Cowlitz 911 Public Authority Board of Directors

Meeting Agenda

Wednesday, April 17, 2024 @ 10:00 AM

Hybrid – Cowlitz 911 & Zoom

1. **Call to Order and Introductions**
2. **Approval of Agenda**

   Recommended Action: A motion to approve the agenda as presented.
3. **Approval of Meeting Minutes**
   A. March 20, 2024, Minutes

   Recommended Action: A motion to approve the meeting minutes of March 17, 2024.
4. **Public Comment**
   A. The public comment period allows any member of the public to speak to any item that is not on the regular agenda. There is a time limit of three minutes. All comments should be directed to the Chair.
5. **Payables**

   The following transactions are presented.

ACCOUNT	TRANSACTION NUMBERS	AMOUNT
Payroll 3/20/2024	360 – 393	$126,922.95
Payroll 4/5/2024	417 – 449	$117,006.70
*Payroll Benefits 1/25/2024	123 – 126	$10,286.10
Claims 3/29/2024	399 – 416	$143,624.04
Claims 4/12/2024	452 – 475	$126,924.14
*Claims 1/31/2024	127	$5,701.47
TOTAL		$530,465.40

   *Indicates check register entries that had not been previously added to the Board agenda for approval.

   Recommended Action: Motion to approve payables as presented.
6. **Financial Report**
   A. Financial Report Presented
7. **Board Committee Reports / Board Comments**
   A. Law TAC report
   B. Fire TAC report
8. **Guild / Cowlitz 911 Memorandum of Understanding regarding adding the Dispatch Floor Supervisor Classification into the Bargaining Unit.**
   A. This MOU will add the Dispatch Floor Supervisor Classification to the Bargaining Unit. Staff, along with Evan Chinn, Summit Law, have met with the Guild and their attorney and submit the attached Job Description, and MOU.

   Recommended Action: Motion to approve the Memorandum of Understanding between the Guild and Cowlitz 911 regarding adding the Dispatch Floor Supervisor Classification into the Bargaining Unit.
9. **AdComm presentation of phase one proposal.**

A. Susan Ronning, Owner and Principal, AdComm Engineering summarizing findings and submitting proposal for phase one of the Cowlitz 911 Radio Project.

Recommended Action: Motion to approve Cowlitz Radio Project phase one and authorization for Executive Director to enter into related agreements not to exceed $300,000.00.

10. Director's Report

A. Staffing Update
B. National Telecommunicators Week is in progress this week.
C. GIS Update

11. Old Business

12. **Executive Session:** RCW 42.30.110(1)(g) Evaluation/Performance of a Public Employee

13. Adjournment

14. Closed session to discuss bargaining.

Cowlitz 911 Public Authority Board of Directors

Meeting Minutes

Wednesday, March 20, 2024, at 10:00

Hybrid – Cowlitz 911 & Zoom

Attending:

Board members and Alternates: Bill Lemonds, Rick Dahl, Erik Halvorson, Charlie Worley, Robert Huhta, Alan Headley, Scott Goldstein

Staff: John Diamond, Don Turrentine, Dannyka Baker, Jessica Weygandt, Jerry Jensen, Frank Randolph (Counsel).

Guests: Susan Ronning (AdComm), Jason Kester (virtual), Jeff Tone (virtual), Jeremy Huff (virtual), Kurt Stitch (virtual), Eric Koreis (virtual), Brandon Poff (virtual), Unknown phone caller (virtual).

1. **Call to order and Introductions**
   Commissioner Headley called the meeting to order 10:00
   Sheriff Thurman, Chair, is out on excused absence.
2. **Approval of Agenda**
   Motion by Councilman Halvorson, seconded by Chief LeMonds; All in favor, motion carried.
3. **Approval of meeting minutes**
   Approval of February 21, 2024, meeting minutes.
   Motion by Chief LeMonds, seconded by Chief Worley; All in favor, motion carried.
4. **Public Comment**
   Commissioner Headley opened the floor to public comment. No comments made.
5. **Payables**

ACCOUNT	TRANSACTION NUMBERS	AMOUNT
Payroll 2/20/2024	213 - 244	$117,167.12
Payroll 3/5/2024	283 - 315	$127,412.01
Claims 2/29/2024	258 - 281	$181,002.41
Claims 3/15/2024	332 – 359	$65,453.48
TOTAL		$491,035.02

   Motion by Councilman Halvorson, seconded by Chief LeMonds; All in favor, motion carried.
6. **Financial Report**
   Director Diamond reported that as of February 29, 2024 all accounts are balanced.
7. **Approval of Banking**
   A. Authorization to add Jessica Weygandt, Budget Finance Manager, to banking accounts.
   Motion by Chief LeMonds, seconded by Councilman Halvorson; All in favor, motion carried.

8. **Acceptance of Patriot project as complete.**
    A. Acceptance of the project as complete. Having met with Counsel and Project Manager, this is the next step which is an administrative function and starts a clock for the state to ensure L&I, Department of Revenue, and Department of Employment Security have received all information and claims from the contractor and sub-contractors as required.
    B. Retainage is still held and will be until the state approves payment of it.
    C. Patriot Construction has been responsive of late in dealing with warranty items and continues to do so. Acceptance does not change this ongoing work.

    Motion by Commissioner Dahl, seconded by City Manager Hamilton; All in favor, motion carried.
9. **Board Committee Reports / Board Comments**

    A. Law TAC – Chief Worley reported that the last meeting was a continuation of radio project and nothing new to report.

    B. Fire TAC – Chief LeMonds reported the group did not meet and nothing to report.

10. **AdComm Engineering Update**
    A. Susan Ronning, Owner and Principal, AdComm Engineering reporting on findings. AdComm has met with stake holders and completed many hours of engineering analysis and now have an agreed upon recommendation. This will be a high-level overview of those findings and a recommendation for a radio system moving forward.
    Information only, no action taken.

11. **Director's Report**
    A. 15 Dispatchers on the schedule, three in training and two of those to be signed off next month. Seven full-time and one part-time non-represented staff. Two non-represented staff of long-term leave.
    B. Dannyka is working hard to ramp up for Telecommunicator week, April, 14 – 20.
    C. Would like to show public appreciation for those that are, in addition to regular duties, training new staff.
    D. Our 457b plan was successfully transitioned to the new provider. The service contract with GeoComm has been executed with the board requested changes to arbitration venue and termination for convenience clause. Jessica has jumped in with both feet and is doing great work. Jessica and I will be working with Brandi to adjust the organization and line items of the budget to make more concise and clear.
12. **Reschedule of June 2024 Meeting**
    A. In June of 2024, the regularly scheduled board meeting fall on the Juneteenth Holiday. Proposed either June 12 or June 26, or option to cancel June meeting.

Motion by Councilman Halvorson **to** cancel the June 2024 board meeting, seconded by City Manager Hamilton; All in favor, motion carried.

13. Old Business

No old business discussed.

14. Executive Session

No executive session was held.

15. Adjournment

Commissioner Headley Adjourned the meeting at 11:28.

Approved:

_____

Board Chair, Sheriff Thurman

Attest:

_____

Executive Director, John Diamond

CHECK REGISTER

Cowlitz 911 Time: 15:28:59 Date: 04/11/2024

03/20/2024 To: 03/20/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
385	03/20/2024	Payroll	1	EFT	COWLITZ COUNTY TREASURER'S OFFICE (IRS)	20,193.23	941 Deposit for Pay Cycle(s) 03/20/2024 - 03/20/2024
379	03/20/2024	Payroll	1	12972		2,880.39	
386	03/20/2024	Payroll	1	12973	KAISER PERMANENTE MEMBERSHIP ADMIN	4,888.73	Pay Cycle(s) 03/20/2024 To 03/20/2024 - MEDICAL-KAISER
387	03/20/2024	Payroll	1	12974	WASHINGTON STATE DEPT OF RETIREMENT	14,051.30	Pay Cycle(s) 03/20/2024 To 03/20/2024 - PERS2; Pay Cycle(s) 03/20/2024 To 03/20/2024 - PERS3
388	03/20/2024	Payroll	1	12975	WCIF	13,716.02	Pay Cycle(s) 03/20/2024 To 03/20/2024 - MEDICAL-WCIF; Pay Cycle(s) 03/20/2024 To 03/20/2024 - LIFE INS BUYUP; Pay Cycle(s) 03/20/2024 To 03/20/2024 - LTD BUYUP; Pay Cycle(s) 03/20/2024 To 03/20/2024 -
360	03/20/2024	Payroll	2	EFT		2,041.50	
361	03/20/2024	Payroll	2	EFT		876.92	
362	03/20/2024	Payroll	2	EFT		1,772.97	
363	03/20/2024	Payroll	2	EFT		4,218.51	
364	03/20/2024	Payroll	2	EFT		3,287.95	
365	03/20/2024	Payroll	2	EFT		2,554.80	
366	03/20/2024	Payroll	2	EFT		2,255.91	
367	03/20/2024	Payroll	2	EFT		2,159.23	
368	03/20/2024	Payroll	2	EFT		2,143.44	
369	03/20/2024	Payroll	2	EFT		3,197.44	
370	03/20/2024	Payroll	2	EFT		2,696.67	
371	03/20/2024	Payroll	2	EFT		2,670.26	
372	03/20/2024	Payroll	2	EFT		1,900.56	
373	03/20/2024	Payroll	2	EFT		2,169.75	
374	03/20/2024	Payroll	2	EFT		1,670.45	
375	03/20/2024	Payroll	2	EFT		2,376.94	
376	03/20/2024	Payroll	2	EFT		2,462.76	
377	03/20/2024	Payroll	2	EFT		2,215.89	
378	03/20/2024	Payroll	2	EFT		2,812.67	
380	03/20/2024	Payroll	2	EFT		2,350.43	
381	03/20/2024	Payroll	2	EFT		2,121.01	
382	03/20/2024	Payroll	2	EFT		4,404.60	
383	03/20/2024	Payroll	2	EFT		3,341.70	
384	03/20/2024	Payroll	2	EFT		2,316.02	
389	03/20/2024	Payroll	2	EFT	CAPSCO	50.00	Pay Cycle(s) 03/20/2024 To 03/20/2024 - ASSN FEE
390	03/20/2024	Payroll	2	EFT	COWLITZ 911 EMERGENCY SERVICES ASSN	375.00	Pay Cycle(s) 03/20/2024 To 03/20/2024 - UNION DUES; Pay Cycle(s) 03/20/2024 To 03/20/2024 - INITIATION FEE
391	03/20/2024	Payroll	2	EFT	EMPOWER TRUST COMPANY, LCC	1,922.82	Pay Cycle(s) 03/20/2024 To 03/20/2024 - DEF COMP
392	03/20/2024	Payroll	2	EFT	HRA VEBA	8,100.00	Pay Cycle(s) 03/20/2024 To 03/20/2024 - VEBA
393	03/20/2024	Payroll	2	EFT	REHN AND ASSOCIATES	727.08	Pay Cycle(s) 03/20/2024 To 03/20/2024 - HSA
		001 OPERATIONS				126,922.95	

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
						126,922.95	Payroll: 126,922.95

CERTIFICATION:
I, the undersigned, do hereby certify under penalty of perjury that the information listed has been provided to me as described herein and that I have issued payment as directed and received by Cowlitz 911.

_____	_C2FR_____	_____
Brandi Ballinger, Signature	Agency	Date

CERTIFICATION/AUTHORIZATION:
I, the undersigned, do hereby certify under penalty of perjury that the materials have been furnished, the services rendered or the labor performed as described herein, that any advance payment is due and payable pursuant to a contract or is available as an option for full or partial fulfillment of a contractual obligation, and that the claim is a just, due and unpaid obligation against Cowlitz 911, and that I am authorized to authenticate and certify to said claim. We have reviewed the claims listed above totaling $_____, and we approve payment with our signatures below.

_____	_____
Budget Finance Manager, Signature	Date
_____	_____
Executive Director, Signature	Date
_____	_____
Board Chair, Signature	Date

CHECK REGISTER

Cowlitz 911 Time: 15:29:35 Date: 04/11/2024

04/05/2024 To: 04/05/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
441	04/05/2024	Payroll	1	EFT	COWLITZ COUNTY TREASURER'S OFFICE (IRS)	18,737.00	941 Deposit for Pay Cycle(s) 04/05/2024 - 04/05/2024
436	04/05/2024	Payroll	1	12994		2,855.19	
442	04/05/2024	Payroll	1	12995	KAISER PERMANENTE MEMBERSHIP ADMIN	1,813.13	Pay Cycle(s) 04/05/2024 To 04/05/2024 - MEDICAL-KAISER
443	04/05/2024	Payroll	1	12996	WASHINGTON STATE DEPT OF RETIREMENT	13,439.63	Pay Cycle(s) 04/05/2024 To 04/05/2024 - PERS2; Pay Cycle(s) 04/05/2024 To 04/05/2024 - PERS3
444	04/05/2024	Payroll	1	12997	WCIF	12,158.26	Pay Cycle(s) 04/05/2024 To 04/05/2024 - MEDICAL-WCIF; Pay Cycle(s) 04/05/2024 To 04/05/2024 - LIFE INS BUYUP; Pay Cycle(s) 04/05/2024 To 04/05/2024 - AD-D BUYUP
417	04/05/2024	Payroll	2	EFT		1,906.99	
418	04/05/2024	Payroll	2	EFT		1,034.78	
419	04/05/2024	Payroll	2	EFT		1,783.03	
420	04/05/2024	Payroll	2	EFT		4,069.69	
421	04/05/2024	Payroll	2	EFT		3,099.74	
422	04/05/2024	Payroll	2	EFT		2,347.48	
423	04/05/2024	Payroll	2	EFT		2,203.68	
424	04/05/2024	Payroll	2	EFT		1,914.92	
425	04/05/2024	Payroll	2	EFT		2,181.37	
426	04/05/2024	Payroll	2	EFT		3,196.44	
427	04/05/2024	Payroll	2	EFT		2,971.52	
428	04/05/2024	Payroll	2	EFT		2,335.18	
429	04/05/2024	Payroll	2	EFT		2,201.27	
430	04/05/2024	Payroll	2	EFT		2,727.10	
431	04/05/2024	Payroll	2	EFT		1,669.25	
432	04/05/2024	Payroll	2	EFT		2,030.02	
433	04/05/2024	Payroll	2	EFT		3,114.83	
434	04/05/2024	Payroll	2	EFT		2,134.35	
435	04/05/2024	Payroll	2	EFT		3,050.09	
437	04/05/2024	Payroll	2	EFT		2,356.09	
438	04/05/2024	Payroll	2	EFT		2,117.31	
439	04/05/2024	Payroll	2	EFT		4,401.25	
440	04/05/2024	Payroll	2	EFT		2,227.28	
445	04/05/2024	Payroll	2	EFT	CAPSCO	47.50	Pay Cycle(s) 04/05/2024 To 04/05/2024 - ASSN FEE
446	04/05/2024	Payroll	2	EFT	COWLITZ 911 EMERGENCY SERVICES ASSN	375.00	Pay Cycle(s) 04/05/2024 To 04/05/2024 - UNION DUES; Pay Cycle(s) 04/05/2024 To 04/05/2024 - INITIATION FEE
447	04/05/2024	Payroll	2	EFT	EMPOWER TRUST COMPANY, LCC	2,257.33	Pay Cycle(s) 04/05/2024 To 04/05/2024 - DEF COMP; Pay Cycle(s) 04/05/2024 To 04/05/2024 - DEF COMP- AFTER TAX
448	04/05/2024	Payroll	2	EFT	HRA VEBA	7,725.00	Pay Cycle(s) 04/05/2024 To 04/05/2024 - VEBA
449	04/05/2024	Payroll	2	EFT	REHN AND ASSOCIATES	525.00	Pay Cycle(s) 04/05/2024 To 04/05/2024 - HSA
		001 OPERATIONS				117,006.70	
						117,006.70	Payroll: 117,006.70

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo

CERTIFICATION:
I, the undersigned, do hereby certify under penalty of perjury that the information listed has been provided to me as described herein and that I have issued payment as directed and received by Cowlitz 911.

_____	_C2FR_____	_____
Brandi Ballinger, Signature	Agency	Date

CERTIFICATION/AUTHORIZATION:
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_____	_____
Budget Finance Manager, Signature	Date
_____	_____
Executive Director, Signature	Date
_____	_____
Board Chair, Signature	Date

CHECK REGISTER

Cowlitz 911 Time: 12:47:51 Date: 04/11/2024

01/25/2024 To: 01/25/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
123	01/25/2024	Payroll	1	12874	ESD - PFMLA	3,008.97	Pay Cycle(s) 10/01/2023 To 12/31/2023 - PFMLA
124	01/25/2024	Payroll	1	12875	ESD-LTC	2,000.47	Pay Cycle(s) 10/01/2023 To 12/31/2023 - LTC
125	01/25/2024	Payroll	1	12876	ESD	1,361.18	4th Quarter Unemployment: 10/01/2023 - 12/31/2023
126	01/25/2024	Payroll	1	12877	WASHINGTON STATE DEPT OF L&I	3,915.48	4TH Quarter L&I: 10/01/2023 - 12/31/2023
		001 OPERATIONS				10,286.10	
						10,286.10	Payroll: 10,286.10

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_____ _C2FR_____ _____
Brandi Ballinger, Signature Agency Date

CERTIFICATION/AUTHORIZATION:
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_____ _____
Budget Finance Manager, Signature Date

_____ _____
Executive Director, Signature Date

_____ _____
Board Chair, Signature Date

CHECK REGISTER

Cowlitz 911 Time: 12:48:31 Date: 04/11/2024

03/29/2024 To: 03/29/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
399	03/29/2024	Claims	1	12976	ADCOMM ENGINEERING LLC	11,405.00	INV# 16616
400	03/29/2024	Claims	1	12977	ADVANCED ELECTRICAL TECHNOLOGIES	1,136.10	INV# 217867
401	03/29/2024	Claims	1	12978	AMERICAN POWER SYSTEMS	66,825.57	INV# COW0002-IN; INV# CO0002B-IN
402	03/29/2024	Claims	1	12979	CENTURYLINK	1,178.12	ACCT# 206-Z20-0449 994B 0224; ACCT# 206-Z20-0449 994B 0324
403	03/29/2024	Claims	1	12980	COMCAST	4,985.56	INV# 196488616
404	03/29/2024	Claims	1	12981	COWLITZ COUNTY PURCHASING SERVICES	4.40	INV# 14-2024
405	03/29/2024	Claims	1	12982	COWLITZ PUD	2,495.00	ACCT# 4745063 0324; ACCT# 5156128 0324; ACCT# 5162399 0324
406	03/29/2024	Claims	1	12983	DENALI HEATING & AIR CONDITIONING LLC	368.00	INV# S-23770
407	03/29/2024	Claims	1	12984	JOHN DIAMOND	582.41	INV# SPRINGFORUM-2024
408	03/29/2024	Claims	1	12985	IAED/ PRIORITY DISPATCH	220.00	INV# SIN367221
409	03/29/2024	Claims	1	12986	INTEGER ASSOCIATES INC	3,621.24	INV# 24-101; INV# 24-106
410	03/29/2024	Claims	1	12987	LITTLE INDIAN EMBROIDERY	1,265.94	INV# 8262
411	03/29/2024	Claims	1	12988	POINT MONITOR	779.04	INV# 101407
412	03/29/2024	Claims	1	12989	SHI INTERNATIONAL CORP	41,884.65	INV# B18047320
413	03/29/2024	Claims	1	12990	SUMMIT LAW GROUP, PLLC	862.50	INV# 152888
414	03/29/2024	Claims	1	12991	TELECOMUNNICATION SYSTEMS, INC	4,630.96	INV# 04INV-000044297
415	03/29/2024	Claims	1	12992	WALTER E NELSON COMPANY	179.55	INV# 1855264
416	03/29/2024	Claims	1	12993	WASHINGTON STATE PATROL	1,200.00	INV# 00182457

001 OPERATIONS	59,977.82	
003 RADIO OPERATIONS	4,279.55	
004 RADIO RESERVE	78,230.57	
300 PROJECT FUND	1,136.10	
	143,624.04	Claims: 143,624.04

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo

CERTIFICATION:
I, the undersigned, do hereby certify under penalty of perjury that the information listed has been provided to me as described herein and that I have issued payment as directed and received by Cowlitz 911.

_____ _C2FR_____ _____
Brandi Ballinger, Signature Agency Date

CERTIFICATION/AUTHORIZATION:
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_____ _____
Budget Finance Manager, Signature Date

_____ _____
Executive Director, Signature Date

_____ _____
Board Chair, Signature Date

CHECK REGISTER

Cowlitz 911 Time: 12:49:05 Date: 04/11/2024

04/12/2024 To: 04/12/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
452	04/12/2024	Claims	1	12998	AMAZON BUSINESS	876.33	INV# 1DTR-Q69D-313W; INV# 1DTR-Q69D-4QRN; INV# 1KMR-TNWV-4T7G; INV# 1317-X4YM-33PT; INV# 1JWR-HCMP-66KN; INV# 1JQD-X9MG-39KT; INV# 1HLQ-KPPT-3GGP
453	04/12/2024	Claims	1	12999	AMERICAN POWER SYSTEMS	66,201.72	INV# COW0006-IN; INV# CO00006B-IN
454	04/12/2024	Claims	1	13000	AT&T MOBILITY LLC	244.27	INV# 287315187389X03272024
455	04/12/2024	Claims	1	13001	COMCAST	615.82	ACCT# 8778 10 113 0684045 0424; ACCT# 8778 10 111 1306527 0424
456	04/12/2024	Claims	1	13002	COWLITZ 2 FIRE & RESCUE	2,500.00	INV# 24-057
457	04/12/2024	Claims	1	13003	COWLITZ PUD	464.17	ACCT# 4671145 0324; ACCT# 4737086 0324
458	04/12/2024	Claims	1	13004	DAY WIRELESS	5,871.55	INV# INV819583
459	04/12/2024	Claims	1	13005	DENALI HEATING & AIR CONDITIONING LLC	6,314.43	INV# S-23730; INV# S-23746; INV# S-23677; INV# S-23773; INV# S-23778; INV# S-23791; 2023 HVAC MTCE RETAINER RELEASE; INV# S-23820; INV# S-23865
460	04/12/2024	Claims	1	13006	FRANK F. RANDOLPH	1,927.00	INV# RLF030124; INV# RLF040124
461	04/12/2024	Claims	1	13007	JERRY JENSEN	33.97	032824-REIMBURSEMENT
462	04/12/2024	Claims	1	13008	LANGUAGE LINE SVCS INC	130.91	INV# 11258537
463	04/12/2024	Claims	1	13009	LEVEL 3 COMMUNICATIONS, LLC	1,649.79	INV# 684092047
464	04/12/2024	Claims	1	13010	LONGVIEW, CITY OF	1,041.07	2939
465	04/12/2024	Claims	1	13011	EMILY A MCGREGOR	49.91	040224-MILAGE
466	04/12/2024	Claims	1	13012	MORE POWER TECHNOLOGY-NONPROJECT	35,115.82	INV# 16028; INV# 16060; INV# 16006; INV# 16027
467	04/12/2024	Claims	1	13013	NW ENVIRONMENTAL LANDSCAPE SERVICES	990.03	INV# JANUARY 2024
468	04/12/2024	Claims	1	13014	PRIORITY DISPATCH	82.16	INV# SIN369081
469	04/12/2024	Claims	1	13015	RELIABLE ADMINISTRATION SOLUTIONS	2,000.00	INV# 24-034
470	04/12/2024	Claims	1	13016	ROYAL BUSINESS SYSTEMS	17.18	INV# IN220225
471	04/12/2024	Claims	1	13017	SIERRA SPRINGS	87.43	INV# 5351188 040424
472	04/12/2024	Claims	1	13018	SIGNMASTERS AWARDS 'N MORE, INC.	77.90	INV# 7205A
473	04/12/2024	Claims	1	13019	T-MOBILE USA INC	40.07	ACCT# 986172236 0324
474	04/12/2024	Claims	1	13020	TOSHIBA AMERICA BUSINESS SOLUTIONS	403.37	INV# 5029276913; INV# 5029262042
475	04/12/2024	Claims	1	13021	WASHINGTON STATE DEPT OF REVENUE	189.24	Q1 2024 LEASEHOLD TAX

001 OPERATIONS	50,633.52		
003 RADIO OPERATIONS	9,098.87		
004 RADIO RESERVE	66,201.72		
300 PROJECT FUND	990.03		
	126,924.14	Claims:	126,924.14

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo

CERTIFICATION:
I, the undersigned, do hereby certify under penalty of perjury that the information listed has been provided to me as described herein and that I have issued payment as directed and received by Cowlitz 911.

_____	_C2FR_____	_____
Brandi Ballinger, Signature	Agency	Date

CERTIFICATION/AUTHORIZATION:
I, the undersigned, do hereby certify under penalty of perjury that the materials have been furnished, the services rendered or the labor performed as described herein, that any advance payment is due and payable pursuant to a contract or is available as an option for full or partial fulfillment of a contractual obligation, and that the claim is a just, due and unpaid obligation against Cowlitz 911, and that I am authorized to authenticate and certify to said claim. We have reviewed the claims listed above totaling $_____, and we approve payment with our signatures below.

_____	_____
Budget Finance Manager, Signature	Date
_____	_____
Executive Director, Signature	Date
_____	_____
Board Chair, Signature	Date

CHECK REGISTER

Cowlitz 911 Time: 12:49:43 Date: 04/11/2024

01/31/2024 To: 01/31/2024 Page: 1

Trans	Date	Type	Acct #	Chk #	Claimant	Amount	Memo
127	01/31/2024	Claims	1	12878	US BANK (VISA)	5,701.47	ACCT# 4484 7345 5001 2810
		001 OPERATIONS				5,680.91	
		003 RADIO OPERATIONS				20.56	
						5,701.47	Claims: 5,701.47

CERTIFICATION:
I, the undersigned, do hereby certify under penalty of perjury that the information listed has been provided to me as described herein and that I have issued payment as directed and received by Cowlitz 911.

_____	_C2FR_____	_____
Brandi Ballinger, Signature	Agency	Date

CERTIFICATION/AUTHORIZATION:
I, the undersigned, do hereby certify under penalty of perjury that the materials have been furnished, the services rendered or the labor performed as described herein, that any advance payment is due and payable pursuant to a contract or is available as an option for full or partial fulfillment of a contractual obligation, and that the claim is a just, due and unpaid obligation against Cowlitz 911, and that I am authorized to authenticate and certify to said claim. We have reviewed the claims listed above totaling $_____, and we approve payment with our signatures below.

_____	_____
Budget Finance Manager, Signature	Date
_____	_____
Executive Director, Signature	Date
_____	_____
Board Chair, Signature	Date

Monthly Financial Report
Thru March 2024

COWLITZ 911
Police • Fire • Medical

BUDGETED BEGINNING FUND BALANCE FOR ALL FUNDS	$11,429,418.00
ACTUAL BEGINNING FUND BALANCE FOR ALL FUNDS	$13,480,700.56

NEW REVENUES

	FUND	Budget	Actual Thru Aug	Remaining to collect	%Remaining
	Operations	**$3,105,860.00**	**$806,802.05**	**$2,299,057.95**	**74%**
	Tax	*$1,146,934.00*	*$288,223.57*	*$858,710.43*	*75%*
1	*CPD Grant*	*$52,061.00*	*$0.00*	*$52,061.00*	*100%*
2	*User Fees*	*$1,890,865.00*	*$501,384.36*	*$1,389,480.64*	*73%*
3	*Misc*	*$16,000.00*	*$17,194.12*	*-$1,194.12*	*-7%*
	Radio Operations	**$48,820.00**	**$41,046.27**	**$7,773.73**	**16%**
4	*Tower Rent*	*$46,349.00*	*$39,847.70*	*$6,501.30*	*14%*
3	*Misc*	*$2,471.00*	*$1,198.57*	*$1,272.43*	*51%*
3	**Equipment Reserve**	**$2,500.00**	**$14,781.61**	**-$12,281.61**	**-491%**
3	**Radio Reserve**	**$27,692.00**	**$11,728.49**	**$15,963.51**	**58%**
5	**Sales Tax**	**$3,129,528.00**	**$872,373.89**	**$2,257,154.11**	**72%**
3	**Stabilization Reserve**	**$5,000.00**	**$12,838.73**	**-$7,838.73**	**-157%**
3	**Facility Reserve**	**$60.00**	**$3,581.31**	**-$3,521.31**	**-5869%**
3	**Bond Reserve**	**$16,639.00**	**$1,070.72**	**$15,568.28**	**94%**
3	**Project Fund**	**$5,000.00**	**$19,430.20**	**-$14,430.20**	**-289%**
6	**Federal Grant Radio Equip**	**$11,000.00**	**$0.00**	**$11,000.00**	**100%**
	TOTAL REVENUES	**$6,352,099.00**	**$1,783,653.27**	**$4,568,445.73**	**72%**

EXPENSES

	FUND	Budget	Actual Thru Aug	Remaining to Spend	%Remaining
	Operations	**$5,514,482.00**	**$1,175,360.80**	**$4,339,121.20**	**79%**
	Salaries Wages & Benefits	*$4,318,270.00*	*$761,896.81*	*$3,556,373.19*	*82%*
7	*Travel/Training*	*$65,887.00*	*$6,826.59*	*$59,060.41*	*90%*
8	*Overhead*	*$356,100.00*	*$178,371.64*	*$177,728.36*	*50%*
	General Facility	*$110,250.00*	*$26,725.72*	*$83,524.28*	*76%*
	Professional Fees	*$438,988.00*	*$131,995.95*	*$306,992.05*	*70%*
	Technology & Software	*$223,787.00*	*$69,483.59*	*$154,303.41*	*69%*
	Other	*$1,200.00*	*$60.50*	*$1,139.50*	*95%*
	Radio Operations	**$323,450.00**	**$81,578.88**	**$241,871.12**	**75%**
9	*Overhead*	*$10,106.00*	*$121.98*	*$9,984.02*	*99%*
	General Facility	*$162,548.00*	*$35,929.61*	*$126,618.39*	*78%*
	Leases	*$150,796.00*	*$45,527.29*	*$105,268.71*	*70%*
	Equipment Reserve	**$92,664.00**	**$20,467.11**	**$72,196.89**	**78%**
	Radio Reserve	**$1,888,040.00**	**$274,338.80**	**$1,613,701.20**	**85%**
	Sales Tax	**$0.00**	**$0.00**	**$0.00**	**0%**
	Stabilization Reserve	**$0.00**	**$0.00**	**$0.00**	**0%**
	Facility Reserve	**$0.00**	**$0.00**	**$0.00**	**0%**
10	**Bond Reserve**	**$743,160.00**	**$0.00**	**$743,160.00**	**100%**
11	**Project Fund**	**$746,945.00**	**$397,034.01**	**$349,910.99**	**47%**
12	**Federal Grant Radio Equip**	**$1,502,000.00**	**$0.00**	**$1,502,000.00**	**100%**
	TOTAL EXPENDITURES	**$9,308,741.00**	**$2,030,358.48**	**$7,278,382.52**	**78%**

MEMORANDUM OF Understanding

This Memorandum of Understanding ("MOU") is entered into by and between The Cowlitz 911 Emergency Services Association (“Association” or “Union”) and Cowlitz 911 (collectively known as the “Parties”). This MOU is for the purpose of setting forth the terms on the integration of the Dispatch Floor Supervisor Classification into the Bargaining Unit represented by the Association.

Whereas, the Parties have a current collective bargaining agreement (2022-2024) and wish to amend the agreement with this MOU, and

Whereas, Cowlitz 911 desires to create an additional working supervisor position with its own job description and job title – Dispatch Floor Supervisor, and

Whereas, Cowlitz 911 and the Association have an interest that all Supervisor positions would work the consoles, count toward minimum staffing, and provide a supervisory and leadership resource for Dispatchers on the floor, and

Whereas, the Parties have agreed that as working supervisors they properly belong in the bargaining unit represented by the Association,

Now, Therefore, for and in consideration of the mutual promises of the parties, hereinafter stated, the parties do agree as follows:

1. Effective April 17, 2024, the Dispatch Floor Supervisor position(s), shall be included in the bargaining unit represented by the Association and shall be covered by all of the provisions of the parties’ current collective bargaining agreement, unless otherwise provided for in this Memorandum of Understanding.
2. The Dispatch Floor Supervisor Position will be incorporated into the Parties’ successor bargaining agreements as part of the Bargaining Unit.
3. The duties of the Dispatch Floor Supervisor position shall be as set forth in the attached Job Description, which may not be modified except upon mutual agreement of the Parties.
4. The salary range for the Dispatch Supervisor is attached hereto and by this reference incorporated herein.
5. For the purposes of Seniority, Dispatch Supervisors shall retain credit for all current continuous service with the Employer and its predecessor based on initial hire date (“total Seniority”) in accordance with Article 23 of the parties’ CBA.
6. The Employer may designate effective January 1, 2025, for shift bidding purposes, four (4) shifts for Dispatch Floor Supervisors. Dispatch Floor Supervisors shall be

limited to one of those four (4) shifts based on total Seniority. Any change to the current shift bid, (2024), will be negotiated between the parties.

7. Dispatch Floor Supervisors shall bid shifts in the normal rotation with all members of the bargaining unit.
8. Dispatch shall bid Vacation in the normal rotation based on total Seniority and shall not receive a preference based on their position as a Dispatch Floor Supervisor.
9. Dispatch Floor Supervisors shall be subject to Mandatory Overtime in the same manner as other employees of the Bargaining Unit and when mandated they will function as a Dispatcher.
10. Voluntary Overtime will continue to be allotted as provided in the Collective Bargaining Agreement with no preference for Dispatch Floor Supervisors. When working voluntary overtime, the Dispatch Floor Supervisor shall function as a Dispatcher.
11. Any additional overtime for the purpose of the Dispatch Floor Supervisor performing non-dispatch activities shall not result in a detriment to other members of the Bargaining Unit ability to work overtime on a voluntary basis
12. The current Lead Dispatchers shall be "grandfathered" and shall continue to receive the Lead Dispatcher differential until such time as they are either promoted or leave the employer. Cowlitz 911 retains the management right to fill vacancies as required by operational needs. Dispatchers promoted to Dispatch Supervisor Floor shall receive promotional increase in accordance with Article 9.3.2 of the parties' CBA.

Guild:

_____	_____	_____
Printed Name:	Signature:	Date:

Cowlitz 911:

_____	_____	_____
Chair Printed Name:	Signature:	Date:
_____	_____	_____
Executive Director Printed Name:	Signature:	Date:

Cowlitz 911 Job Description

The job description is intended to describe the general nature and level of work being performed by the incumbent and is not to be construed as an exclusive list of responsibilities, duties and skills required by the incumbent on this position. The job description does not imply an offer of employment, nor a contract for employment. It is subject to change at the discretion of the employer.

Job Title: Dispatch Floor Supervisor **FLSA:** Non-Exempt

Agency: **Cowlitz 911** **Union Affiliated:** Yes

Reports to: **Operations Manager** **Pages:** 4

General Position Summary:

The Dispatch Floor Supervisor (Supervisor) is responsible for day-to-day oversight of Dispatchers and operations. The Supervisor will work an assigned shift with dispatchers and will participate in processing emergency, non-emergency and administrative calls for partner agencies, emergency providers and the public; to ensure training and work quality in accordance with the Dispatch Center's mission, standards, and goals; to ensure adherence to established policies and procedures, guidelines, coordinate, plan, direct the activities of staff and ensures continuity of work. The Supervisor is responsible for situational awareness of dispatch activities ensuring staff and field unit safety.

This position promotes positive working relationships and a cooperative attitude. It also performs general clerical tasks to ensure complete and accurate records that meet reporting requirements.

Essential Duties and Responsibilities:

1. Supervise, assign, review and participate in the work of dispatchers; monitor phone and radio traffic to ensure procedural compliance; review case information entered in the computer system; conduct quality assurance feedback and coaching sessions at regular intervals. Complete annual performance evaluation of assigned dispatchers.
2. Motivate, support, and positively recognize staff members. Actively contribute to a healthy work environment through modeling positive behaviors. Provide feedback to team members which is designed to optimize personal and professional success through performance enhancement.
3. Works as a part of the leadership team to recommend for adoption, develop, review, update and implement policies, procedures, operating guidelines, technology, and professional development resource allocation strategies which are current, applicable, and sustainable.
4. Contributes to the identification of root causes in common performance issues and develops education and guidance to correct the issue.
5. Plan, prioritize, assign, supervise, and review the work of assigned staff; participate in the selection of assigned staff; provide or coordinate staff training; work with employees to correct deficiencies; implement discipline procedures.
6. Suggest edits to and maintain a thorough knowledge of agency guidelines, policies, procedures, training documents, etc. Will lead staff appropriately on these. At the direction of the Operations Manager or Executive Director conducts investigations and disciplinary actions in violation of these, as needed with the assistance of Human Resources.

7. Ensures that schedules are written and maintained for shifts and are adequately staffed, implementing voluntary or mandatory overtime in accordance with Collective Bargaining Agreement.
8. Communicate with the public, subordinates, peers, other supervisors; interpret, explain, and answer operational and procedural questions; receive complaints from citizens, employees, and user agencies; complete notifications to appropriate agency or person.
9. Ensures that proper action is taken in the event of equipment failure or other center emergencies. Contacts the proper vendors, staff, and/or Executive Director as needed to address situation.
10. Attend staff meetings, user-agency, department planning, and regional development meetings as assigned. Represent agency and contribute ideas to improve overall agency efficiency.
11. May represent Cowlitz 911 as Training Coordinator, Public Education Coordinator, or other state office responsibilities as assigned by the Executive Director.
12. Attend continuing education and training as needed and assigned.
13. Prepares and regularly updates various logs, records, and reports. Lead the maintaining, trouble shooting and updating of CAD data.
14. Work closely with other supervisors, and other agency staff as needed to maintain center operations.
15. Observe, abide by, and set example, of all policies, goals, and objectives.
16. Performs other related duties or projects as assigned by the Operations Manager or Executive Director.

Preferred Minimum Qualifications:

1. Must be willing to work night-shift hours, and overtime as needed and assigned.
2. Possess the minimum qualifications of a 911 Dispatcher, and preferably a minimum of three (3) years working within the operations of a 911 center directly in dispatch or 911 leadership.
3. Must be proficient in current position with positive feedback/reviews as well as possess thorough knowledge of, or obtain knowledge of, the policies and procedures used by the Center as well as the regulations of the agencies providing services to the 911 Center, such as the NCIC, a State Criminal Justice Information System, Access, the Department of Licensing, and the FCC.
4. Thorough understanding or experience with common office software: Word, Outlook and Excel and office equipment.
5. Have, or obtain within (1) one year, supervisor skills training provided by APCO, NENA, WCIA or related agency.

Required Skills and Abilities:

1. Leadership skills to guide, train, and motivate dispatchers. Maintain effective lines of communication with all staff.

2. Possess and exhibit interpersonal and customer service skills to contribute to the success of the organization by developing and maintaining good working relationships, trust, and confidence with all staff as well as other agencies.
3. Effectively handle a multi-tasking and fast paced work environment. Be detail oriented, organized, and be able to follow through with tasks even with frequent interruptions and distractions.
4. Possess the initiative to act and be self-motivated within prescribed guidelines, policies, and procedures. Work well independently, as well as in a team setting.
5. Communicate in a professional business-like manner, both orally and in writing. Portray a professional image and attitude.
6. Maintain strict confidentiality of restricted or private information, including that of other staff members, and effectively handle sensitive matters.
7. Ability to understand and interpret the union collective bargaining agreement.

Equipment or Tools:

1. Operate a personal computer effectively, and other electronic and communications equipment common to the trade.
2. Operate standard office equipment such as fax, copy machine, and multi-line phones.

Job Scope:

Level of Supervision Received:

Minimum supervision expected after training, and more supervision for special projects. Provide regular status reports.

Level of Supervisory Responsibilities:

This position is supervisory in nature, must provide technical assistance, training, guidance, and coaching as needed to staff as directed.

Contact/Communication with others:

Extensive oral communications with the staff and the public in person, over the phone and radio. Extensive typed communications will occur with individuals within the center, other client/servicing agencies. Frequent contacts with other local, state, and federal agencies, law enforcement, and the public. Contacts are written, verbal, or electronic. High level of fluency in English.

Decision Making Capacities:

Requires fast-paced decision-making following policies and procedures and good common sense with a focus on doing the right thing for the right reasons. Guidance or clearance should be requested for unusual situations, out-of-scope, and special tasks.

Working Conditions:

1. Able and willing to work any shift as assigned for 40 hours/week in a 24/7/365 environment; work weekends, overtime, nights, holidays, rotating shifts, rotating days off, schedules, starting and stopping times, and opposite shifts of other Supervisors to allow leadership assignments on each shift.
2. Abke to handle disgruntled staff, public, stressful situations, and be exposed to case related material that may be disturbing.
3. Able to tolerate extended exposure to computers, monitors, and screens. Able to sit/stand/work in front of at a workstation for long periods of time.
4. Must be able to work in secured facility, with restricted access and without windows.
5. Must pass an extensive background investigation.

Physical Requirements	N/A	Rarely (1-12%)	Occasionally (13-33%)	Frequently (34-66%)	Regularly (67-100%)
Standing				X	
Walking				X	
Climbing		X			
Sitting					X
Stooping / Kneeling			X		
Lift/Carry up to 15 lbs.			X		
Lift/Carry up to 30 lbs.		X			
Lift/Carry up to 50 lbs.		X			
Push/Pull up to 25 lbs. of exertion		X			
Push/Pull up to 50 lbs. of exertion	X				
Work below waist level			X		
Work at waist to shoulder level				X	
Work above shoulder level			X		
Reach further than arm's length				X	
Typing					X
Grasping / Holding				X	
Talking					X
Hearing					X
Seeing					X
Work in confined spaces	X				
Exposed to extreme temperatures		X			
Operate tools or machinery (incl. office equip.)					X
Operate motorized vehicles/equipment		X			
Work at heights balancing	X				
Use/exposed to hazardous substances		X			

April 2024
Last Revision

_____ Executive Director

_____ Incumbent

_____ Date

PUBLIC SAFETY RADIO IMPROVEMENTS PLAN

PN0732 | Cowlitz Radio Project | Version 1.0

PREPARED FOR:

Cowlitz 911
Public Authority

DATE SUBMITTED
04/12/2024

ADCOMM Engineering LLC

Bridging The Gap Between Operations & Technology®

P.O. Box 308
Woodinville, WA 98072-0308
Phone: 425-487-1361
adcomm911.com
WA Firm License ID No. 20106216

ABOUT THIS DOCUMENT

This document is the primary Phase 1 "Public Safety Radio Improvements Plan" deliverable for Professional Services Agreement Contract Number 2023-11-15-01 signed November 15, 2023, between Cowlitz 911 Public Authority and ADCOMM Engineering LLC.

Terms and Abbreviations

ADCOMM	ADCOMM Engineering LLC
Conv	conventional
DAQ	delivered audio quality
DNR	Department of Natural Resources
EMS	emergency medical services
FCC	Federal Communications Commission
FDMA	frequency division multiple access
FNE	fixed network equipment
HVAC	heating, ventilation, and cooling
ISSI	Inter-RF Subsystem Interface
LMR	land mobile radio
MGB	master ground bus
PD	police department
PSAP	public safety answering point
PUD	public utility district
RF	radio frequency
RFP	request for proposal
SME	subject matter expert
SOI	system of interest
TDMA	time division multiple access
TRS	trunked radio system
UHF	ultra-high frequency
UPS	uninterruptible power supply
VHF	very high frequency
WSDFW	Washington State Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

TABLE OF CONTENTS

Appendices

EXECUTIVE SUMMARY

ADCOMM Engineering LLC evaluated Cowlitz 911 Public Authority's current public safety radio system and made recommendations for updates, improvements, and procurement recommendations that Cowlitz 911 can manage and maintain for the next 15 to 20 years.

Assessment and Findings

ADCOMM interviewed stakeholders across the Cowlitz 911 ecosystem, from dispatch operators, to Fire and Law First responders, to maintenance personnel, and learned that field personnel are lacking reliable communications across their service territories. They have holes in coverage where they need it, or where there is coverage, the audio is intelligible. For others, when they walk into a building, they lose service.

> "Coverage changes day-to-day"

Two-way radio communications IS the First Responder's lifeline.

- First responders need reliable communications that applies technology to support their operations.
- They need digital capabilities that captures and logs who is talking, when, and where.
- They need an emergency button that sends their ID and location and alerts both dispatch and field personnel to help.
- They need a radio system that manages the frequencies and fleet updates in the background so they can focus on their task at hand – *to save lives*.

Dropped audio on a 9-1-1 response call should never occur. Unfortunately, it is occurring far too often on the existing Cowlitz 911 radio system. The radio system and microwave network equipment that Cowlitz 911 First Responders rely on uses dial-up modem-era technology that lacks spare parts on the used market.

It's bad to have coverage holes or poor services areas in the first place, it's worse when you can't predict where the holes have moved to.

The existing radio system needs to be stable.

It also needs a significant upgrade.

ADCOMM identified and recommended replacement radio system solution architectures to improve reliability and operations. We identified sites to improve coverage. We identified available frequencies to ensure reliable communications countywide and inside buildings. We defined a secure, reliable, resilient, microwave backhaul network that would ensure always on communications.

ADCOMM engaged the Fire-Law Tac committees to educate them and ensure they understood each of the options, their pros and cons, and to clarify impacts to user operations. Our

engagement of the Tac committee ensures the chosen system that best meets operational users' needs.

- The Tac's recommendation to the Cowlitz 911 Board was a single, countywide 15-site 700 MHz P25 Phase 2 radio system that significantly improves reliable coverage and clear audio across the rural and urban topologies, and inside buildings.

Recommendations for next steps:

ADCOMM recommends that two primary bodies of work happen in parallel to continue to keep the existing system operational while the new system funded, built and tested.

There is still a significant amount of work that must be performed before procurement of a wholly updated microwave network or replacement radio system can happen.

1. Move forward with making decisions on the long-term system solution to
    a. Define which and how many sites to sign lease agreements with or build out
    b. Define future predicted coverage for a replacement radio system
    c. Confirm the final, improved microwave network in a reliable, resilient, ring topology.
2. Troubleshoot and fix current issues of the legacy VHF radio and microwave system, and
    a. Audio issues are plaguing the users daily
        i. The issues affecting the reliability of the legacy radio system require work to stabilize the immediate audio issues.
    b. System-wide and site outages are regular issues
        i. The existing backhaul network includes antiquated equipment as primary links that must be replaced as soon as possible. These will be identified and replaced to support critical public safety communications. To meet this need, one short-term improvement is concentrated on improving the microwave network to reduce system-wide outages.

Future work:

Once initial mitigating issues are quelled, then future work is needed to:

- Procure site lease agreements
- Build out the final microwave network to support the future radio network.
- Define technical and operational requirements for inclusion in a radio system network procurement.

Once those tasks are completed, then the last stage is to proceed with a phased implementation plan based on budget constraints to deploy a new 700 MHz P25 Phase 2 radio system.

1. PURPOSE OF THIS DOCUMENT

The Public Safety Radio Improvements Plan incorporates the following goals:

- Define the systems and scope that are needed to improve the radio system, microwave system, radio sites, and interface with our new secure 911 IP network and dispatch console systems.
- Assess alternative sites and/or consider new construction, equipment, and technology that will best fit the radio coverage needs of Cowlitz 911 and its user agencies that will integrate with the current VHF simulcast public safety radio infrastructure and our local terrain.
- Consider the best or most suitable public safety radio infrastructure, equipment, FCC licensing, coverage needs, system functionality, cost, permitting, zoning, accessibility, soil, hazards, grading, site readiness, dependability, sustainability, and maintainability.
- Develop both short-term and long-term solutions to radio coverage and performance issues.
- Prepare a public safety radio improvement professional engineering design and equipment improvement recommendations that Cowlitz 911 can manage and maintain for the next 15 to 20 years.
- Collaborate with Cowlitz 911 staff and prepare a project budget for the radio technology and equipment improvements that will meet fiscal and resource constraints.

1.1 Background

Cowlitz 911 Public Authority is a public safety answering point (PSAP) located in Cowlitz County, Washington. Cowlitz 911 Public Authority issued a "Request for Qualifications — 911 Emergency Communication Center Public Safety Radio Improvements PSR Architecture and Engineering Services" on September 25, 2023. Through competitive procurement, ADCOMM Engineering LLC ("ADCOMM") was awarded and engaged to assess stakeholder operations and technology systems to provide recommended radio system improvements.

Cowlitz County is located in the southwestern part of Washington state. The county has a total area of 1,166 square miles (3,020 km2), of which 1,140 square miles (3,000 km2) is land and 26 square miles (67 km2) (2.2%) is water. The county was formed in April 1854. Cowlitz County is one of the state's smaller counties (28 of 39).[1]

Cowlitz County is bordered by Wahkiakum, Lewis, Skamania, and Clark in Washington State, and Columbia County in Oregon State. Cities include Castle Rock, Kalama, Kelso (County seat), Longview, and Woodland.

[1] Wikipedia - https://en.wikipedia.org/wiki/Cowlitz_County,_Washington

FIGURE 1: Cowlitz and Border Counties

The Cowlitz 911 Center serves as the primary Public Safety Answering Point (PSAP) for a combination of thirteen (13) law enforcement, fire and medical response agencies in Cowlitz County, Washington. The organization serves a population of 111,800 citizens. The organization answers an average of 210 emergency 911 calls and 400 business calls per day.[2]

1.2 Methodology

The primary purpose of a radio communications system is to deliver reliable, quality, audio to end users in the field. To meet this need, an iterative approach assesses three major items:

1. Radio coverage, using viable radio tower sites (existing brownfield or new greenfield) must first be determined that provide to reliable service to end user operating areas.

2. Once coverage defined, then network connectivity between sites and other key locations, e.g., dispatch operations center, must be established.

3. Meanwhile, available licensable frequencies or radio spectrum, must be determined.

[2] Cowlitz 911 - About Us - https://cowlitz911.org/

Once these three major components are determined, then optional technology and system architecture solution options can be determined for a conceptual design.

2. OPERATIONAL ASSESSMENT

The operational assessment evaluates stakeholder operations and current processes, equipment, software, systems, practices, and more to identify opportunities for improvement. The outcome of the operational assessment is stakeholder needs that any future modifications to technology and/or operations would be validated against.

2.1 Participating Agencies

The following agencies use, manage, maintain, or interface with Cowlitz911 dispatch, the member agencies, and/or the radio system.

TABLE 1: Stakeholder Agency List

LAW ENFORCEMENT	FIRE AND EMS	OTHERS
▪ Kelso Police Department ▪ Longview Police Department ▪ Cowlitz County Sheriff's Office ▪ Kalama Police Department ▪ Castle Rock Police Department ▪ Woodland Police Department	▪ Cowlitz County Fire District #1 ▪ Cowlitz 2 Fire & Rescue ▪ Cowlitz County Fire Protection District 3 Toutle ▪ Cowlitz County Fire District 5 Kalama ▪ Cowlitz County Fire District 6 (Castle Rock Fire & Rescue) ▪ Longview Fire Department	▪ Cowlitz 911 PA Dispatch ▪ Cowlitz County Public Works (Roads Department) ▪ Day Wireless (Radio Shop) ▪ Adjacent Counties – Lewis, Wahkiakum, Columbia, Skamania, Clark ▪ State and Federal agencies – WSP, WSDOT, DNR, etc.

2.2 Stakeholder Groups

Stakeholders either directly use the system or impact the system in some way. They include:

- End users
- Operators
- Supervisors
- Managers
- Maintainers
- Suppliers
- Executives
- The public

The four stakeholder types are business, operators, maintainers, and support personnel. User groups within each stakeholder type have a common set of needs based on how they interact with the integrated system.

The primary stakeholder groups that were interviewed and assessed included operators (fixed users/dispatch operators, and field users) and maintainers.

Public safety personnel (law, fire, EMS) are the primary users of the land mobile radio (LMR) communications system. At the heart of any technology system, these operational end users are the reason the system exists.

2.3 Channel Allocation

The existing radio channel plan consists of a mix of VHF analog repeated and simplex channels. There are four primary repeated fire channels (Control 1, OPS2, OPS3, OPS4), one repeated county roads channel, five repeated law channels (CCSO, KPD, LPD/2, LTAC), and a mix of repeated other agency and/or interoperability channels.

Some channels are simulcast voted at multiple sites where others are only available at single locations.

The following excerpt from the Fire services Radio Procedures Manual outlines use of the channels and describes how they should be used.

Designator	Use
1. Control 1 (*)	Dispatch, Initial Response, Routine Operations
2. OPS 2 (*)	Command and Control
3. OPS 3 * +	Command and Control
4. OPS 4 * +	Command and Control, Inter-Discipline Coordination (Repeated)
5. OPS 5 (*)	Command & Control/Inter- Discipline Coordination (Simplex) /Tactical
6. TAC 6	Cowlitz 1 Tactical
7. TAC 7	Cowlitz 2 Tactical
8. TAC 8	Cowlitz 3 Tactical
9. TAC 9	Cowlitz/Skamania 7 Tactical
10. TAC 10	Cowlitz 5 Tactical
11. TAC 11	Cowlitz 6 Tactical
12. TAC 12	Longview Fire Tactical
13. TAC 13	Vacant Tactical
14. V-TAC 12	Federal Inter-Op Frequency
15. V-TAC 13	Federal Inter-Op Frequency
16. Control 1	Firefighter Safety Placeholder

** This frequency is capable of being used in the Communications Center.*
( ) These frequencies can be used to communicate with Life Flight helicopters.
+ These frequencies are patched into Clark County's 800Mhz system.

FIGURE 2: Cowlitz County Fire Chiefs Association Radio Procedures Manual, 9-Jan-23

2.4 Subscriber Inventory

Each agency is responsible to purchase and maintain their subscriber mobile and portable radios. In addition, some agencies own and maintain radio system infrastructure assets (control stations, base stations, repeaters, etc.) and are responsible for FCC license renewals.

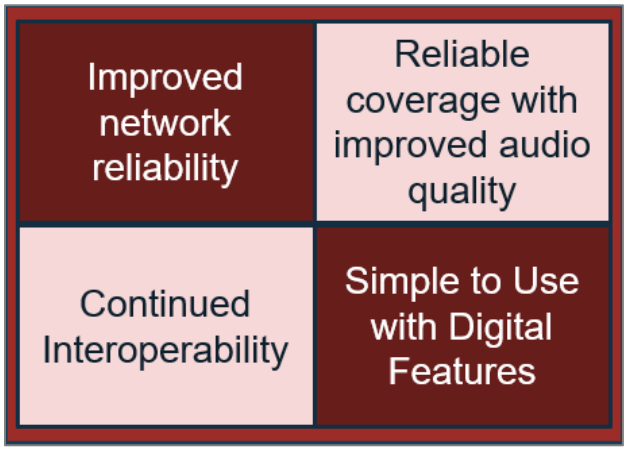
Subscriber radios consist of a mix of manufacturer makes and model numbers, purchased in various years. They include Motorola (APX 6000XE, APX 8000, APX 900), Kenwood (NX5200, NX-5200-K2, etc.), Bendix King (BKR 5000, KING-150S), Icom (F70S), and others.

2.5 Stakeholder Needs

ADCOMM performed user interviews to understand the existing operating environment experienced by the field and dispatch personnel. Some of the responses included:

- We "want to move into the 21st Century"
- "If we can get good coverage and encryption, I'll learn to speak robot"
- "Our car radios work almost 100% of the time, no complaints"
- "The standard patrol officer would agree that we are behind the criminal element because of the lack of encryption"
- "We get used to deciphering words through static"
- Coverage changes, "By the day"
- "It sucks"

There were four primary needs affecting user operations. They included:



1. **Improved Network Reliability.** The radio system needs to be stable and consistent. It's not great to have coverage holes, it's worse to not know where the holes have moved to. "Coverage changes day-to-day."

2. **Reliable Coverage with Improved Audio Quality.** There are many areas in the county where two-way radio coverage is poor or non-existent. There are other areas where coverage exists, but the audio quality is too poor to support coherent communications. Additionally, coverage inside buildings is lacking and needs improvement.

3. **Simple to Use with Digital Features.** Channel allocation is generally good for those channels configured as simulcast. "TAC channels should be accessible by field and dispatch, and be based on operational use, not geography." Otherwise, TAC channels are not well allocated – users must be in the right area to use the right channel. Simplex channels are available for use but dispatch operators do not have access to communicate on simplex channels. Enhanced digital features can save lives: location data, radio IDs, emergency Button, encryption are inherent features with digital technology.

4. **Continued Interoperability.** Stakeholders need continued communications within the county and with adjacent agencies and those that pass through it. Therefore, any new system design should consider all partners and ensure continued communications for the VHF analog or P25 Phase 1 conventional users.

3. TECHNICAL ASSESSMENT

ADCOMM performed research and engineering studies and led maintenance team and system manager interviews to understand the existing capabilities and configurations of the technology systems that field and dispatch personnel were employing to perform their duties.

Frequency (Channel) Assessment. FCC database searches captured which frequencies are licensed where and if any additional frequencies may be available to modify or expand the existing radio system.

Site Assessment. ADCOMM performed site searches using available databases to identify existing and future potential site locations. In addition, field surveys at a subset of site locations were performed. The sites were assessed based on space availability for new racked equipment within existing shelters along with space for LMR and microwave antennas on existing towers or determine if improvements or upgrades would be needed to support the new radio system.

Coverage Assessment. ADCOMM performed coverage predictions of the existing radio system at existing radio sites. Coverage studies aid in understanding the geography for each area and expected coverage (or propagation) from each site. Additional sites were assessed for coverage to see if and how well they could improve coverage holes or improve existing audio quality on existing and proposed frequency bands and using analog versus digital technologies.

Backhaul Transport Network Assessment. As the sites were assessed for coverage capabilities, they were additionally assessed with respect to backhaul transport, i.e., point-to-point microwave, etc. to ensure they could be connected to each other and the dispatch center.

Sharing Opportunities. ADCOMM assessed adjacent agency radio systems to identify coverage overlaps and potential sites to use or share, for improved primary radio system coverage.

Costs. ADCOMM considered both capital and on-going costs for infrastructure equipment versus subscriber equipment, FCC licensing fees, supplier software licenses, on-going maintenance expectations, etc.

Maintenance and Management. ADCOMM considers the personnel and skill sets needed to manage and maintain owned versus leased radio systems to include the site facilities (e.g., tower/ shelter, primary vs backup power, network, RF, grounding, etc.), fixed radio site equipment (base stations, antenna systems, network switches/ routers/ firewalls), along with end user equipment (field mobile and/or portable radios, desktop control stations, fixed base stations, dispatch console positions, etc.).

3.1 FCC Licensed Frequency Findings

Research of frequencies assigned to Cowlitz 911, law agencies and fire districts revealed locations of transmitter sites. Note: receive only locations are not identified so there are additional sites/ equipment locations that are not listed here.

	CALLSI(	Freque ncy (MHz)	Repeat er Input (MHz)	City-Wide	Cowlitz 911 Public Authority	Abernathy Mountain	Coldwater	Columbia Heights 3 MILE N OF LONGVIEW WA	Davis Peak	Rainier Hill	Signal Peak	Speelyai	HQ	312 SW FIRST STREET, KELSO	32560 Highland Road	CLATSKANIE-FD5 1.2 M ENE OF INTOF SOUTH NEHALEM	Mt. Brynion Road-FD5 3 miles E of Elsie	MARBLE-FD5 1.6 M NNE OF AREL
CC PWKS	WPZR413	151.0850	159.0150						FB2	FB2	FB2							
CC PWKS	WQVS25:	151.0850	159.0150					FB2										
KELSO SCH		151.5350																
PAC CORP		153.4550	160.0350															
KELSO PW		153.5300																
FD5_NXDN	WQXF715	153.9125		Authorization on a secondary basis												FB2		
Cow FD Ops	WPZR413	154.0250				FB2	FB2		FB2	FB2	FB2	FB2						
Cow FD Ops	WQVS25:	154.0250						FB2										
Cow FD Ops	WNST218	154.0250		MO Other														
NOT IDENTIFIED	WPZR413	154.1150				FB2	FB2		FB2	FB2	FB2	FB2						
NOT IDENTIFIED	WQVS25:	154.1150						FB2										
FD5_NXDN	WQXF715	154.1825																FB2
FD5_NXDN	WQXF715	154.2125														FB2		
FD5_NXDN	WQXF715	154.2200													FB2			
Fire Control 1	WPZR413	154.2350	158.9100			FB2	FB2		FB2	FB2	FB2	FB2						
Fire Control 1	WQEY99(	154.2350	158.9100							FB2								
Fire Control 1	WQVS25:	154.2350	158.9100					FB2										
Fire Control 1	WXP571	154.2350	158.9100	MO Ost...														
Fire Control 1	WQEY99(	154.2350	158.9100											FB2				
SO TAC1		154.3325	SIMPLEX															
FD5_NXDN	WQXF715	154.4375														FB2		
VTAC 12		154.4525	SIMPLEX															
Fire Ops 4	WPZR413	154.7250	158.9850			FB2	FB2		FB2	FB2	FB2	FB2						
Fire Ops 5	WQVS25:	154.7250						FB2										
WSP KEL		154.7700	N/A															
County Main (SO [	WPZR413	154.8150	159.0825			FB2	FB2		FB2	FB2	FB2	FB2						
County Main (SO [	WQVS25:	154.8150	159.0825					FB2										
OSP		154.9050	155.4600															
SO C-C		154.9500	SIMPLEX															
FD5_NXDN	WQXF715	155.0325														FB2		
L-TAC	WPZR413	155.0850	158.9250			FB2	FB2		FB2	FB2	FB2	FB2						
L-TAC	WQVS25:	155.0850	158.9250					FB2										
L-TAC	KNIP568	155.0850	158.9250	MO														
L-TAC	KNIP580	155.0850	158.9250	MO														
KPD 2		155.1300	SIMPLEX															
SO TAC2		155.1825	SIMPLEX															
FD5_NXDN	WQXF715	155.1975																FB2
FD5_NXDN	WQXF715	155.2425													FB2			
KELSO SBUS		155.2800																
NOT IDENTIFIED	WPZR413	155.3100				FB2	FB2		FB2	FB2	FB2	FB2						
NOT IDENTIFIED	WQVS25:	155.3100						FB2										
LERN		155.3700	SIMPLEX															
SO TAC3		155.4375	SIMPLEX															
National LERN		155.4750	SIMPLEX															
LPD	WPZR413	155.5350	158.8350			FB2	FB2		FB2	FB2	FB2	FB2						
LPD	WQVS25:	155.5350	158.8350					FB2										
FD5_NXDN	WQXF715	155.5575													FB2			
FD5_NXDN	WQXF715	155.5875														FB2		
FD5_NXDN	WQXF715	155.6025																FB2
SO CMD		155.6925	SIMPLEX															
FD5_NXDN	WQXF715	155.7075																FB2
VCALL 10		155.7525	SIMPLEX															
FD5_NXDN	WQXF715	155.7750													FB2			
FD5_NXDN	WQXF715	155.8275																FB2
NOT IDENTIFIED	WQEY99(	155.9400											FB					
WSP ST		155.9700	N/A															
KPD	WPZR413	156.0900	159.0675	Authorization (		FB2..	FB2..		FB2..	FB2..	FB2..	FB2..						
KPD	WQVS25:	156.0900	159.0675					FB2										
OSCCR		156.1350	SIMPLEX															
FD5_NXDN	WQXF715	156.1575		Authorization on a secondary basis														FB2
NOT IDENTIFIED	WQEY99(	156.2100											FB					
FD5_NXDN	WQXF715	158.7300													FB2			
FD5_NXDN	WQXF715	159.1050													FB2			
NOT IDENTIFIED	WQEY99(	########											FB2					
NOT IDENTIFIED	KB65032	########		MO														
NOT IDENTIFIED	WQEY99(	########											MO,,					
NOT IDENTIFIED	WNPU64(	########		MO									FB2					
NOT IDENTIFIED	KK5320	########		MO														
Fire Control 1	KJS658	154.235											FB					

FIGURE 3: FCC Licensed Frequencies versus Sites

The frequency search confirmed simulcast channel transmitter locations, TAC channel locations, and mobile licenses for the Cowlitz 911 agencies. In addition, the NXDN radio system frequencies and site locations associated with Fire District 5 were identified. It may be possible to reallocate unused VHF channels for the larger system, but additional engineering is needed to ensure viability for collocation and research with the FCC is necessary to confirm the ability to license reused channels for the desired use.

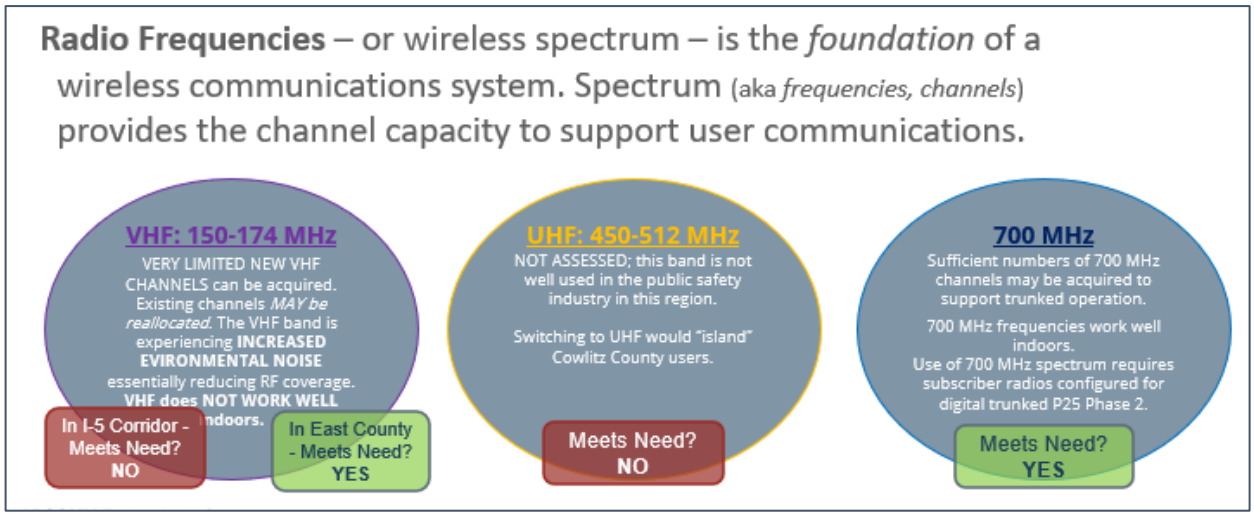


FIGURE 4: Frequency Research Findings

Additionally, ADCOMM researched state allocated 700 MHz frequencies for use by Cowlitz 911. There are sufficient number of channels suitable for a regional radio system which makes the 700 MHz frequency band a viable option for an upgraded or replacement radio system.

3.2 RF Coverage Findings

A major complaint of the existing radio system was poor audio quality within the Kelso and Longview areas. Prior to ADCOMM's involvement, radio system testing was performed capture known radio performance issues.

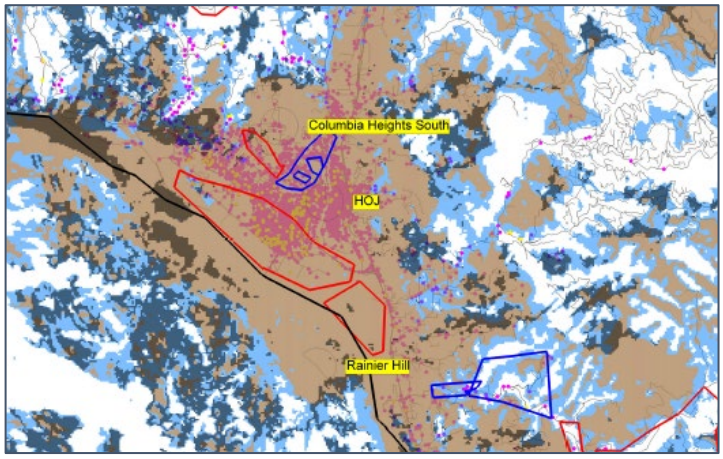


FIGURE 5: Audio quality issues (pink dots) identified during Fire Services drive test in 2016

ADCOMM's experience and assessment yield the following reasons for poor audio quality on the existing radio system. 1- VHF frequency band does not work well indoors. 2 – VHF frequency band is plagued by increasing environmental noise, especially in urban areas. 3- VHF prediction maps show a high amount of simulcast overlap in the Kelso-Longview areas due to insufficient simulcast launch delays and/or lack of proper antenna types and azimuths for desired propagation.

Over 60 existing and potential sites were assessed via Google Earth and various propagation modeling tools to determine if they could add or improve RF coverage for Cowlitz County radio users. ADCOMM narrowed down the site count to 21 for RF coverage comparisons.

Potential sites prioritized as follows:

1. Existing Cowlitz member agency radio or microwave equipment sites were reviewed first while sites owned and managed by others were considered next; and
2. Microwave backhaul connectivity to one or more sites are available or possible.

TABLE 2: Site List

NO.	SITE NAME	LATITUDE	LONGITUDE
1	Abernathy Mountain*	46 20 16.64 N	123 05 49.68 W
2	Bakers Corner	46 10 19.25 N	123 01 03.50 W
3	Beebe Rd+	46 19 45.78 N	122 57 54.95 W
4	Castle Rock	46 17 00.86 N	122 54 48.84 W
5	China Garden+	46 01 03.03 N	122 46 47.97 W
6	Coldwater*	46 18 12.68 N	122 15 53.86 W
7	Columbia Heights South*	46 10 54.78 N	122 57 02.45 W
8	Cowlitz 911 PA	46 08 55.72 N	122 57 21.18 W
9	Cresa Longview	45 54 33.34 N	122 42 01.55 W
10	Davis Peak*	45 59 36.83 N	122 35 47.45 W
11	Deer Island Tower+	45 58 30.65 N	122 54 00.50 W
12	Hall of Justice	46 08 36.00 N	122 54 57.00 W
13	Johnson Ridge	46 16 30.86 N	122 13 05.44 W
14	Landfill+	46 14 36.20 N	122 47 38.80 W
15	Mt Solo	46 09 23.12 N	123 00 12.99 W
16	Rainier Hill*	46 03 29.26 N	122 55 19.35 W
17	Signal Peak*	46 17 08.07 N	122 33 06.31 W
18	Speelyai*	45 59 05.22 N	122 23 43.82 W
19	Webster Lane+	45 57 27.30 N	122 45 11.78 W
20	Woodland CRESA+	45 54 33.34 N	122 42 1.55 W
21	Woodland WTP	45 55 16.28 N	122 44 37.18 W

* Identifies sites visited by ADCOMM personnel | + Identifies sites not currently in use

The following thumbnail maps provide a subset of the total coverage analysis performed. The six maps show comparisons between existing versus potential future coverage scenarios.

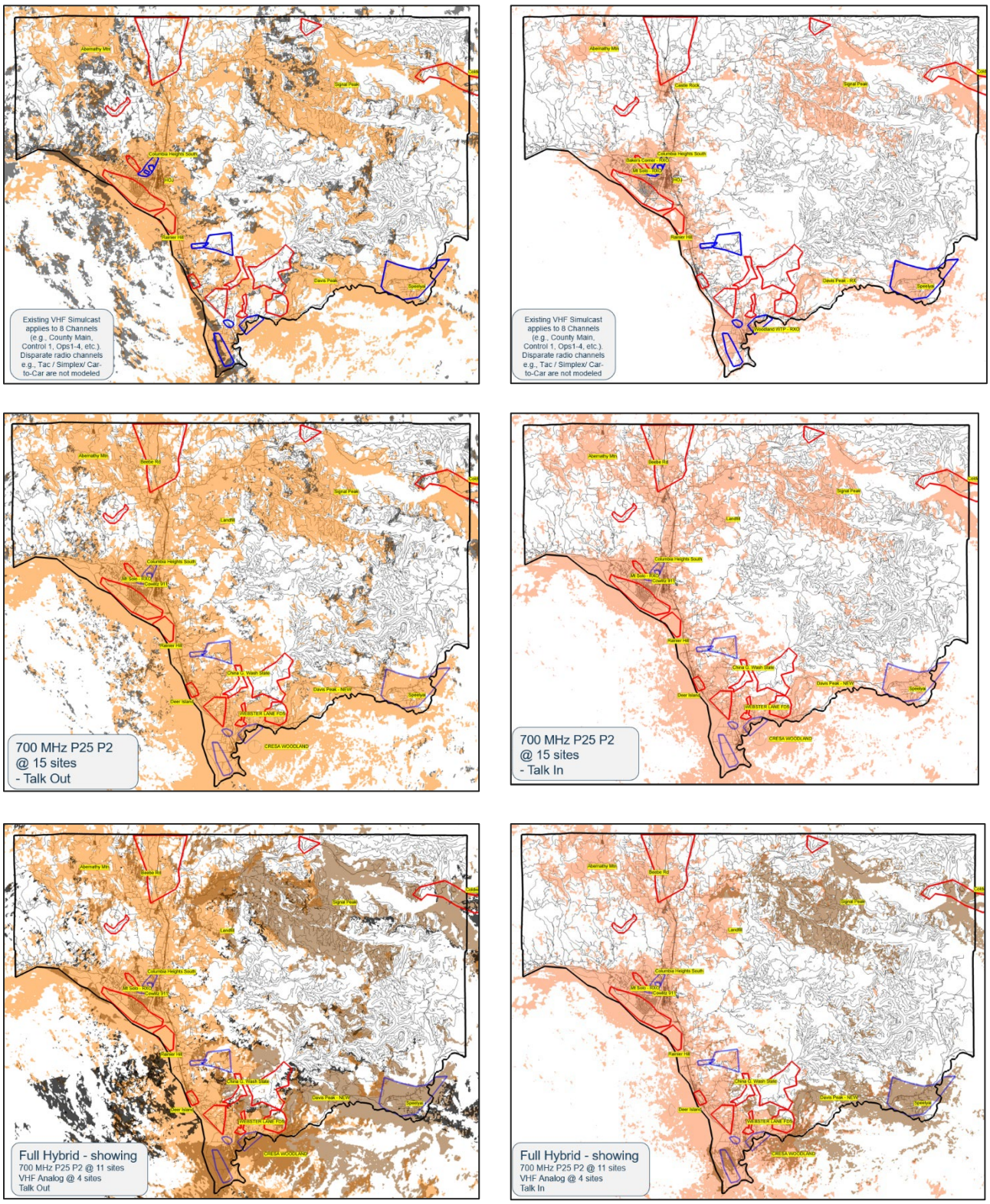


FIGURE 6: Coverage Study Comparison – Talk Out and Talk In for (Row 1) Existing VHF Analog vs (Row 2) Prospective 700MHz P25 Phase 2 versus (Row 3) Hybrid (700MHz P25P2 + VHF Analog)

All maps display portable radio coverage at delivered audio quality (DAQ) of 3.4 [TSB 88: "understandable without repetition. Some noise or distortion present"].

Talk Out maps depict the audio quality from a dispatch operator to the field user. Talk In maps depict coverage from a field user back to the dispatch operator. Talk Out maps include simulcast interference (black color) which results in audio distortion. Where possible, ADCOMM has adjusted potential new coverage for reduced simulcast interference in populated areas.

It is important to note that coverage of each channel on a conventional system acts independent of other channels meanwhile coverage on a trunked system is consistent across channels.

Some questions arose as to whether VHF or 700 MHz perform better and the pros and cons of the various system architectures. The following descriptions provide a synopsis of discussion between ADCOMM engineers and Cowlitz Fire-Law Tac committee members.

Question: Does VHF analog perform better than digital 700 MHz P25 Phase 2 in terrain limited environments? A side-by-side comparison of VHF versus 700 MHz coverage (see Figure 7) shows slight differences in coverage *in terrain-limited environments.* In mountainous areas with steep hills and valleys, coverage is limited by the terrain, with some gains and some losses due to the differences in VHF versus 700 MHz antenna patterns.

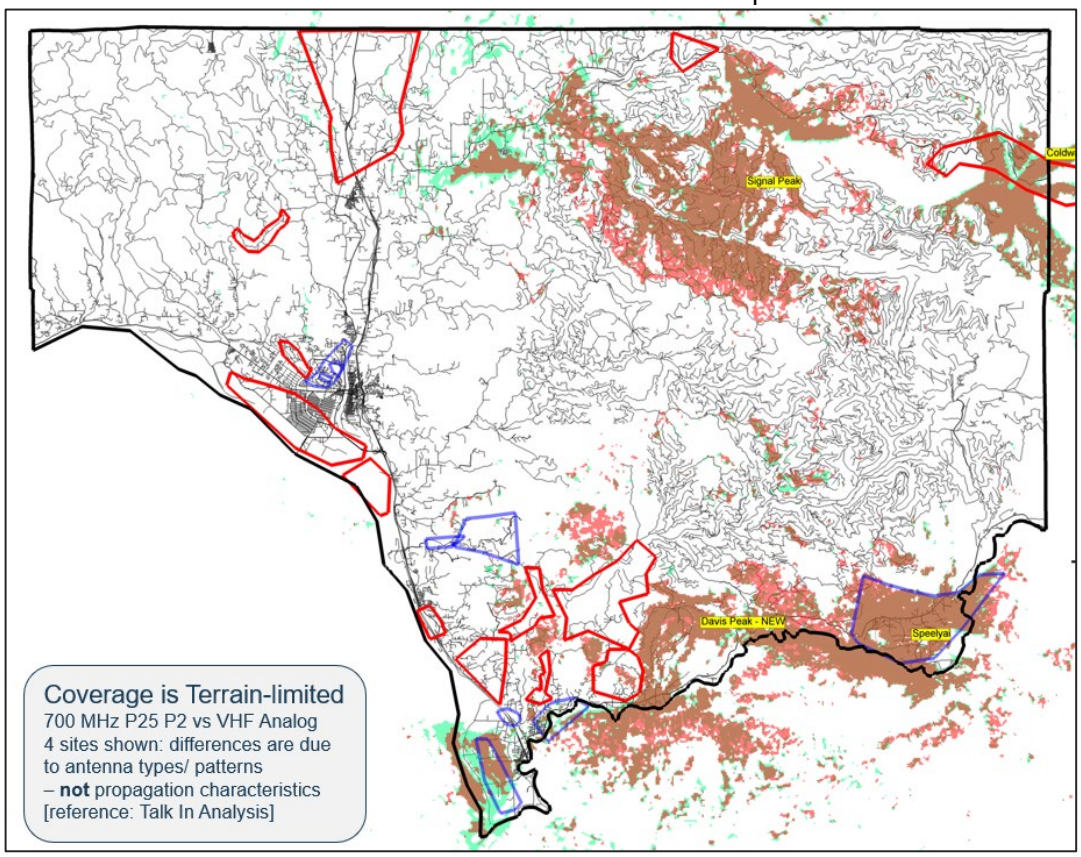


FIGURE 7: Coverage Comparison – VHF Analog (red) versus 700 MHz P25 Phase 2 (green) versus Both (brown) in Terrain-Limited Environments

Question: Does VHF analog perform better than digital 700 MHz P25 Phase 2 overall? A side-by-side comparison of VHF analog versus 700 MHz P25 Phase 2 (digital) coverage is shown using a representative 15 sites. Figure 8 models the existing 8-site transmit/ 12-site receive VHF analog system. Figure 9 models the VHF analog with a total of 15 transmit-receive sites. Coverage is improved with the additional site. The VHF analog design has been modified to reduce simulcast interference by applying timing launch delays and appropriate antenna patterns. Figure 9 is compared against Figure 10 to demonstrate the similarity in coverage between the improved VHF analog coverage and 700 MHz P25 Phase 2. Less simulcast interference is produced in the 700 MHz band.

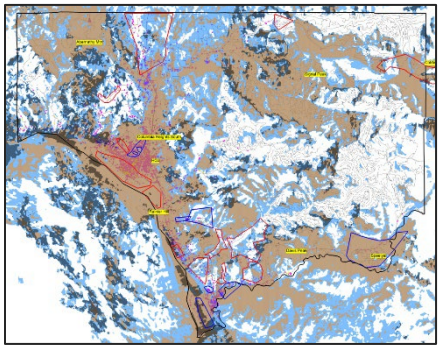


FIGURE 8: Existing 8-Site Talk Out VHF Analog

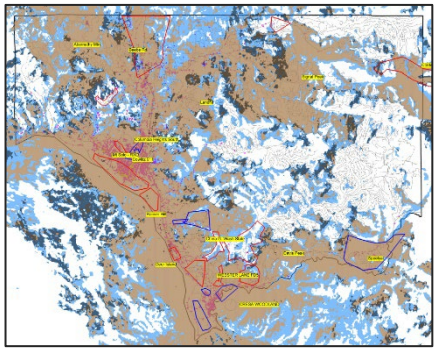


FIGURE 9: Potential 15-Site Talk Out VHF Analog

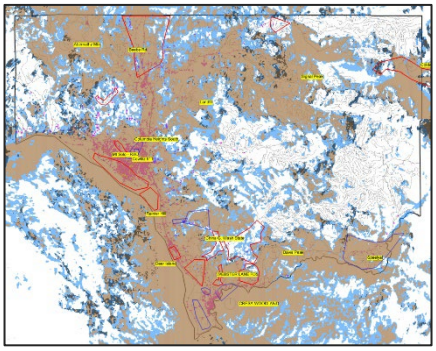


FIGURE 10: Potential 15-Site Talk Out 700MHz P25 P2

Question: Why not include Abernathy in the VHF portion of the Hybrid design? VHF travels far over areas that are NOT terrain limited therefore can easily interfere with any sites within its line-of-site. For this reason, ADCOMM contained the Hybrid VHF design to just four sites.

Adding Abernathy (Figure 12) as a 5th site creates simulcast interference across the region due to its ability to "see" Signal Peak. In contrast (Figure 13), 700 MHz does not travel as far, therefore its propagation can more easily be contained, resulting in significantly less potential simulcast interference.

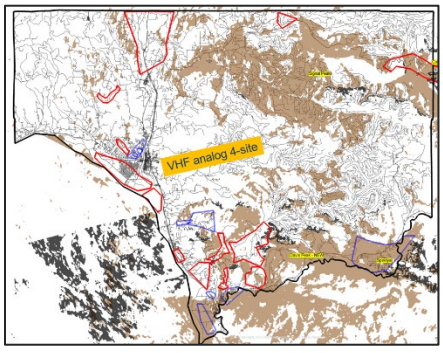


FIGURE 11: 4-Site Talk Out VHF Analog

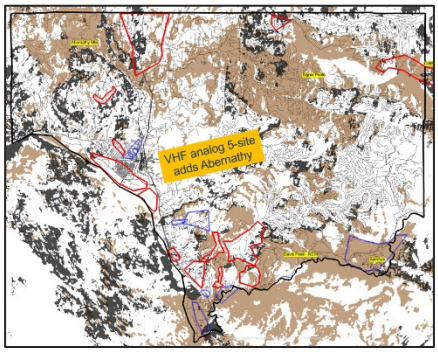


FIGURE 12: 5-Site Talk Out VHF Analog (adds Abernathy)

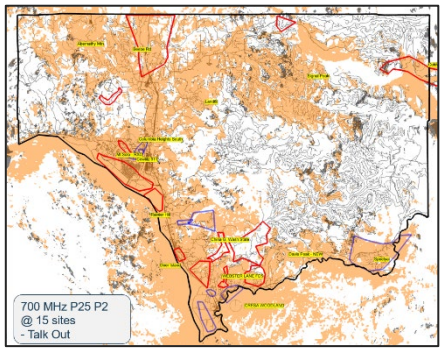


FIGURE 13: 15-Site Talk Out 700MHz P25 Phase 2

Question: What are the operational differences between VHF analog conventional versus 700 MHz P25 Phase 2 trunked radio system architecture? Conventional-mode radio systems are geographically based, whereas trunked-mode radio systems are operational-based systems. Conventional radio systems allocate one user group to one channel (i.e., one-to-one), whereas Trunked radio systems apply a pool of channels (i.e., n + 1) to support user operations. Trunked radio system employee a computerized controller to assign what channel resource should be allocated to which radio user group. In contrast, a specific site-based channel resource is always assigned to a particular user group and location.

What does trunking mean for the radio user? Trunked systems "follow" the radio user, much like a cellular telephone is assigned to person. Regardless of where that user is physically located, the radio system knows which "channel" the user has selected, and automatically assigns a nearby channel resource to support their communications. Due to the efficiency of a trunked radio system, more user groups can be assigned to a reduced number of channels. For example, a five-channel conventional system can only accommodate 5 user groups as compared to 5-channel trunked system which can easily handle 20 or more radio user groups (talkgroups).

3.3 Paging System Findings

Cowlitz Fire and EMS services employ analog two-tone paging over the existing VHF conventional radio system. The tones are sent across the Fire dispatch channel, one station at a time. Once all tones have been sent, then dispatch operators are able to talk on the channel to inform responding units of the incident type and location. This operation is time consuming and prone to missed audio. All communications on the Fire dispatch channel must halt until tones are complete. Digital paging allows tones to be embedded into the audio stream allowing audio communications to continue while tone data is sent. Receivers decode only the tone(s) intended for their device. Simulcast interference from the existing VHF analog two-tone paging system (Figure 13) can be cleared up by applying a digital paging format, e.g., POCSAG (Figure 14). Additionally, paging can be embedded within a P25 Phase 2 radio system. P25 Phase 2 paging has the added advantage of being "built into" voice radio systems. Meaning, no additional infrastructure hardware (base stations, antennas, transmit filters, etc.). is necessary to deploy paging as it can be integrated into the same architecture as the voice radio system.

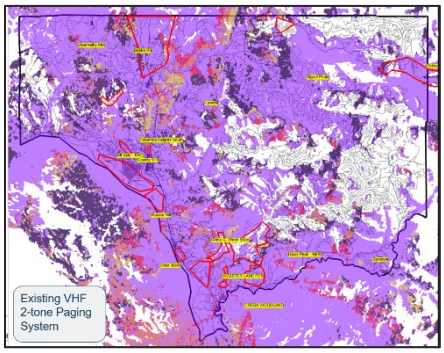


FIGURE 14: Existing VHF Two-Tone Paging System

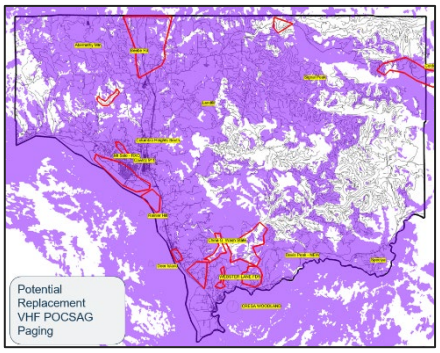


FIGURE 15: Prospective VHF POCSAG Digital Paging System

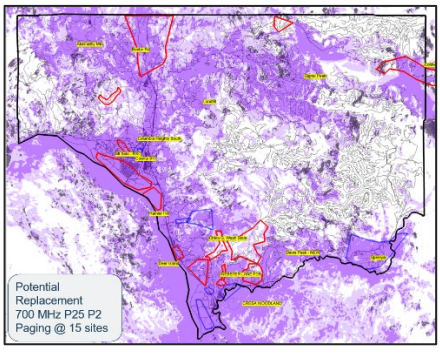
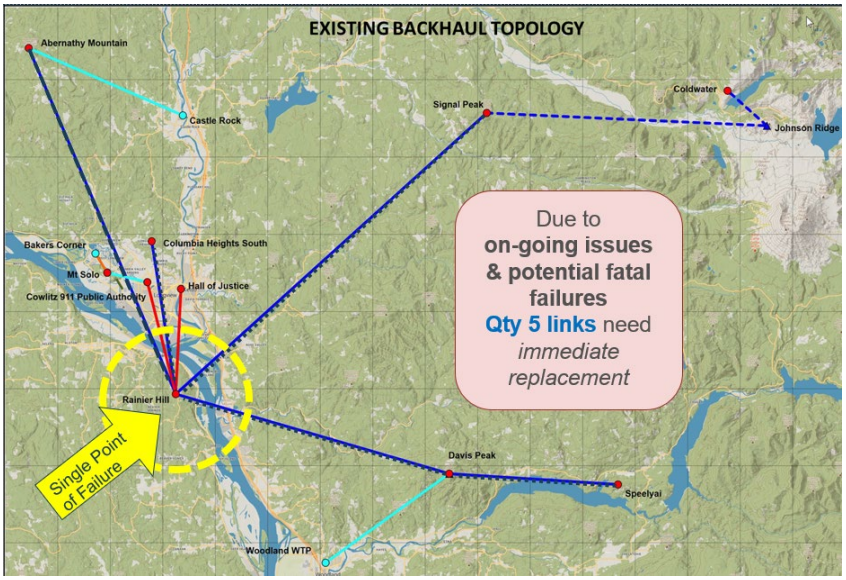


FIGURE 16: Prospective 700 MHz P25 Phase 2 Digital Paging System

3.4 Backhaul Transport Network Findings

Existing System. The existing network topology has experienced numerous outages. Over half of the existing link equipment (MDR8000) is too old; spare parts are no longer available. The existing network topology is hub-and-spoke design, for which -Rainier Hill is a potential single point of failure. A significant outage, e.g., site power failure, would take down the entire radio system.



The existing analog radio system requires dedicated timed synchronization using aged circuitry that is no longer manufactured whereby limited parts exist on the secondary market. Therefore, the current network topology must stay in place until a suitable IP-based radio system can be deployed.

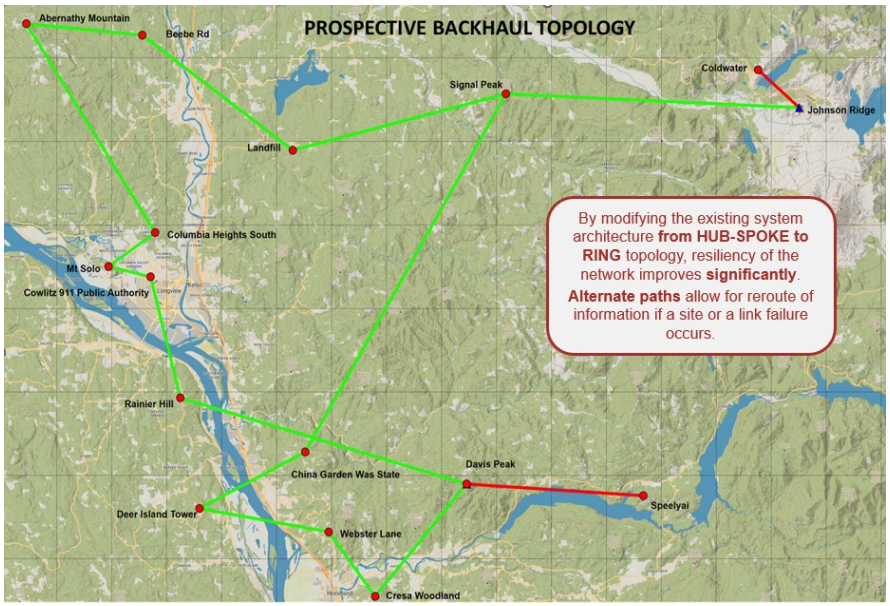
FIGURE 17: Existing Backhaul Network Map

TABLE 3: Links – Existing Network

ID NO.	SITE A	SITE B	EQUIPMENT	EXPECTED MODIFICATIONS
1	Hall of Justice	Rainier Hill	PTP820*	Future Reuse
2	Davis Peak	Woodland WTP	PTP670	Future Replacement
3	Signal Peak	Johnson Ridge	MDR8000	Pending Replacement
4	Rainier Hill	Davis Peak	MDR8000+	Replace Now
5	Rainier Hill	Abernathy Mountain	MDR8000+	Replace Now
6	Abernathy Mountain	Castle Rock	PTP670	Future Replacement
7	Cowlitz 911 PA	Mt Solo	PTP670	Future Replacement
8	Rainier Hill	Signal Peak	MDR8000+	Replace Now
9	Bakers Corner	Mt Solo	PTP820*	Future Reuse
10	Rainier Hill	Columbia Heights South	MDR8000+	Replace Now
11	Speelyai	Davis Peak	MDR8000+	Replace Now
12	Johnson Ridge	Coldwater	MDR8000	Pending Replacement
13	Rainier Hill	Cowlitz 911 PA	PTP820*	Future Reuse

* Identifies equipment that may be reused in the future (see purple text).
+ Identifies equipment must be replaced as soon as possible (see red text).

Future System. Modifying the existing site links for a more resilient architecture resulted in a potential "future network" design. The backhaul network architecture is based on 15 sites for a total of 16 links in a ring topology with minimal spur links. A ring topology allows for redirection of data in the event of a failure of site or link. With this updated design, the system-wide single point failure is removed. For spur links, redundant hot-standby equipment is recommended.



Of the 16 links, two links may be repurposed from the existing equipment (PTP820) and five links from the interim equipment upgrade may be repurposed, resulting in nine new links to be procured. Note: microwave links are frequency specific, therefore each link will need to be evaluated for future reuse.

FIGURE 18: Future Backhaul Network Map

TABLE 4: Links – Potential Future Network

ID NO.	SITE A	SITE B	EQUIPMENT	COMMENTS
1	Signal Peak	Johnson Ridge	Microwave tbd	New or apply interim
2	Davis Peak	Rainier Hill	Microwave tbd	New or apply interim
3	Signal Peak	Landfill	Microwave tbd	New or apply interim
4	Columbia Heights South	Abernathy Mountain	Microwave tbd	New or apply interim
5	Beebe Rd	Abernathy Mountain	Microwave tbd	New or apply interim
6	Columbia Heights South	Mt Solo	Microwave tbd	New or apply interim
7	Cowlitz 911 PA	Mt Solo	Microwave tbd	New or apply interim
8	Deer Island Tower	China Garden	Microwave tbd	New or apply interim
9	Webster Lane	Cresa Longview	Microwave tbd	New or apply interim
10	Beebe Rd	Landfill	Microwave tbd	New or apply interim
11	Deer Island Tower	Webster Lane	Microwave tbd	New or apply interim
12	Johnson Ridge	Coldwater	PTP820	Existing / Reuse
13	Davis Peak	Speelyai	PTP820	Existing / Reuse
14	Davis Peak	Woodland	Microwave tbd	New or apply interim
15	Signal Peak	China Garden	Microwave tbd	New or apply interim
16	Rainier Hill	Cowlitz 911 PA	Microwave tbd	New or apply interim

The selected microwave vendor will need to assess the interim and final backhaul network plan in order to identify the best deployment strategy for reusing interim links.

ADCOMM recommends reuse of PTP820 equipment at spur sites (locations not on a ring topology) but does not recommend reuse of existing PTP670 equipment. PTP670 equipment is not highly reliable, and therefore not considered public safety grade. Table 5 provides a side-by-site comparison of the existing microwave equipment.

TABLE 5: Evaluation of Existing Microwave Equipment

PARAMETER	PTP670	PTP820G
Environment	Outdoor	All-Indoor
Protection	1+0 NSB	1+1 HSB
Type	Wireless Ethernet bridge	Licensed
Duplex	TDD	Full
Antenna	Integrated, N-female	N-female
Frequency Bands	4.9, 5.8 GHz	6, 11 GHz
Spectrum	Spread Spectrum	Fixed Channel
Aggregate Throughput (no compression)	451 MBPS	347 MBPS
Channel Sizes	5, 10, 15, 20, 30, 40, and 45 MHz	10, 20, 30, and 40 MHz
NLOS technology	Yes	No
Encryption	FIPS-197 128/256-bit AES	FIPS-140-2 * AES 256-bit
Ingress Protection	IP66/67	IP56
Maximum Transmit Power	27 dBm	35 dBm
Adaptive Modulation	Fast Preemptive Adaptive Modulation featuring 13 modulation / FEC coding levels ranging from BPSK to 256 QAM dual payload MIMO	QPSK to 2048 QAM w/ACM
Packet Classification	Layer 2 & 3 IEEE 802.1p, MPLS, Ethernet priority	VLAN ID, p-bits, IPv4, DSCP, IPv6 TC, MPLS EXP
T1/E1 TDM Support	8 x T1/E1 TDM (Network Indoor Unit (NIDU)) G.823-compliant	16 x E1/T1 (Optional MDR 69-pin)
QoS	Extensive, up to 8 Queues	8 priority queues
Latency, one direction	1 - 3 ms	
High-Capacity Multi-Point	Up to 8 Nodes	N/A, PTP Only

3.5 Site Survey Findings

ADCOMM performed a limited number of site surveys.

Additional site surveys are needed to ensure site viability and to gather data with respect to radio and microwave antenna mounting structure details and antenna location information on each tower. Data collected from the site surveys ensure the most accurate coverage and path modeling information.

The sites visited by ADCOMM personnel include:

1. Abernathy Mountain
2. Coldwater
3. Columbia Heights South
4. Davis Peak
5. Rainier Hill
6. Signal Peak
7. Speelyai

ADCOMM developed site reports for each location visited. Reports include access information, shelter and tower type, primary and backup power systems, existing communications system equipment, and space availability for additional equipment, and any findings or recommendations for improvements, i.e., grounding, DC power batter system replacements, etc. Site reports are provided in Appendix B.

3.6 Other Findings

Costs. Multiple agencies identified that they have limited funds and technical personnel to devote to the costs of procuring and maintaining equipment; a replacement radio system needs to be as cost effective as possible. Consolidation of equipment and maintenance services would streamline operations and ultimately reduce costs.

Sharing Opportunities. ADCOMM assessed adjacent agency radio systems to identify coverage overlaps and potential sites to use or share, for improved primary radio system coverage. There were no other radio systems with significant overlapping coverage footprint in the area other than Clark County to the south. There may be an opportunity to share sites and coverage with Columbia County as their metropolitan areas are geographically close although on opposite sides of the Columbia River. Port of Longview, Oregon Department of Transportation, and Maritime Fire and Safety Rescue have suitable tower sites for equipment collocation. In addition, there aren't any significant sharing opportunities for back haul transport networks.

Maintenance and Management. Currently, each agency is responsible for the purchase and maintenance of their own radio infrastructure and subscriber radios and associated FCC licenses. Agencies commented on the need for a "one-stop-maintenance-shop" where they could combine purchasing and maintenance of radio subscribers and systems.

"Future-proof" wherever possible. New Infrastructure equipment and subscriber devices should be capable of working on old and new technology systems and allow for continued

interoperability with adjacent agencies. Equipment purchased today should be viable to use for the next 5 to 10 years.

Off-System Operations. Personnel commented on the continued need to ensure operations in remote areas not connected to the main radio system. Optional or augmented system solutions should be identified to continue support communications when the primary radio system is not available.

4. SOLUTION OPTIONS, RECOMMENDATION & DECISION

ADCOMM identified and presented four solutions that could meet stakeholder needs. Each solution had pros and cons to consider. The most important aspects included the need for reliable service with improved coverage and audio quality, with operational ease of use and interoperability with adjacent agencies as significant secondary factors.

The four solutions (and their configuration) included:

A. VHF Analog Conventional (Countywide 15s 8ch | Kelso-Longview 5s 2ch)
B. VHF P25 Phase 1 Conventional (Countywide 15s 8ch | Kelso-Longview 5s 2ch)
C. 700 MHz P25 Phase 2 Trunked (Countywide 15s 5ch)
D. Hybrid 700/ VHF Analog Conventional & P25 Phase 2 Trunked (700 11s 5ch | VHF 4s 4ch)

Each solution included 15 sites configured with 2, 5, or 8 channels.

- Solution A consists of VHF analog conventional system, with two major subsystems:
  - Countywide radio system of 15 sites configured for 8 channels, and
  - Kelso-Longview area radio system consisting of 5 sites with 2 channels.
- Solution B consists of VHF P25 conventional system, with two major subsystems:
  - Countywide radio system of 15 sites configured for 8 channels, and
  - Kelso-Longview area radio system consisting of 8 sites with 2 channels.
- Solution C consists of a single 700 MHz P25 Phase 2 Trunked system:
  - Countywide radio system of 15 sites configured for 5 channels.
- Solution D consists of Hybrid 700/ VHF Analog Conventional & P25 Phase 2
  - An urban area core radio system of 11 sites configured for 5 channels, and
  - A rural area radio system consisting of 4 sites with two channels.

Note: site and channel counts were estimated based expected coverage needs and existing channel allocations.

A Fire-Law Tac Radio Group was formed to advise the Cowlitz 911 Public Authority Board on their recommendation for a radio system given all available information. ADCOMM lead a stakeholder

engagement workshop to provide technical data about the various system configurations and solution options. Additionally, ADCOMM led a coverage workshop to enable the stakeholders a chance to review detailed coverage for VHF analog, VHF P25, and 700 MHz P25 Phase 2 systems.

4.1 Voice Radio Technology Operational Impacts

Analysis of the various solution options provides the following operational impacts:

A. **VHF Analog Conventional.** No operational improvement. Continued coverage holes, no in-building communications, poor audio in overlap areas.

B. **VHF P25 Phase 1 Conventional.** No significant operational improvement – potential loss of interoperability with analog VHF partners. Improved Audio Quality; no improved in-building coverage.

C. **700MHz P25 Phase 2 Trunked.** Significant operational improvements; improved audio quality; improved in-building coverage; sufficient capacity to support countywide/ regional TAC and shared OPS channels, as well as other county agencies, as needed or desired; able to integrate conventional/ mutual aid channels with trunked talkgroups.

D. **Hybrid of A and C.** Same as Solution C in Urban areas; must "change channels" and lose digital features when operating in rural areas.

4.2 Paging Technology Operational Impacts

When analyzing paging technologies, there are three potential options:

E. **VHF Analog Conventional.** No operational improvement. Continued coverage holes, no or limited in-building service, poor audio in overlap areas. Must keep the existing single two-tone-channel, multi-site VHF analog radio system on-the-air and maintained in the short-term or replace with newer IP-connected base stations and antenna systems in the long term. Existing paging devices can continue to be reused.

F. **VHF POCSAG Conventional.** Improved coverage and operations – no waiting for tones on top of dispatch communications, no or limited in-building service, improved reliability in overlap areas. Must build out a new single-channel, multi-site VHF POCSAG-channel IP-connected base stations and antenna systems. Existing paging devices must be replaced.

G. **700MHz P25 Phase 2 Trunked (same as Option C).** Improved coverage and operations – no waiting for tones on top of dispatch communications; improved reliability in overlap areas; improved in-building coverage. No need to build and maintain a separate system – paging system can "ride on top of" the voice radio system.

4.3 Cost Assessment

Costs were estimated based on radio infrastructure equipment as the primary differentiator; as all other cost considerations (site systems, transport network, dispatch console, etc.) would be similar regardless of solution.

TABLE 6: Links – Potential Future Network

ID NO.	Solution A	Solution B	Solution C	Solution D
Solution Description	VHF Analog Conventional: CW 15s8ch; KL 5s2ch;	VHF P25 P1 Conv.: CW 15s8ch; KL 5s2ch;	700 P25P2 Trunked: CW 15s5ch;	Hybrid: 700 P25P2 Trunked 11s5ch; VHF Analog Conv. 4s5ch
User Transition	Difficult	Difficult	Easy	Easy-Moderate
Operational Improvements	Minimal	Good	Excellent	Good
Total Infrastructure Cost	**$9,400,000**	**$10,730,000**	**$9,200,000**	**$8,900,000**
Site Systems	*tbd*	*tbd*	*tbd*	*tbd*
Site Equipment	$1,005,000	$1,005,000	$1,005,000	$1,005,000
Transport Network	*tbd*	*tbd*	*tbd*	*tbd*
Dispatch Console	*tbd*	*tbd*	*tbd*	*tbd*
Radio System Infrastructure	$8,395,000	$9,717,500	$8,165,000	$7,889,000

Cost considerations include:

- Site improvements will be needed regardless of system type therefore were not included in initial cost estimates. Improvements may include: tower/ shelter enhancements, DC power system updates, backup power/ battery upgrades, etc. Detailed site improvements have not yet been determined.
- Trunked architecture has high up-front server costs than conventional architecture.
- Trunked architecture enables lower on-going deployment costs as it is easier add sites and channels without impacting operations.
- 700 MHz antennas, filters, and base station equipment is overall less expensive and more readily available than VHF equipment.
- VHF has more expensive RF antennas and filter infrastructure equipment due to the unique frequency pairing; additional VHF requires larger antennas and filters due to its frequency requirements - more space may result in higher or additional lease fees.
- A countywide trunked radio system requires less overall number of base stations than a comparable conventional radio system.
- Single band subscriber radios are least expensive whereas multiband radios costs are SIGNIFICANTLY more expensive but enable interoperability for multiple types of systems.

- Subscriber costs were estimated at $5M total for all agencies (estimate 1000 units at $4-5k per unit) to provide a comparison between use of existing VHF analog equipment versus replacement with new equipment.

Overall, the cost differential between infrastructure options A, B, C, and D were within 20% of one another. The difference between Solution Options' infrastructure cost is not great enough to make a decision based on costs, therefore the decision should be based on coverage and operational improvements.

4.4 Decision

The Law-Fire Tac committee agreed to **Solution C: 700MHz P25 Phase 2 Trunked** as their future system architecture.

This solution provides the simplest user operation, the highest capacity for region-wide talkgroups, a least cost infrastructure solution when factoring in Paging infrastructure, and the ability to take on outside subscribers to help reduce on-going fees.

#	Description	System Configuration	Cost Estimate*	Operational Improvements
A	VHF Analog Conv.	8ch 15site Countywide + 2ch 5site Kelso-Longview	Infra.$ 9.4M + Subs. $0	No Change; continued coverage holes, no in-building communications, poor audio in overlap areas
B	VHF P25 P1 Conv.	8ch 15site Countywide + 2ch 5site Kelso-Longview	Infra.$10.7M + Subs. $0	No operational changes; Improved Audio Quality; no improved in-building coverage
C ✓	700MHz P25 P2 Trunked	8ch 15site Countywide	Infra.$ 9.2M + Subs. $5M	Significant operational improvements; improved audio quality; improved in-building coverage; capacity to support countywide/ regional TAC and Shared Ops channels; able to integrate conventional/ mutual aid channels with trunked talkgroups
D	Hybrid: A + C	700MHz 5ch 11site Urban + VHF 5ch 4site Rural	Infra.$ 8.9M + Subs. $5M	Same as C in Urban areas; must "change channels" and lose digital features when operating in rural areas

*Costs do NOT include Site Improvements nor Backhaul Network

Figure 19 Solution Options and Decision

A 700MHz P25 Phase 2 Trunked Radio system solution requires a higher level of maintenance and management than analog conventional radio systems, therefore one-to-two persons will need to be trained to manage the radio network and its subscriber devices.

5. LONG-TERM PLAN

The long-term radio system plan is centered around deploying a voice radio and paging system that improves operations for its user base.

To meet this need, improvements to the radio system, backhaul network, associated supporting systems (microwave, IP network, etc.) and enabling systems (training, subscriber fleet management, alarms and monitoring systems, etc.) are necessary.

The following journey map describes the process necessary to define and deploy a radio communications system. Parallel processes include site definition and make ready upgrades (green boxes) and FCC licensing (blue boxes) of frequencies based on defined sites.

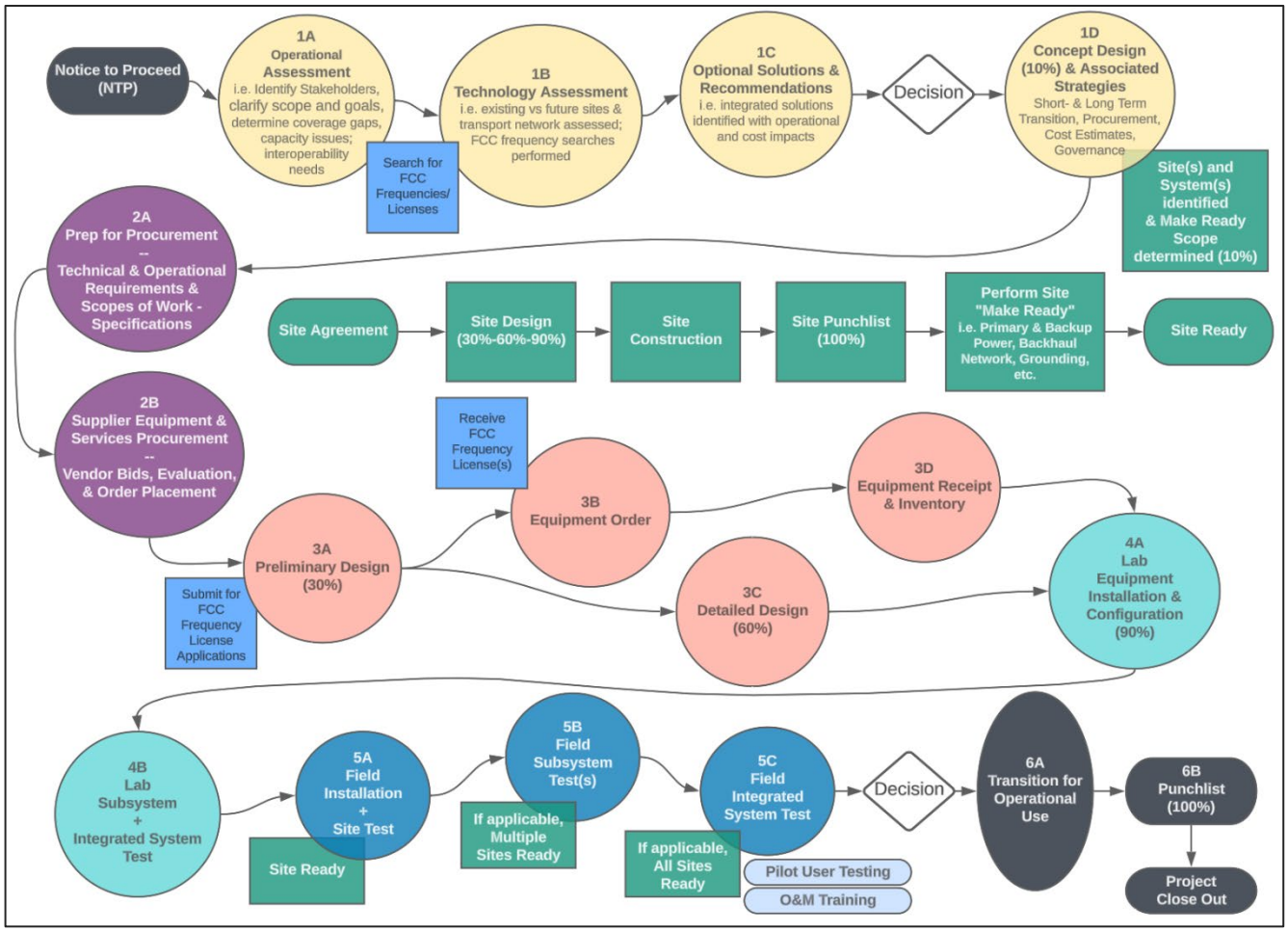


FIGURE 20: Long Term Plan – Radio System Implementation Journey Map

Based on the decision to move forward with Solution C: 700 MHz P25 Phase 2 radio system, the current existing VHF analog system will stay in place and in use until the new system is built and tested. Interim improvements will be needed to ensure longevity of the existing system while the new system is defined, designed, procured, and deployed. The expected timeline for the replacement radio system is 3-5 years.

5.1 Systems and Scope

The following systems and scopes of work are necessary to move the project forward with a long-term plan.

5.1.1 Radio System

The radio system project's goals and objectives are clear based on the work performed as part of this stakeholder needs and systems assessment. The next body of work is to define a Radio System Concept Design. A Concept Design is "10% level design" for the project. It establishes a project's system architecture going forward and the technical and operational requirements that must be met.

It helps to ensure that the design is coordinated with the other disciplines and systems, such as radio equipment vendors, IT/OT network engineers, site architects and engineers, power engineering disciplines, general contractors, other subject matter experts (SMEs).

A well-defined Concept Design is critical for the success of a project, as it helps to minimize design errors, conflicts, and delays and ensures that the project meets the required technical, functional, and aesthetic requirements.

5.1.2 FCC Licensing

Viable, licensable public safety frequencies must be applied for and granted by the FCC prior to procuring RF equipment and turning up any radio system sites.

Specific site data must be included in the applications (i.e., site location, antenna manufacturer model, azimuth, height AGL, output power, etc.) for each radio system:

1. 7/800 MHz P25 Phase 2 Trunked Radio System
2. VHF/UHF/7/800 MHz mutual aid national interoperable repeater channels, if adding or modifying equipment or site locations.

An initial frequency search and plan must be done to confirm viable available frequencies for the radio system. Once complete, FCC license applications may be submitted. FCC licenses must be in place before radio frequency (RF) equipment can be turned up for testing and use.

5.1.3 Sites

To date, 15 sites have been identified to provide adequate countywide coverage.

Of the 15 RF sites, five (5) are not currently used by Cowlitz 911. Candidates for these sites have been identified but are not yet confirmed. Woodland WTP was initially excluded from coverage modeling due to potential site leasing issues but has now been included since continued leasing potential has become more likely. Woodland WTP requires site civil construction to add a tower ande equipment shelter.

In addition to the 15 already identified, one more site is needed provide to coverage within the Rose Valley area; this site has not yet been determined.

Further assessment and approval of all sites is needed before a total site count and final expected coverage can be determined.

Any sites new to Cowlitz 911 will need agreements in place with landowners to ensure lease fees and occupation agreements are suitable to move forward with.

TABLE 7: Proposed Site List

NO.	SITE NAME	STATUS	LATITUDE	LONGITUDE
1	Abernathy	Existing Cowlitz	46 20 16.64 N	123 05 49.68 W
2	Beebe Rd*	Brownfield	46 19 45.78 N	122 57 54.95 W
3	China Garden *	Brownfield	46 01 03.03 N	122 46 47.97 W
4	Coldwater	Existing Cowlitz	46 18 12.68 N	122 15 53.86 W
5	Columbia Heights South	Existing Cowlitz	46 10 54.78 N	122 57 02.45 W
6	Davis Peak*	Existing Cowlitz	46 08 55.72 N	122 57 21.18 W
7	Deer Island Tower*	Brownfield	45 59 36.83 N	122 35 47.45 W
8	Landfill*	Greenfield	45 58 30.65 N	122 54 00.50 W
9	Mt Solo*	Existing Cowlitz	46 14 36.20 N	122 47 38.80 W
10	Ocean Beach	Existing Cowlitz	46 09 23.12 N	123 00 12.99 W
11	Rainier Hill	Existing Cowlitz	46 03 29.26 N	122 55 19.35 W
12	Signal Peak	Existing Cowlitz	46 17 08.07 N	122 33 06.31 W
13	Speelyai	Existing Cowlitz	45 59 05.22 N	122 23 43.82 W
14	Webster Lane FD5*	Brownfield	45 57 27.30 N	122 45 11.78 W
15	Woodland WTP*	Existing Cowlitz	45 55 16.28 N	122 44 37.18 W

* Sites visits, lease agreements, and make ready scope of work needed to confirm viability

5.1.4 RF Coverage

Solution C: 700MHz P25 Phase 2 Trunked predicted coverage of the 700MHz P25 Phase 2 radio system is provided below. Coverage is based on 15 sites as identified in the proposed site list. The Rose Valley area has been identified to need coverage whereby a site has not yet been determined.

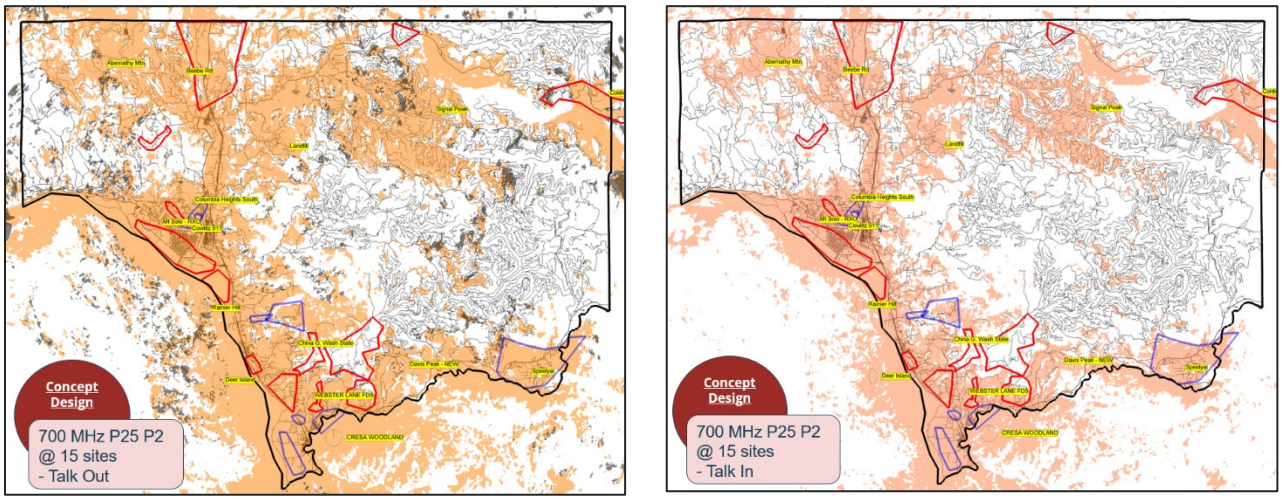


FIGURE 21: Concept Design Coverage – 700 MHz P25 Phase 2 Talk Out, Talk In, Paging

Radio system coverage is subject to change based on confirmation of available sites and available antenna locations on towers. The proposed site list and its coverage will be reviewed and approved with project stakeholders' Fire-Law Tac as part of defining the Radio System Concept Design.

5.1.5 Radio Channel Plan

A channel plan will need to be developed that matches the operational needs of the radio users.

5.1.6 Radio Dispatch Consoles

The Dispatch Radio Console will need to be capable of interfacing with the new P25 Phase 2 trunked radio system, and continue to support analog VHF radio equipment. Audio logging recorder equipment will additionally need to be updated to support audio and meta data logging.

5.1.7 Subscriber Radios

Mobile, portable, and control station radios are known as "subscriber devices." The subscriber radios and their associated accessories must be limited to those that have been tested for reliable operation on the procured P25 Phase 2 radio system.

To support the future system, agencies will need to replace or augment existing VHF portable/ mobile radios with 700 MHz P25 P2 radios. Anyone requiring VHF will need to purchase multiband radios (and/or keep secondary VHF radios)

5.1.8 Maintenance Considerations

Both infrastructure and subscriber equipment should be remotely accessible for testing, troubleshooting, and configuration to allow for a small maintenance team the ability to manage a large, wide-area system.

5.1.9 Pagers

The future paging system will be integrated into the voice radio system. Therefore, new pagers will be needed to support the replacement radio system. Pagers should be purchased close to when the radio system will be ready for deployment. In the meantime, existing pagers and paging equipment will continue to be used.

5.1.10 Fire Station Alert

The fire station alerting system will need to follow the implementation of the new voice radio system. New 700 MHz P25 P2 radios will replace existing fire station alerting system radios. New radios will need to be assessed and detailed confirmed to ensure proper integration.

5.1.11 Coverage Augmentation Solution Options

Coverage augmentation solutions will need to be addressed. Some options include:

Portable Repeaters. Repeaters can be employed in areas where tactical on-scene communications are needed where coverage is not sufficient from the fixed infrastructure sites using trailers or Command Vehicles, or suitcase mounted units.

Vehicular Area Network (VAN) Extenders. Vehicles that have mobile coverage can extend coverage to portables who do not; coverage extension is supported by: simplex channels to portable radios or through speaker mics via WiFI or Bluetooth technology.

Other options for coverage extension include use of commercial networks, i.e., **Satellite to WiFi/ CBRS/ LTE** e.g., Starlink. Or **Cellular Services** using data hot spots or Radio over IP for anywhere access to radio talk groups, e.g., ESChat.

5.2 Estimated Costs

Radio equipment and services costs for 15 radio system sites are estimated based on recent pricing from similar projects and radio vendor request for information data.

TABLE 8: COST ESTIMATE

SYSTEM	DESCRIPTION	CAPITAL COST
Radio System Infrastructure	15 Sites	$9.2 M
Backhaul Network	12 Microwave New Links	$1.6 M
Subscriber Units	1,000 units	$5 M
Site Systems	Towers, Shelters, Grounding, etc.	Not yet identified
Services	Engineering, Project Management, Design	$2-3 M
Total Capital Costs		**$20-25 M**

Costs have not yet been estimated for site improvements or builds; engineered site designs, licensing, and permitting are not included.

5.3 Procurement Strategy

Procurements may be sole sourced, purchased via direct contact, or competitively bid.

ADCOMM recommends using a competitive procurement strategy either through a traditional RFP process that follows set procedures or via radio vendor 'pre-bid' contract pricing based on specifications that would have been used for an RFP.

- Responses to a competitive bid process are likely to include incentives that favor the buyer.

ADCOMM further recommends to "keep procurements simple". Industry terminology of "turn-key" systems aren't viable. Each supplier has its core business; by adding work that is outside of that supplier core business adds overhead cost and potential risk to the project delivery.

- Radio vendors supply radio equipment, they should not be responsible for civil engineering upgrades to radio equipment sites.

ADCOMM will continue to support Cowlitz 911 PA, as an owner's engineer. In this role, ADCOMM develops site design drawings and scopes of work for adds and changes to existing owned or leased, or new greenfield sites to support radio system and related equipment. ADCOMM will provide procurement support for the microwave and radio systems, and vendor oversight as needed for equipment installation and test, subscriber programming and/or installation, and system commissioning and acceptance of the radio system.

Procurements will follow the project timing, e.g., site improvements before backhaul improvements before IT/OT network improvements, before radio system deployments.

5.4 Transition Strategy

Since the replacement radio system will be a brand-new radio system operating on different frequencies, the new radio system can be installed and tested with the existing radio system in place.

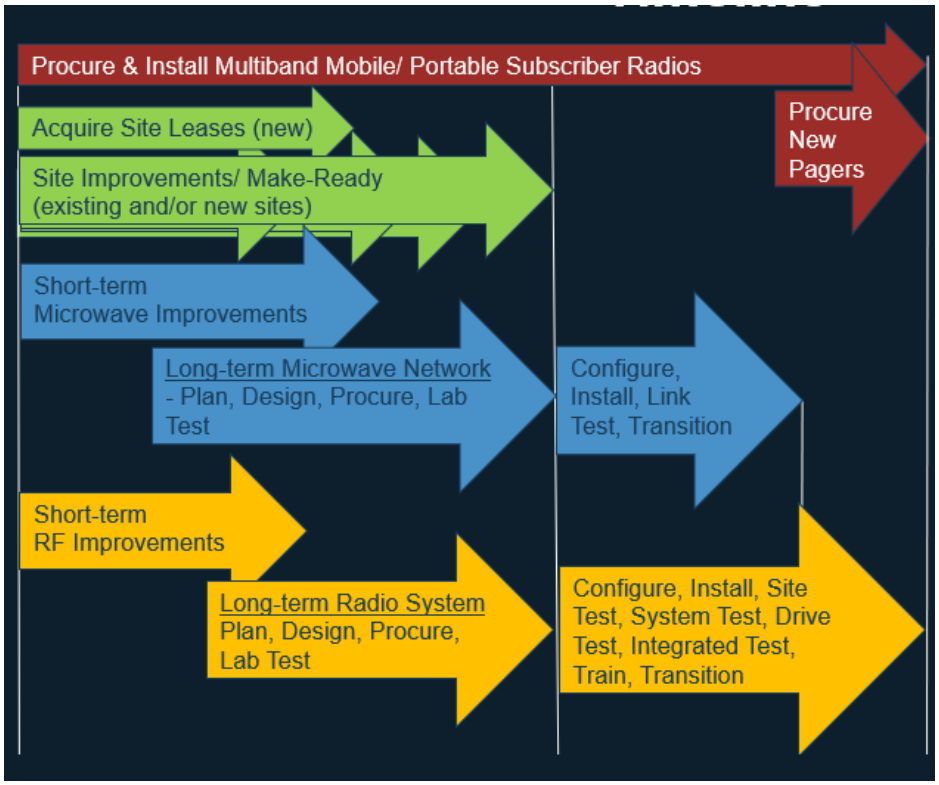


FIGURE 22: Transition Timeline

In-building coverage should be tested in buildings of concern. These buildings should be identified early in the system procurement process to ensure that they are considered by potential vendors. Once system sites are providing coverage in the target building's area, users could visit buildings and test indoor coverage with portable radios issued for that purpose.

Radio system users would be transitioned across to the new system from the old system, with the ability to "fall back" to the old radio system during a pre-set burn-in phase (typically 30 to 45 days).

Space constraints are the primary driver that affects transitions.

- Space inside existing radio site shelters will have to be identified to ensure that there is room for both new and old systems at the radio sites.
- Likewise, space for an additional mobile radio may be necessary inside vehicles. Mobile subscriber units may be installed site by site with existing radios prior to system transition. If space is not available, then a mobile installation plan will need to be coordinated to manage the installation process. Better yet, multiband radios would enable use on analog VHF of the existing radio system, and future 700 MHz P25 Phase 2 trunked operation.

Radio dispatch console updates (if determined to be needed) would be performed during system testing and before transition to the new system. It is expected that the existing radio dispatch console or any new system will be able to communicate directly between the old and new systems, so long as control station and other system resources are available for integration.

6. SHORT-TERM IMPROVEMENTS

6.1 Short Term: Backhaul Network Improvements

One-for-one replacements of five (5) links should be performed immediately. Two additional links should be replaced when access to the Coldwater site is possible.

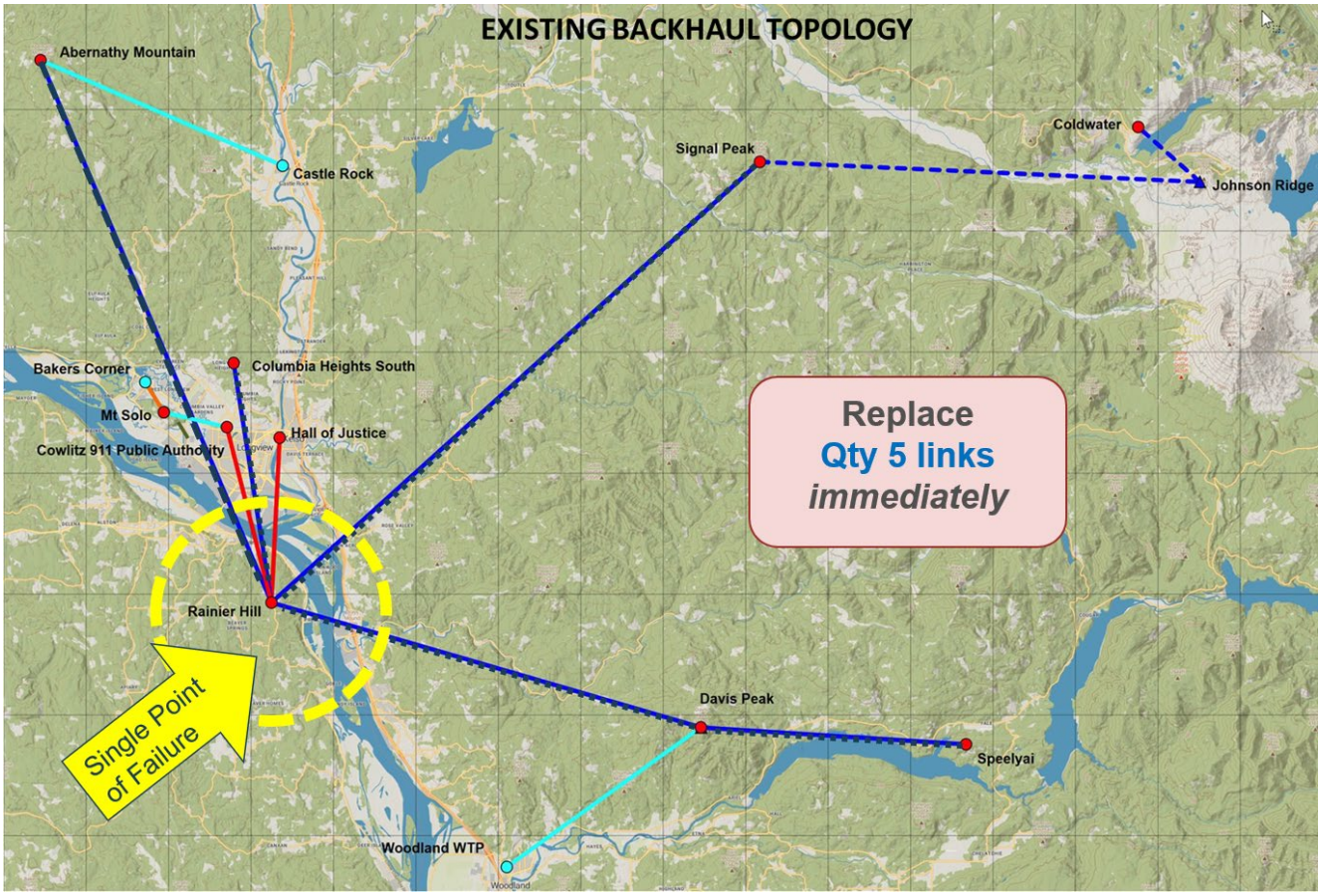


Figure 23: Near Term – Replace Qty 5 Microwave Links

TABLE 9: Links – Existing Equipment Requires Urgent Replacement

ID NO.	SITE A	SITE B	EQUIPMENT	EXPECTED MODIFICATIONS
1	Rainier Hill	Davis Peak	MDR8000	Replace Now
2	Rainier Hill	Abernathy Mountain	MDR8000	Replace Now
3	Rainier Hill	Columbia Heights South	MDR8000	Replace Now
4	Speelyai	Davis Peak	MDR8000	Replace Now
5	Rainier Hill	Signal Peak	MDR8000	Replace Now
6	Johnson Ridge	Coldwater	MDR8000	Pending Replacement
7	Signal Peak	Johnson Ridge	MDR8000	Pending Replacement

6.2 Short Term: Legacy VHF – RF Coverage Simulcast Interference Improvements

Modifications at four site locations would result in reduced simulcast interference and improved audio quality for the Longview and Kelso areas. Modifications are needed at: Abernathy, Davis, Rainier Hill, and Speelyai.

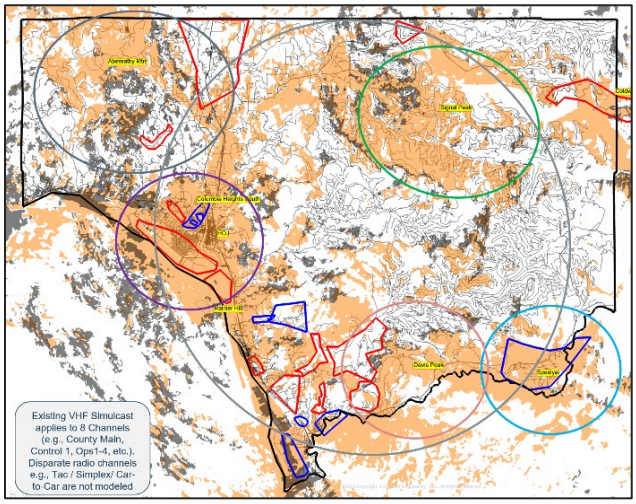


FIGURE 24: Existing VHF Simulcast System Interference (shown in black) significantly impacts audio quality in Longview-Kelso areas

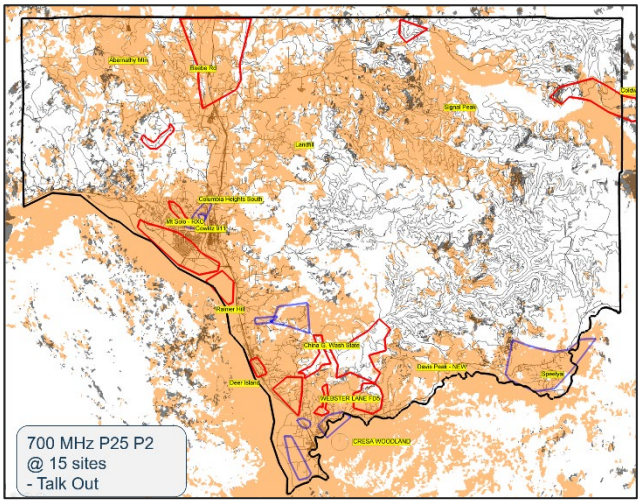


FIGURE 25: Existing VHF Simulcast System Interference Areas reduced with Antenna Changes and Timing Modifications at four (4) sites

The following engineering services, site modifications, and system testing will need to be performed to reap audio quality improvements.

Engineering & System Testing

1. Verify existing performance
    - Drive test existing system before performing any modifications
2. Perform site surveys & site measurements
    - To document location details of existing antennas needing to be replaced and/or reoriented
    - To document operating condition of existing antennas and transmission lines where antennas need to be replaced and/or reoriented
    - To verify as-built simulcast timing parameters
3. Perform detailed engineering (individual sites and at the system-level)
    - Estimate costs for materials and services
    - Develop specifications for materials and services

4. Perform installations/ modifications
    - Perform site antenna modifications and update timing parameters
5. Verify modifications
    - Drive test post-modification

Existing Site Modifications

1. Abernathy
    - Tower Crew Needed: Remove & replace antenna
    - Remove existing SD212 Transmit antenna (and mount) @ 120' AGL and install new SD212R-SF2P90LDF @ 120' AGL, 45º T.N. on (existing / new) mount on (x leg / face) oriented at 45º T.N.
    - Site Tech Needed: Verify launch delay at 0 µS
2. Rainier Hill
    - Tower Crew Needed: Reuse existing antenna
    - Reorient existing SD212 Transmit antenna @ 160' AGL to 45º T.N. using existing mount
    - Site Tech Needed: Verify launch delay at 0 µS
3. Davis Peak
    - Tower Crew Needed: Remove & replace antenna
    - Remove existing SD212 Transmit antenna (and mount) @ 120' AGL and install new SD212R-SF2P120LDF @ 180' AGL, 180º T.N. on (existing / new) mount on (x leg / face) oriented at 180º T.N.
    - Site Tech Needed: Adjust launch delay to 20 µS
4. Speelyai
    - Site Tech Needed: Adjust launch delay to 20 µS

6.3 Short Term: Legacy VHF – Radio System Troubleshooting

Radio system users have been beleaguered by on-going issues of dropped or lost audio as a result of network reliability link fades and other unknown timing-related problems.

The existing VHF radio system relies on antiquated circuit-switched T1-based technology for its network connection and timing, for which hardware components are no longer available nor serviceable. Timing of audio must be time-synchronized at all simulcast transmission sites, otherwise audio becomes intelligible.

Antiquated T1-based equipment must be replaced by current available IP-based equipment to put these issues to rest.

Due to the anticipated timeline necessary to procure and deploy a new radio system, it may be worthwhile to deploy short term IP-connected VHF base stations on a channel-by-channel basis to remove current T1-based timing requirements altogether. This option is only viable after the microwave network has been upgraded in the interim to improve network reliability.

Any new VHF base stations purchased for short-term improvements can be reallocated for future use to replace existing interoperability repeaters that will also need future replacement.

7. NEXT STEPS

It is imperative to stabilize the existing radio system and backhaul network to support critical public safety communications. To support this effort, short-term improvements must be performed while long-term decisions need to be made.

Short-term improvements include:

- Troubleshoot existing dropped audio issues and develop a stabilization plan.
- Replace five existing aged microwave links to improve network connectivity and reduce on-going system-level failures.
- Modify existing antennas and launch delays to improve known bad simulcast overlap areas within the Kelso and Longview areas.

While short-term improvements are on-going, work on the future radio system must continue.

- Sites visits must be performed validate usability for future use and improved coverage.
- Tentative site lease agreements must be put into place and site “make ready” upgrades must be identified.
- The Fire-Law Tac committee’s input is needed to confirm desired final coverage and therefore, agreed-to site locations to support future coverage.

Once initial mitigating issues are quelled, then continued work is needed to:

- Procure site lease agreements
- Build out the final microwave network to support the future radio network.
- Define technical and operational requirements for inclusion in a radio system network procurement.

Once those tasks are completed, then the last stage is to proceed a phased implementation plan based on budget constraints to deploy a new 700 MHz P25 Phase 2 radio system.

APPENDIX A:
Engineering Assessment Findings and Recommendations Presentation

APPENDIX B:
Site Survey Reports

ADCOMM Engineering LLC

Bridging The Gap Between Operations & Technology®

PROPOSAL FOR SERVICES

DATE: April 12, 2024

TO: John Diamond, Executive Director, Cowlitz 911

FROM: Susan Ronning, P.E., PMP, ASEP, Principal, ADCOMM Engineering LLC

SUBJECT: Cowlitz Radio Project (CRP2) – Phase 2: Short-term Improvements and Concept Design Site Decisions

1. PURPOSE

Cowlitz 911 has requested ADCOMM proceed with the next phase of the Cowlitz Radio Project (CRP2).

This Phase 2 Proposal includes initial troubleshooting of the existing radio and microwave system to determine what the current issues being experienced are related to, as well as short-term improvements of the existing legacy VHF radio system and microwave network. Additionally, long-term decisions must be made to support the next body of work (radio system procurement) therefore, work efforts associated with decision making is also included in this project phase.

1.1 Background

In Phase 1, the Fire-Law Tac and Cowlitz 911 Board agreed to move forward with a 700 MHz P25 Phase 2 Trunked Radio System to replace their aged VHF analog radio system. Significant work is needed to keep the existing system alive and useful until a new digital trunked 700 MHz trunked radio system can be procured and deployed.

The short-term improvements will significantly improve reliable network connectivity and are expected to improve the audio quality of the existing public safety radio system. This work will happen in tandem with long-term improvements including designing, procuring and deploying a new, updated, digital trunked 700 MHz P25 Phase 2 radio system and microwave network, over the next three-to-five years (depending on funding allocations).

2. SCOPE OF WORK

ADCOMM will provide the following engineering and project management services:

2.1 Troubleshoot Existing System

The existing radio system and microwave network are experiencing constant outages for which the cause is not well known.

2.1.1 Tasks

1. **Perform Troubleshooting services.** Lead data capture and engineering assessment with Day Wireless (radio vendor) to identify symptoms and define options for testing and verification.
    - Site visits for troubleshooting will be coordinated with Task 2 VHF Radio System improvements and/or Task 3 Microwave System Improvements.
2. **Develop technical memo**. Identify likely cause and recommendation for improvements.

2.1.2 Deliverables

1. **Technical Memo**. Describes issue(s) found and recommended improvements.

2.1.3 Timeline

- Engineering services are expected to be completed within 4-6 months.

2.2 Short-term Improvements: VHF Radio System

Short-term improvements include replacing and/or reorienting VHF antennas at three locations and modifying timing launch delays at four total locations to reduce the simulcast interference currently experienced by users within the Longview and Kelso areas.

2.2.1 Tasks

1. **Perform Engineering**
    a. Perform site surveys & site measurements
        i. To document location details of existing antennas needing to be replaced and/or reoriented
        ii. To document operating condition of existing antennas and transmission lines where antennas need to be replaced and/or reoriented
        iii. To verify as-built simulcast timing parameters
    b. Perform detailed engineering (individual sites and at the system-level)
        i. Estimate costs for materials and services
        ii. Develop specifications for materials and services

2. **Lead Existing Site Modifications**
    a. Abernathy

i. Tower Crew Oversight: Remove & replace antenna
   - Remove existing SD212 Transmit antenna (and mount) @ 120' AGL and install new SD212R-SF2P90LDF @ 120' AGL, 45º T.N. on (existing / new) mount on (x leg / face) oriented at 45º T.N.

ii. Site Tech Oversight: Verify launch delay at 0 µS

b. Rainier
   i. Tower Crew Oversight: Reuse existing antenna
      - Reorient existing SD212 Transmit antenna @ 160' AGL to 45º T.N. using existing mount
   ii. Site Tech Oversight: Verify launch delay at 0 µS
c. Davis Peak
   i. Tower Crew Oversight: Remove & replace antenna
      - Remove existing SD212 Transmit antenna (and mount) @ 120' AGL and install new SD212R-SF2P120LDF @ 180' AGL, 180º T.N. on (existing / new) mount on (x leg / face) oriented at 180º T.N.
   ii. Site Tech Oversight: Adjust launch delay to 20 µS
d. Speelyai
   i. Site Tech Oversight: Adjust launch delay to 20 µS

3. **Lead / Perform On-site Oversight and Testing**
   a. Oversee and verify installations/ modifications
      i. Oversee site antenna modifications and update timing parameters
   b. Verify modifications
      i. Perform pre- and post- verification testing.
   c. ADCOMM personnel are expected to be on-site for 10 days to support pre- and post-test verification efforts; this work additionally supports troubleshooting efforts.

2.2.2 Deliverables

1. **Installation Work Plan**. ADCOMM will develop a statement of work, drawing sets, and other documentation to support an installation vendor to procure equipment and perform the required services.

2. **Coverage Test Plan and Report.** ADCOMM will develop a test plan and lead pre- and post test verification to ensure system performance meets expectations.

2.2.3 Timeline

- Engineering services are expected to be completed within 7-9 months of notice to proceed.

2.3 Short-term Improvements: Existing Microwave Network

Short-term improvements consist of replacing five (5) existing microwave links on the legacy microwave network. This upgrade will improve reliability of the network and remove network-related issues currently experienced by users on the radio system.

2.3.1 Tasks

1. Develop site documentation (drawing package set), system requirements (narrative), and scope of work for a microwave vendor to respond to.
2. Lead technical review and responses for microwave vendor procurement.
3. Oversee vendor test plans and engineering services to support equipment order and system deployment.
4. Review, define, and ensure test criteria meet performance metrics; review and/or develop test plans; assist with site access; assist with site installations, and support site and system test development, performance, documentation, and resolutions.

2.3.2 Deliverables

1. **Microwave System Requirements and Specifications Package.** Written specifications to support Cowlitz 911 vendor procurement.
2. **Site Drawings.** Site drawing package necessary to support vendor design and installation and testing efforts.

2.3.3 Timeline

- Engineering services are expected to take 9-12 months.

2.4 OPTION: Legacy VHF Interim IP-Base Station Replacement

If troubleshooting of the radio system determines the existing radio system timing equipment is problematic, the system can instead be replaced with IP-connected VHF base stations. Newer base stations have embedded simulcast timing functionality embedded in software, removing the need for aged timing controllers.

2.4.1 Tasks

1. Once a decision is made to proceed, ADCOMM will develop the design documents necessary to support procurement.
2. Lead technical review and responses for IP-base station vendor procurement.
3. Oversee vendor test plans and implementation engineering services to support equipment order and system deployment.
4. Review, define, and ensure test criteria meet performance metrics; review and/or develop test plans; assist with site access; assist with site installations, and support site and system test development, performance, documentation, and resolutions.

2.4.2 Deliverables

1. **IP-connected VHF Base Stations Procurement Package.** Written documentation to support Cowlitz 911 vendor procurement.
2. **Site Drawings.** Site drawing package necessary to support vendor design and installation and testing efforts.
3. **Test Plans and Results.** Documents tests performed and results capture to confirm reliable audio.

2.4.3 Timeline

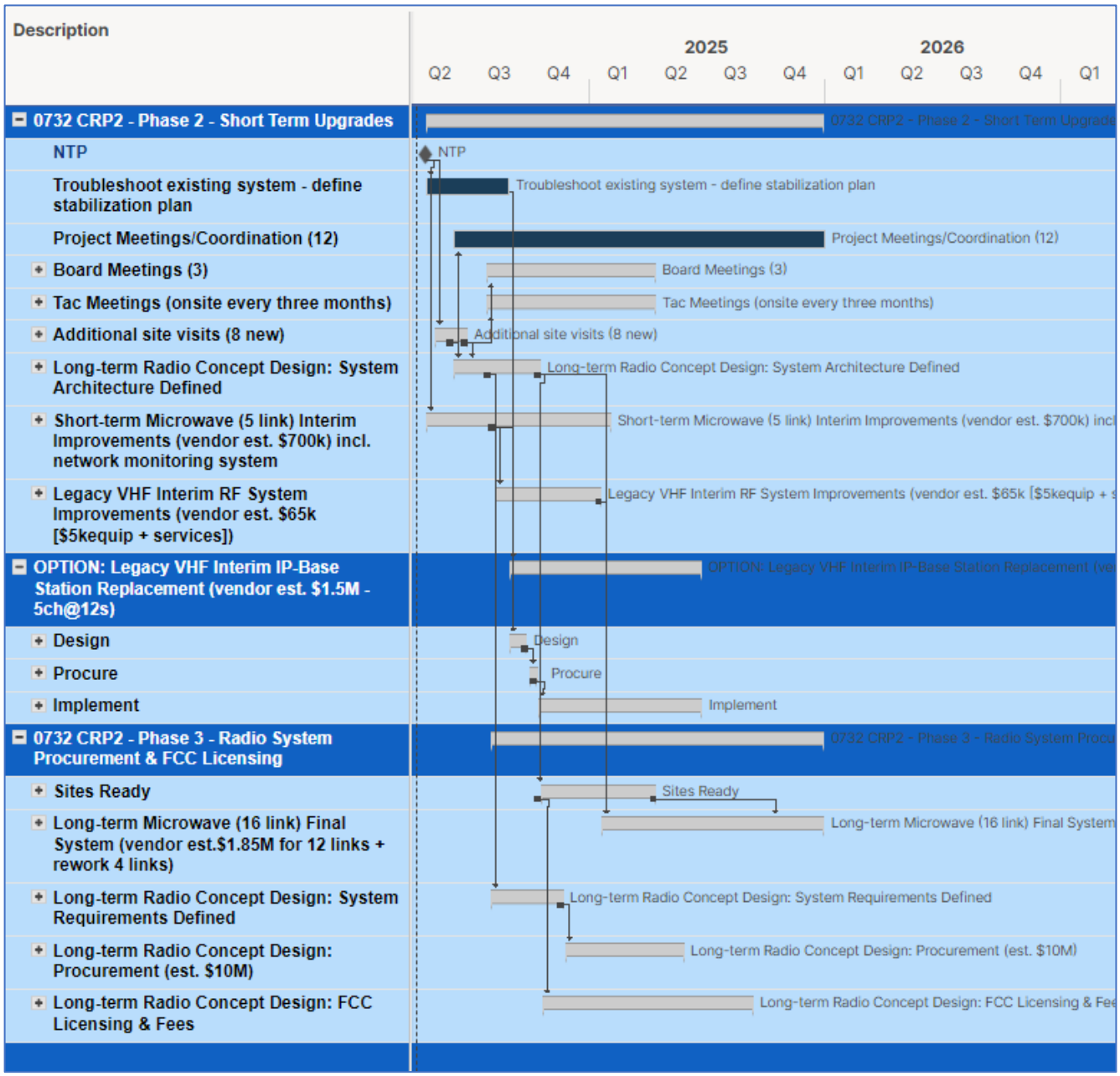
- Engineering services are expected to take 10-12 months; dependent on equipment order and delivery delays.

3. TIMELINE

The anticipated Phase 2 project schedule is provided below.

Additionally, timing expected for Optional VHF Interim IP-Base Station Replacement is identified if it is determined that is needed based on outcome of the Stabilization Plan.

Also, future Phase 3 work effort, which includes Site Make Ready, FCC licensing, and Long-term Microwave deployment through Radio System Procurement is provided for reference.



4. COST ESTIMATE

Consulting services are estimated to be up to **$285,550 or 1,395 hours** for the services, expenses, and deliverables as detailed herein.

If optional VHF Base Station Procurements are needed, ADCOMM anticipates an additional **$43,890 or 206 hours** will be needed to support that work effort.

TABLE 1: ADCOMM 2023-2024 RATE SCHEDULE

CATEGORY	RATE
Principal	$215/hour
Chief Engineer	$215/hour
Technical Specialist	$190/hour
Senior Consultant	$180/hour
Consultant	$160/hour
Project Manager	$150/hour
Site Manager	$150/hour
Engineer	$140/hour
Technical Writer	$115/hour
Office Manager	$80/hour
Technical Assistant	$75/hour
Administrative Assistant	$70/hour

4.1 Terms

- Time is billed in 15-minute increments; notes are provided for all billed time.
- ADCOMM invoices based on actual time and expenses on a monthly basis for the duration of the project.
- Projected cost is based on hours used. If additional time is needed, additional time may be added as a change order.
- Mileage is billed at the current IRS rate.
- Expenses are billed at cost (travel, telephone, copies, etc.).
- Meals are billed on a per diem basis using GSA rates.
- Pass-through costs are marked up 5 percent (FCC license fees, equipment, subconsultants, subcontractors, materials, etc.).
- Rate increases are subject to review every 2 years, on odd numbered years, not to exceed 3 percent each biennium.

5. AGREEMENT FOR SERVICES

If you have any questions, please contact Susan Ronning at s.ronning@adcomm911.com or 971-718-7574.

APPROVED FOR: Okanogan County	**APPROVED FOR:** ADCOMM Engineering LLC
Name:	Ms. Susan Ronning, P.E., PMP, ASEP, Principal
Date	April 12, 2024 **Date**

A signed proposal constitutes agreement for services between both parties.

This proposal is valid for 120 days.

For technical questions or clarification, contact:

Susan E. Ronning, P.E., PMP
Owner and Principal Consultant

Voice/Text: 971-718-7574
Email: s.ronning@adcomm911.com

For invoice or billing questions, contact:

Sue Seefeld
Office Manager

Mailing Address: P.O. Box 308, Woodinville, WA 98072-0308
Voice/Text: 425-487-1361
Fax: 206-374-2834
Email: accounting@adcomm911.com