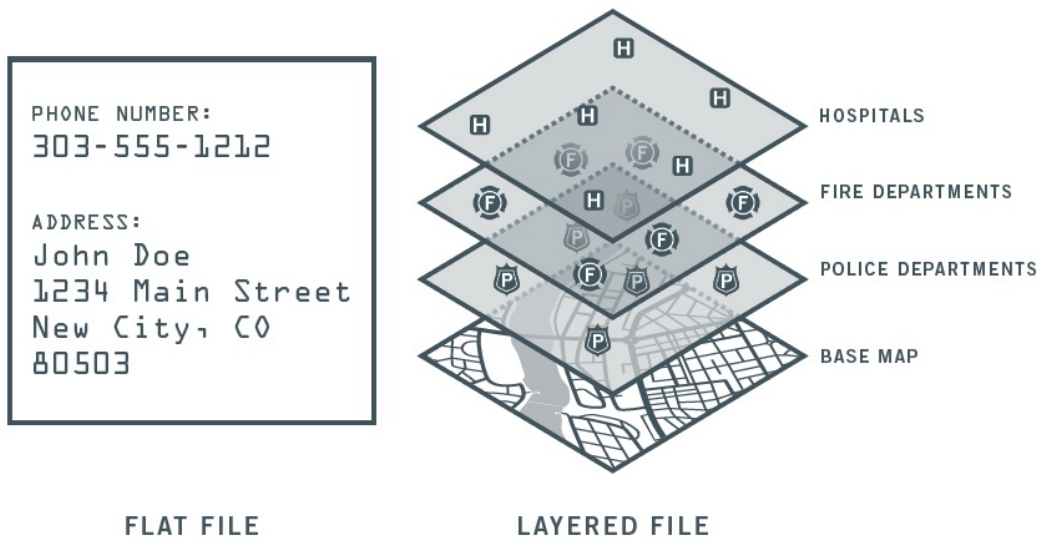


FIGURE 7
Flat File Versus Layered File

The biggest issue with this conversion is the many operational and policy issues resulting with receiving, processing, and storing multi-media data. In the past, dispatchers were not subjected to images of accidents, injuries, or other events in the dispatch. There is considerable discussion about the necessity of receiving it and the policies associated with how to manage and access the data. Significant policy work will be required as these technologies become available. This will be a significant issue for policy makers. While the new ESINet II will not support multi-media initially, it is expected to be enhanced as the technology becomes available.

¹¹ <https://mil.wa.gov/blog/news/post/next-generation-911-network-officially-goes-online>



Some of the community and policy issues are:

- What are citizen and responder expectations who currently can use services such as Facetime and Google Hangouts for video calls?
- What will the funding be for these services?
- What services will be required?

Some of the Kitsap 911 issues are:

- How will staff subjected to on-scene images be supported emotionally?
- Will additional staffing be required to process calls with multi-media attached?
- What training is required?
- Call receiver skills will likely change to analyze and process images and other data
- How will records retention and FOIA requests be handled?
- How will all this new technology and services be funded?
- What is the real need for this information versus “because it is available?”

Policy development in these areas should begin so when the technology arrives, Kitsap 911 is ready.

Data Network

Data network interconnection is one of the fast growing areas of technology. This includes areas such as Smart Cities¹² initiatives, social media, mapping, messaging, and mobility (see Figure 8). The amount of interconnectedness and the speeds available will continue to grow with the advent of additional services and user requirements.



FIGURE 8
Smart Cities — Many Different Technologies Interconnected

These other data requirements are in addition to the traditional public safety CAD and RMS for law enforcement and fire agencies (see Figure 9).

¹² <https://www.transportation.gov/smartcity>



FIGURE 9
Data System Interconnection

As with many aspects of current daily life, access to data and networks not only has evolved but has become an expected part of the services provided. There are significant benefits for public safety to have these networks and information resources be interconnected. For example, one of the best sources for local road conditions during a snow storm or major weather event may be local neighborhood news groups or Facebook pages. First responders may have personal area networks with the capability of reporting the health and biometrics of the responder back to dispatch or some other location. It may be possible to route live action video from a 9-1-1 caller to field units. These technologies have many public policy issues that are intertwined with legal issues such as records retention and FOIA requests.

Kitsap 911 should begin the process of reviewing the progress of these technologies and developing policies whether to implement certain technologies and if implemented under what guidelines.

Existing CAD System

The existing Kitsap 911 CAD system operates on a geographically based routing and data system so the existing system can support geographically based services in the future.

In order to more efficiently and effectively process calls for service, there is, however, a need for CAD-to-CAD interoperability between South Sound 9-1-1, MACECOM (Mason County), Navy,

Jeffcom, and the Washington State Patrol (WSP). Implementing a CAD-to-CAD link between South Sound 9-1-1 could significantly improve the automatic fire response in the Purdy and north Gig Harbor areas where Pierce County and Kitsap County fire provide support to each other.

Kitsap 911 should continue to keep their CAD software up-to-date and work with their surrounding agencies on implementing CAD-to-CAD links.

Long-Term Planning Issues

The following items are some long-term data network planning issues to be considered.

- Are there city, county, and school CCTV cameras Kitsap 911 should have access to?
- How will requests for access or monitoring of other CCTV services such as school cameras be handled and what are the policies?
- Does Kitsap 911 have access to information on water mains, gas lines, power lines, propane storage, etc. in the CAD system?
- Does Kitsap 911 have access to other systems such as transit vehicle location, real-time ferry status, etc.?
- Do the users want and are willing to fund real-time analytics?
- How should Kitsap 911 monitor social media?
- How should Kitsap 911 provide social media output?
- Who will drive the data systems and interaction process?
- Will there be one agency providing services or will each agency operate autonomously?
- How will all this enhanced integration be managed?
- How will this enhanced integration be paid for?
- Who will handle the integration and policies for things like personal area networks, vehicular routers and networks, etc.?
- How does all this information fit into existing data retention, recovery, and FOIA request policies? What new policies and procedures are needed?

Facility

The existing Kitsap 911 facility was built at the same time as the existing radio system.¹³ The facility is a long-term investment whose basic structure should last a minimum of 50 years with proper maintenance. The facility was originally sized for growth and should not need to be expanded over the next 10 to 15 years unless Kitsap 911 takes on dispatching responsibilities for one or more of the surrounding counties. The basic underlying infrastructure of the facility is such that dispatch operations and expanded administrative and technical support could move into the existing Department of Emergency Management (DEM) space. DEM would need to relocate, however. It is not anticipated this would occur within the next 10 years.

Building Systems

While the basic facility infrastructure should support the mission of Kitsap 911 for well into the future, the basic building systems will need upgrades and replacements over the next 10 years.

Uninterruptible Power System (UPS)

The UPS system provides power to critical electronic systems from a large battery system during the loss of external building AC power while the emergency generator is starting. Should the generator fail to start, the UPS system will continue to supply power to these critical systems for an hour or two depending on the actual load.

The UPS system is currently 13 years old and has experienced operational failures. Considerable work has been done to repair and evaluate the existing system. The manufacturer made several changes in the system, which appear to have resolved the problems in the short term. However, the system uses old technology and should be replaced as soon as possible. The newer systems are more energy efficient and will be manufacturer supported for a longer period of time.

The batteries were recently replaced. However, the valve regulated lead acid (VRLA) batteries can fail resulting in the loss of the ability for the UPS system to provide power. The loss of a single battery will result in the loss of the entire string of batteries. In order to be aware of a potential battery failure, a battery monitoring system should be installed that monitors each cell and reports when one is nearing failure. That individual cell can then be scheduled for replacement.

Generator

The following items should be implemented.

- The regular generator exercise should always be done under load. Running a generator without a load can cause a number of potential problems with the engine.
- The addition of connection and switching equipment to facilitate use of a portable generator should the fixed-mount generator fail.

¹³ The 9-1-1 center became operational in 2005.

- The generator may be oversized for the application. This should be confirmed with the generator manufacturer and a load bank added if advised by the manufacturer.

HVAC Systems

The building heating, ventilation, and air conditioning (HVAC) systems should be reviewed and if necessary be replaced or updated. Other items needing improvement were identified. They are:

- Equipment room heat management and airflow need to be reviewed.
- Temperature balancing in the facility should be reviewed, especially in relation to where thermostats are placed.
- Replacing existing systems nearing the end of life with more energy efficient units should be evaluated.

Data Network

The basic facility data network for the facility is in good condition. However, some improvements to the equipment room patch panels and related infrastructure should be accomplished.

Office Furniture

Some officer furniture such as that in the technology support area needs to be replaced. In general, however, the furniture has been replaced as it has worn out and is in good condition. There are few bookcases and file cabinets that also need to be replaced. The ongoing process of funding incremental replacements should continue.

Lighting

The lighting should be reviewed to evaluate newer technology alternatives. There have been some recent updates. Some specific things needing to be done are:

- The flag lights at the front of the building need to be replaced or repaired.
- Some of the lights in the dispatch room are hard to replace because of the location of the consoles. Alternatives should be reviewed.
- Consider converting to dimmable LED lighting. However, LED lights have been shown to create radio noise so this should be carefully evaluated.

Carpet

The carpet is being well maintained and is generally in good condition.

Audio Visual System

The existing audio visual system is mostly original and is using obsolete equipment. It should be upgraded over the next 2 years.

Security System

The security system is the original system and should be evaluated and updated to replace obsolete equipment and systems. The basic card reader approach is still sound.

External Facility

In general, the external facility and grounds have been maintained. However, the following should be considered:

- Curb repairs are needed in places.
- Vehicle gate actuators and system need to be updated and possibly replaced.
- Tinting should be added on the east facing lobby windows to reduce the morning glare when there is sun coming in as it is very bright and lets in heat.
- Exposed wood beams should be inspected regularly and maintained to prevent degradation.
- Roof drains should be inspected, cleaned, and monitored during heavy rains to ensure operation.

These items should be added to the facility maintenance budget over the next 3 years.

Kitsap 911's Role

Public safety communications technology and public infrastructure technologies associated with Smart Cities will likely move towards greater integration. In addition, there will be greater integration between the various specific public safety technologies currently available and being developed. Where does Kitsap 911 fit into this process? Kitsap 911 can either lead this process, work with other lead agencies in these technologies, or they can follow and react to what other agencies are doing.

There will be some policy decisions with far reaching operational, legal, and cost implications, such as how to handle video. Simply refusing to accept video may not be a viable alternative. For example, should Kitsap 911 accept live video feeds from schools? The initial response may be to refuse to accept video but political pressure and other public policies may override that desire.

Radio System as a Service

The next radio system deployed by Kitsap 911 will likely be a trunked radio system. Trunked radio systems are much more complicated to operate and manage than the current conventional radio system. This includes programming and managing user radios. With the current system, users are generally free to program their user radios either themselves or using the vendor of their choice. With a trunked radio system, each radio is essentially like a computer terminal attached to the radio system. As such, it is not advisable to just let anyone have access to the programming software and information to activate user radios. In a P25 digital system there are also many other settings that require careful adjustment and testing to optimize.

As a result of this additional complexity, it has become more common for the radio system operator to manage and even maintain the fleet of radios for their user agencies. The user agencies pay a fee for access to the system and then an additional fee for radio maintenance. If desired, the system owner can also provide funding for the user radios through a revolving fund arrangement where the user pays a monthly fee and the radios are replaced when the particular radio has gone through its expected lifecycle.

Real-Time Data Analysis

One of the major areas of data and information system integration occurring today is bringing in multiple sources of social media and other public information to a central location for use to augment real-time law enforcement and fire responses. In some centers, there is a special console set up to look at publically available information about people and places in support of a primary dispatcher. For example, when an officer is stopping someone for a traffic violation, it is normal to run the person's name through criminal history databases. However, there may be a benefit to also running that person's name through Facebook, Snapchat, Instagram, Google, and other public databases to determine additional information. The technology exists to perform these searches automatically or these searches can be done manually. Is this a service Kitsap 911 wants to offer its users?

With the availability of CAD data and RMS data, it is also possible to develop real-time or close to real-time trend analysis. For example, if someone was monitoring fire activity, it may become evident sooner an arsonist might be at work. In the case of a wild fire, it may be possible, particularly early in the incident to do an analysis of where the most danger is for the public or structures before the fire departments have their command system in place. A less time critical task might be monitoring social media websites, Yahoo Groups, etc. for local input on conditions in various parts of the county during storms or other events. In some cases, a rising crime trend might be picked up on social media before it gets reported to 9-1-1.

FirstNet

FirstNet is here and will be calling on Kitsap 911's user agencies if they have not already. Right now the network is focused on data communications but MCPTT is coming in the next year or two. ADCOMM does not believe FirstNet will be a viable alternative to replace standard public safety land mobile radio communications in rural areas within this Kitsap 911 planning cycle. However, it may provide adequate coverage and services in the urban areas. ADCOMM believes some type of hybrid system may be an option for Kitsap 911 within 5 years. This will largely depend on the development of user radio equipment that supports both FirstNet MCPTT and standard LMR frequencies. This equipment is just starting to be available now but it is not clear how many manufacturers will embrace this technology. This technology should be monitored by Kitsap 911 during the radio infrastructure planning process. However, at this point in time, it should not be considered as a viable alternative.

Where is Kitsap 911 in the process of integrating FirstNet into the repertoire of communications services they offer their users? Should Kitsap 911 be the lead agency for Kitsap County public safety FirstNet communications? Should the agencies individually contract directly with FirstNet instead of as a single unit?

ADCOMM recommends Kitsap 911 work on these policy and service-oriented issues prior to them becoming an issue. Some, such as accessing live video in dispatch from public or private sources such as school districts, are already here and will likely expand.

Summary

The summary below is a brief listing of the long-term planning recommendations for Kitsap 911 based on the planning sessions.

Policy and Services

Short Term, 1 to 4 Years

- What services Kitsap 911 should provide to their users? These could include:
 - Law and Fire information systems support
 - Managing and provisioning agency user radios through an equipment rental fund
 - Real-time data analysis and trend reporting
 - Records management system hosting and operation
- How to respond to the expected increase in video from agency devices, citizens, transit, schools, and commercial locations? The current work should continue.
- How to respond to both incoming social media and outgoing social media? Should Kitsap 911 be monitoring social media in Kitsap County for trends, road conditions, etc.?
- How will Kitsap 911 interface with FirstNet? Will Kitsap 911 continue to be in the radio infrastructure business? Kitsap 911 should continue to monitor FirstNet technologies.

Long Term, 4 to 10 Years

- Continue to update and review policies needed to respond to changes in technology.
- Continue to review the services Kitsap 911 should provide to its users.
- Implement a user and staff technology planning committee to review technology changes and develop policy and implementation recommendations. This committee should meet quarterly.

Radio Infrastructure and Backhaul

Short Term, 1 to 4 Years

- Implement microwave replacement planning, procurement, and implementation
- Develop VHF radio system portable coverage improvements
- Develop VHF radio system in-building coverage improvements
- Develop radio interoperability with Mason and Jefferson County radio systems
- Develop a radio network backup approach for major radio system failure
- Start the radio system replacement planning process with a goal of having the system replaced by 2028
- Implement a smartphone application for command and undercover officers

- Standardize radio models, features, etc., so there are less variations in user equipment
- Require regular maintenance checks of user equipment, especially portable radios
- Monitor radio noise floor on a regular basis not only at sites but at areas where coverage is considered a problem to determine when additional infrastructure will be needed

Long Term, 4 to 10 Years

- Plan and implement radio system replacement by 2028. Determine the following:
 - P25 digital or other protocol
 - How does FirstNet figure into Kitsap 911's planning?
 - Combination FirstNet and private system?
 - What frequency band to use?
- Determine if Kitsap 911 should be in the radio maintenance and supply business as a service to its users
- Monitor technology developments for potential use of LTE and WiFi equipped portables for improved coverage

Data Systems

Short Term, 1 to 4 Years

- The current CAD system, with regular updates, should provide Kitsap 911 effective service for the foreseeable future.
- Continue to move forward as new technology develops.
- Monitor workload as new technology is implemented to determine if staffing adjustments need to be made.
- Implementing CAD-to-CAD interoperability between South Sound 9-1-1, MACECOM, the Navy, Jeffcom, and the WSP should be worked on with the connection to the South Sound 9-1-1 system being the highest priority.
- Review issues related to closest unit dispatch and implement when possible.
- Develop policies and procedures for allowing and handling video from school districts, drones, transit, first responder, and citizen input including data retention, management, and FOIA requests.
- Review and define Kitsap 911's role in providing data services to their users. This could include:
 - Law and Fire RMS
 - Mobile data and vehicular integration (mobile hot spots)
 - Crime analysis both real-time and historical
 - Personal area and scene area networks for first responders

- Review and define Kitsap 911's role with social media. This could include:
 - Continued use to send alerts and other public information.
 - Expanded use for monitoring trends, road conditions, events, problems, etc., being reported at the neighborhood level.
 - Expanded use in support of law enforcement and fire operations in the field. Where social media searches and access could occur in real-time in response to field conditions.

Long Term, 4 to 10 Years

- Continue to monitor technology and upgrade systems and networks as required
- Continue to monitor the deployment of 5G technology and its effect on the data coming into the dispatch center
- Continue to review the services Kitsap 911 should offer

Telephone System

Short Term, 1 to 4 Years

- Continue to monitor current system technologies and replace systems no longer manufacturer supported or using obsolete technology.
- Keep telephone system up to date
- Monitor work load as new technology is implemented to determine effects on dispatch and technical staff

Long Term, 4 to 10 Years

- Continue to monitor technology changes and upgrade systems and networks as required

Kitsap 911 Facility

Short Term, 1 to 4 Years

- The existing facility should meet the needs of Kitsap 911 for the foreseeable future assuming proper maintenance
- HVAC upgrades replacements
 - Equipment room improvements
 - Temperature balancing
 - More energy efficiency
- UPS system
 - Recommend replacing as soon as possible
 - Install individual battery monitoring system

- Data network
 - Need to upgrade equipment room network infrastructure
 - Patch panels need to be cleaned up and updated
- Furniture
 - Some office furniture needs replacement such as tech area
- Lighting
 - There were some recent updates
 - Possibly convert to dimmable LEDs, might create radio noise so proceed carefully
 - Some dispatch room lights can be hard to replace due to location of consoles
 - Flag lights need repair
- Carpet: generally good, being maintained
- AV system
 - Needs updating; most is original
- Security system
 - Needs updating as it is the original system
- Miscellaneous facility
 - Curb repairs needed in places
 - Vehicle gates need to be updated
 - Add tinting on the east facing lobby windows to reduce morning glare but not so much there if no visibility outside
- Furniture
 - Some office furniture needs replacement such as tech area
 - Bookshelves and cabinets need replacement in some areas

Long Term, 4 to 10 Years

- Continue to maintain facility
- Carpet will likely need to be replaced
- Console furniture will likely need to be replaced
- Building HVAC systems will likely need major upgrades
- Building expected to still be sized adequately for dispatch but may need to expand if other services are provided

Debt Service and Technical Projects Appropriation

| Account Description | 2017 Actual | 2018 Budget | 2019 Proposed | Delta \$ | Delta % |
|---|----------------|----------------|----------------|----------------|---------------|
| 591.28.00.0000 LTGO Repayment - Principal | \$ 392,761 | \$ 351,874 | 401,865 | 49,991 | 2.3% |
| 591.28.00.0000 LTGO Repayment - Interest | 106,506 | 92,242 | 40,690 | (51,552) | -61.8% |
| Total Debt Service Appropriation Request | 499,267 | 444,116 | 442,555 | (1,561) | -11.4% |

| Account Description | 2019 Adopted |
|---|------------------|
| Systems Technician (Project) | 89,177 |
| Sub Total - Wages, Salaries, and Benefits | 89,177 |
| 1 MCT NPRVs | 15,000 |
| 2 Backup Center (Complete Phase 1) | 149,269 |
| 3 Multi-Factor Authentication | 10,000 |
| 4 Alerting | 1,000,000 |
| 5 ASAP to PSAP | 150,000 |
| 6 NG911 Geospatial Routing | 60,000 |
| 7 Closest Fire Unit Dispatching | 20,000 |
| 8 Virtual Desktops for Dispatch Floor | 25,000 |
| 9 Backup Center (Phase 2) | 180,000 |
| 10 Technology Monitoring System | 75,000 |
| 11 Tower Site Upgrades | 86,000 |
| 12 ACOM Replacement | 600,000 |
| 13 Replace DC Plant at all sites except Carver and Gold | 155,000 |
| 14 Furnishings upgrades/replacements | 15,000 |
| 15 Data Interoperability | 250,000 |
| 16 Radio Interoperability- Mason County | 25,000 |
| 17 Equipment Room Cooling | 300,000 |
| Sub Total - Supplies and Services | 3,115,269 |
| Total Technical Projects Appropriation Request | 3,204,446 |
| Estimated Ending Fund Balance* | 2,108,899 |

Note: Estimated Ending Fund Balance includes \$1,572,924 Stabilization Fund and 150,000 Gold Mtn Lease

Note: Alerting Surcharges will be billed in 4 installments, 2018-2021 @ approx 250,000 each year

Fund Balance/ Earmarked Reserves

| Description | Projected | End Balance |
|--|----------------------|---------------------|
| | Beginning FB 2019 | 2019 |
| Stabilization Fund | \$ 1,072,924 | \$ 1,572,925 |
| Essential Equip. Replacement/Enhancement | \$ 1,000,000 | \$ 250,000 |
| Misc. Technical Enhancements | | |
| Contingency | \$ 1,174,240 | \$ 250,000 |
| Unreserved | \$ 132,722 | \$ 35,974 |
| Alerting | \$ 500,000 | |
| Carry Forward | \$ 1,168,459 | |
| | \$ 5,048,345 | \$ 2,108,899 |