



Randy Lauer, *Mayor*

David Ripma

Alison Caswell

Geoffrey Wunn

Glenn White

Jordan Wittren

Sandy Glantz

Agenda **March 12, 2024**

Regular Meeting | 7:00 p.m.

Troutdale Police Community Center – Kellogg Room
234 SW Kendall Ct, Troutdale, OR 97060

- 1. Pledge of Allegiance, Roll Call, Agenda Update**
- 2. Public Comment:** Public Comment on non-agenda and consent agenda items is welcome at this time. *Public comment on agenda items will be taken at the time the item is considered. Public comments should be directed to the Presiding Officer and limited to matters of community interest or related to matters which may, or could, come before Council. Each speaker shall be limited to 5 minutes for each agenda item unless a different amount of time is allowed by the Presiding Officer, with consent of the Council. The Council and Mayor should avoid immediate or protracted responses to citizen comments.*
- 3. Consent Agenda:**
 - 3.1 Resolution:** A resolution approving a 2nd short-term extension of the exclusive franchise agreement with Waste Management of Oregon.
- 4. Discussion:** Gresham Fire Department Burn Ban and other suggested Municipal Code Updates. – *Shawn Durham, Gresham Fire Department Battalion Chief*
- 5. Update:** An update on the Urban Flood Safety and Water Quality District (UFSWQD) Capital Funding. – *Erich Mueller, Finance Director & Councilor Ripma*
- 6. Resolution:** A resolution of the Troutdale City Council declaring it's support of the \$150,000,000 Bond Measure to upgrade levees, floodwalls, water pumps, and natural floodplain restoration, brought by the Urban Flood Safety and Water Quality District, Measure 26-243. – *Mayor Lauer*
- 7. Resolution:** A resolution calling for urgent ambulance staffing model reform in Multnomah County. – *Ray Young, City Manager*
- 8. Discussion:** A discussion of County's plans for changes to 257th Avenue.
– *Councilor White*
- 9. Update:** Public Safety Services Delivery Working Group. – *Ray Young, City Manager*
- 10. Motion:** Mayor's Nomination of Councilor Wunn to replace Mayor Lauer on the Public Safety Services Delivery Working Group (PSWG). – *Mayor Lauer*

11. Staff Communications

12. Council Communications

13. Adjournment



Randy Lauer, Mayor

Dated: March 6, 2024

Meeting Participation

The public may attend the meeting in person or via Zoom. Please email info@troutdaleoregon.gov by **5:00pm on Monday, March 11th** to request Zoom meeting access credentials. You may also submit written public comments via email to info@troutdaleoregon.gov no later than **5:00pm on Monday, March 11th**. City Council Regular Meetings are broadcast live on Comcast Cable Channel 30 (HD Channel 330) and Frontier Communications Channel 38 and replayed on the weekend following the meeting - Friday at 4:00pm and Sunday at 9:00pm.

Further information and copies of agenda packets are available at: Troutdale City Hall, 219 E. Historic Columbia River Hwy. Monday through Friday, 8:00 a.m. - 5:00 p.m.; on our Web Page www.troutdaleoregon.gov/meetings or call Sarah Skroch, City Recorder at 503-674-7258.

The meeting location is wheelchair accessible. A request for an interpreter for the hearing impaired or for other accommodations for persons with disabilities should be made at least 48 hours before the meeting to: Sarah Skroch, City Recorder 503-674-7258.



STAFF REPORT

SUBJECT: A Resolution Approving a 2nd Short-Term Extension of Exclusive Franchise Agreement with Waste Management of Oregon

MEETING TYPE: City Council - Regular Meeting

MEETING DATE: March 12, 2024

PRESENTER: Ryan Largura

DEPARTMENT / AFFILIATION: Department of Public Works

ACTION REQUIRED: Resolution (Consent)

PUBLIC HEARING: No

COMMITTEE / COMMISSION RECOMMENDATION: N/A

STAFF RECOMMENDATION: Approval

Exhibits:

N/A

Subject Relates to:

☐ Council Goals ☐ Legislative ☐ Land Use / Development ☒ Other (describe)

Provision of recycling and solid waste services provided by hauler through an exclusive franchise agreement.

Discussion Points:

- The City's exclusive franchise agreement with Waste Management expired December 31, 2023.
- The Council approved an initial 90-day extension at the December 12, 2023 regular council meeting.

Background:

The current "Exclusive Franchise Agreement with Waste Management of Oregon to provide Recycling and Solid Waste Collection Services in the City of Troutdale" expired on December 31, 2023. At the January 10, 2023 City Council Regular Meeting, staff presented City Council the option to either negotiate with Waste Management (WM) for a renewal of their Franchise Agreement (Agreement) or conduct a competitive bid process with potential haulers. City Council directed staff to proceed with negotiations with the general intent to retain Waste Management as the City's franchised waste hauler. The current Agreement took effect January 1, 2016 for a period of eight years. The Troutdale Municipal Code (TMC)

Section 8.40.050 requires that the City and franchisee enter into a written Agreement describing duties and responsibilities of each party, and that such agreement be authorized through a resolution of the City Council. Staff presented to City Council at the October 24, 2023 meeting highlights of potential changes to the current Agreement.

Summary:

Staff has had discussions with Waste Management regarding a new/renewed franchise agreement. The current working draft of the Agreement proposes to carry over many of the same sections in the current Agreement albeit in a new format to improve organization of Agreement sections and contemplates some additions or enhancements to services for Troutdale's residents and businesses. The City and Waste Management have been negotiating the terms of a new exclusive Agreement, but have not finalized those terms of a new Agreement. In the best interests of the City, another short-term extension of ninety (90) days of the existing Agreement would allow attorneys of both parties to continue negotiations on the new Agreement to better serve the public.

Pros & Cons:

Pros:

- Provides additional time to attorneys and staff to negotiate terms of the new Agreement.
- The additional time allows the negotiation of potentially improved services for the public to be included in the new Agreement.

Cons:

- The status quo of services in the existing Agreement will continue.
- The extension will delay City Council's review of potentially adding new self-locking carts and the roll-out of said new carts.

Oversight:

- *Budget Impact:* ☐ Yes, current year (describe) ☒ Yes, future (Added services in the new Agreement may come with added cost to the City) ☐ N/A
- *Community Involvement Process:* ☐ Yes (describe) ☒ N/A
- *Approval by City Attorney:* ☒ Yes ☐ N/A

Reviewed and Approved by the City Manager: _____



RESOLUTION NO.

A RESOLUTION APPROVING A 2ND SHORT-TERM EXTENSION OF THE EXCLUSIVE FRANCHISE AGREEMENT WITH WASTE MANAGEMENT OF OREGON.

THE TROUTDALE CITY COUNCIL FINDS AS FOLLOWS:

1. The City and Waste Management of Oregon ("WM") are parties to that certain Exclusive Franchise Agreement whereby WM is authorized to provide solid waste and recycling collection services within the City ("Existing Franchise Agreement").
2. The Existing Franchise Agreement commenced on January 1, 2016 and continues for a period of eight (8) years expiring on December 31, 2023.
3. The City desires to continue authorizing WM to provide such services within the City and does not intend to authorize a new franchise service provider.
4. The City and WM previously agreed to a 90-day extension, approved by Resolution #2609, extending the term of the existing franchise to March 30, 2024.
5. The City and WM attorneys have been reviewing and negotiating the terms of a new exclusive franchise agreement; however, the parties have not yet finalized the terms of the new agreement.
6. That the City finds it to be necessary, expedient, beneficial to the community, and in the best interests of the City, to enter into a short-term extension of the Existing Franchise Agreement in order to allow the parties to continue their review and negotiations on the new long-term franchise agreement, and that doing so serves a valuable and necessary public purpose and is an authorized public purpose.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF TROUTDALE:

Section 1. Based on the above findings set forth herein, the City Council hereby approves a 2nd extension of the Existing Franchise Agreement for an additional period of ninety (90) days.

Section 2. All other terms of the Existing Franchise Agreement shall remain in full force and effect.

Section 3. The City Manager Ray Young and Finance Director Erich Mueller (each an "City Official") are designated to act individually and/or jointly, on behalf of and in the best interest of the City and without further action by the City Council, and are hereby, authorized empowered and directed to execute any such necessary documents on behalf of the City to implement the intent this resolution.

Section 3. This Resolution shall take effect immediately upon adoption.

YEAS:
NAYS:
ABSTAINED:

Randy Lauer, Mayor
Date:

Sarah Skroch, City Recorder
Adopted:



STAFF REPORT

SUBJECT: Discussion: Gresham Fire Department Burn Ban and other suggested Municipal Code Updates

MEETING TYPE:	City Council - Regular Meeting	MEETING DATE:	March 12, 2024
PRESENTER:	Battalion Chief Shawn Durham and LT. Brandon Baird	DEPARTMENT / AFFILIATION:	Gresham Fire Department
ACTION REQUIRED:	Information / Discussion	PUBLIC HEARING:	Yes
COMMITTEE / COMMISSION RECOMMENDATION:	N/A		
STAFF RECOMMENDATION:	None Forwarded .		

Exhibits:

- A. New TMC Chapter 15.12.100-Bans Backyard Burning
- B. Fire Inspection Fee Schedule for Gresham, Fairview and Wood Village
- C. Suggested Updates to Troutdale Municipal Code Chapter 15.12

Subject Relates

☐ Council Goals ☒ Legislative ☐ Land Use / Development ☐ Other

Discussion Points:

- Should the City enact a Fee Schedule for Fire and Life Safety Inspections
- If so, what should be the amount of the fees.
- Should the City update its reference to the Oregon Fire Code to the most recent iteration
- Should the City ban backyard burning of debris and manmade materials
- Would any such ban improve air quality and safety

Background:

The City is currently being provided fire protection services under an Intergovernmental Agreement (IGA) by the City of Gresham. The fire IGA was a “joint” contract which included services to Wood Village and Fairview also. In addition to fire and emergency services, the Gresham Fire Department (GFD) also provides fire code enforcement, fire related plan review and fire inspection services. The GFD desires

consistent fees, codes, and enforcement across all 4 cities. To that end, the GFD is requesting that the City update its code regarding the current Oregon Fire Code, backyard burning and a fee schedule for inspection services.

Backyard Burning

Currently the City follows the dictates of the Oregon Fire Code and the Oregon DEQ “burn days” to govern when a person may burn materials on their property. DEQ already prohibits backyard burning west of 181st because of increased concerns around smoke inhalation and health, fire risk concerns; and because we have additional options for yard debris disposal. We currently have no specific code section that restricts backyard burning beyond that. The GFD would like the City to adopt a backyard burn ban in accordance with Ex A.

Both Fairview and Gresham have enacted a similar backyard burn ban. The Wood Village City Council has discussed it and seem in favor of it. They have asked staff to do some community outreach before they consider the ordinance change. They anticipate having it on their agenda this summer for a First Reading. For Spring burning they are still allowing days as designated by DEQ, but anticipate that by the fall season they will have enacted an ordinance similar to Fairview and Gresham.

GFD is requesting that we put the backyard burn restrictions in place to improve air quality and to support a healthy environment. It also reduces the risk of “wildfire” due to burns that get out of hand. The impact of backyard burning on adjacent neighbors has only intensified as our community becomes denser due to increasing infill, smaller lot sizes, and the upcoming middle housing.

Fire Fee Schedule

When the City Council adopted code section, “15.12.090 - Fire safety inspection program” in 2007 it contained this phrase multiple times, “... pay a fee ... established by council resolution”. However, the City Council never passed a resolution setting a fee schedule pursuant to the Code. GFD is requesting that we adopt a fee schedule consistent with the fee schedule in Gresham, Fairview and Wood Village. That fee schedule is attached as Ex. B.

The fees paid by the businesses for a fire inspection would be subtracted from the money Troutdale pays GFD under the Fire Service IGA. Each July 1 beginning on July 1, 2024, the fees set out in Exhibit B should be indexed by 5%. The fees set out in Exhibits B should then be automatically adjusted each July 1 thereafter, continuing in 2025 and 2026.

Code Chapter 15.12- Fire and Life Safety Code Update

The City’s Municipal Code includes chapter 15.12 regarding “Fire and Life Safety”, which mostly refers to the State’s Fire Code. The state Fire Marshal tends to update the state code every three to five years. The City last updated its Fire and Life Safety Code in 2007, and specifically references as our code authority the “Oregon Fire Code (OFC), 2007 edition”. We locked our code into the 2007 version, and we have not

updated it since. The language, proposed by GFD stops our code from being locked into what is, and would continue to be, an older version of the code. The intent, with the new language, is to make our code adaptable to the state's code, which would remove the need to revise the City's code every time there was an update to the State's code.

Additionally, GFD recently reviewed the City's code and found other areas to update to keep it consistent with the State's code. Most of the revisions were around affirmative statements about following the state's code as amended and code reference updates. The revisions do not alter how the City performs this work, but rather updates the code to follow how the City and its partners currently enforce the code. A tracked change version of these code amendments is attached as Ex. C.

Conclusion

After the presentation by Chief Durham, City staff would like direction from Council on what code changes to bring back to the Council for a first and second reading.

Pros & Cons

Pros:

- N/A

Cons

- N/A

Oversight:

- *Approval by City Attorney:* ☐ Yes ☒ N/A

Reviewed and Approved by the City Manager: _____



Proposed Backyard Burn Ban

New TMC Chapter 15.12.100, of the Fire and Life Safety Code

15.12.100 - Unlawful Burning

A. No person may:

1. Burn yard debris or any type of material on any single or multiple family property within the City of Troutdale.
 2. Burn at any time any manmade material; rubber; plastic; garbage; construction materials; petroleum-based materials; or any other product for which burning is prohibited by the Department of Environmental Quality.
 3. Conduct any type of burning during a declared fire season.
 4. Set on fire, or cause to be set on fire, any grass, grain, stubble, or other material being or growing on land within the city.
 5. Intentionally or negligently allow fire to escape from the person's own land, or land of which the person is in possession or control.
 6. Accidentally set any fire on the person's own land or the land of another and allow it to escape from control without extinguishing it or using every reasonable effort to do so.
 6. Know of a fire burning on the person's own land, or land of which the person is in possession or control and fail or neglect to make every reasonable effort to extinguish it, regardless of whether or not the person is responsible for the starting or the existence of the fire.
- B. Violators are subject to penalties pursuant to chapter 1.04.095 of this code, and 15.12.10 (C) of this chapter.

Gresham, Fairview, Wood Village**Fire Fee Schedule**

District 10 - No Charge

Troutdale - No Charge

Exhibit B

3/12/24 Council Mtg. Item #4

<u>Permits</u>	<u>Gresham - Fairview- Wood Village</u>
Aircraft Refueling Vehicles	\$158
Special Place of Assembly	\$315
Special Events (i.e. Farmers Market; trade shows, exhibits)	\$315
Carnivals & Fairs	\$315
Seasonal Sales (i.e. Christmas Tree Sales)	\$158
Explosive/Blast Agents	\$315
Fireworks (Wholesale)	\$397
Fireworks (Display)	\$315
Fireworks (Sales - Retail)	\$158
Flammable/Combustible Liquids	\$158
Change Flammable/Combustible Liquid Content	\$158
Fumigation/Thermal Insecticidal Fogging	\$158
Mall-Temporary KIOSK	\$126
Mall- Place of Assembly (> 100 people)	\$126
Mall- Open Flame Device	\$126
Mall-Display Liquid or Gas Fueled Power Equip	\$126
Motor Vehicle Fuel Dispensing Station	\$158
Open Burning - Residential Only	\$158
Pyrotechnical Special Effects Material	\$416
Radioactive Materials	\$416
Tents & Membrane Structure: Includes Tents > 200 sq ft, Canopy > 400 sq ft &, Canopy open on all 4 sides > 700 sq ft	\$158
<u>Life Safety Inspections</u>	<u>Gresham - Fairview- Wood Village</u>
Ultra Low Hazard	\$120
Low Hazard	\$158
Moderate Hazard	\$621
High Hazard	\$1,027
Special Inspections	\$120
Business License (Initial Inspection)	\$158
First Re-Inspection	\$71
Second Re-Inspection	\$158
Fail to Abate	\$825
Excess False Fire Alarms	\$605
Late Fee (if not paid within 30 days of notice)	\$44
Food Cart Plan Review& Inspection (including fire supression system)	\$315
<u>Fire Safety Consultation Fees (GRC 10.25)</u>	<u>Gresham - Fairview- Wood Village</u>
Consultation Fees (onsite) for new construction or design purposes.	\$158 per hr. 1hr Min
Consultation Fees (office) to discuss new construction or design purposes.	\$158 per hr. 1hr Min
<u>Inspection Outside Business Hours</u>	
Special Request Inspection outside office business hours.	\$315 for first two hours or portion thereof; \$158 each addtl hour
<u>State Licensed Facilities Inspections (GRC 10.25.090)</u>	<u>Gresham - Fairview- Wood Village</u>
24-hour Residential Home	\$158
Adult Foster Home	\$158
Assisted Living Facility	\$315
Children's Residential Facility or Day Treatment Facility	\$315
Health Care Facility	\$315
<u>Miscellaneous</u>	<u>Gresham - Fairview- Wood Village</u>
Motor Vehicle Dismantlers	\$1,027
Expedited Plan Review (Max of (2) per week)	\$315
Fire Drill Evaluation/Inspection one hour min.	\$158 per hr
Fire Watch (Min of (2) people) two hour min.	\$158 per hr.
Fire Service Agency Review Forms (Access and Water Supply Review	\$315
Occupant Load Inspection and/or Occupant Load Sign Request one	\$315 per hr. 1hr Min.
Fire Access, Gate Review/Inspection	\$315

Fairview effective 7/01/2023

Gresham effective 7/01/2023

Wood Village effective 7/01/2023

3/7/2024

\\gresham.gov\cog\FES\Administration\Fee Schedule

Title 15 - BUILDINGS AND CONSTRUCTION
Chapter 15.12 FIRE AND LIFE SAFETY CODE*

Chapter 15.12 FIRE AND LIFE SAFETY CODE*

Sections:

15.12.010 Adoption of fire code and fire and life safety regulations.

- A. For the purpose of prescribing minimum regulations governing conditions hazardous to life and property from fire, panic, or explosion, the city adopts the fire code known as the Oregon Fire Code (OFC), 2007 edition, and the whole thereof, including Oregon adopted appendices, except as otherwise amended in Section 15.12.070 of this chapter, and incorporated herein.
- B. This code section, including the codes hereby adopted, shall be filed and maintained in the record of Gresham Fire and Emergency Services (FES), in the State Fire Marshal's Office, and the Troutdale Community Development Department. This chapter shall be known as the Fire and Life Safety Code of the city of Troutdale (hereafter known as "Oregon Fire Code").
- C. In addition to any fines, penalties, remedies or other enforcement powers authorized by the Oregon Fire Code, any violation of the fire code shall also constitute a public nuisance under Chapter 8.28 of this code, and shall be subject to the general penalty provisions in Chapter 1.04 of this code.

(Ord. 787 § 1 Att. 1 (part), 2007)

Commented [SD1]: Remove "2007 edition" in it's entirety.

Commented [SD2]: Add "as adopted by OAR 837-040-001 through 837-040-0140",

Commented [SD3]: Remove "and Emergency Services" And replace with "Department" as we no longer are Gresham FES.

15.12.020 Definitions.

For purposes of this chapter, the following mean:

"Business" means any activity, trade, occupation, profession, or pursuit conducted for the purpose of generating revenue, whether for profit or nonprofit, regardless of occupancy type assigned by code language, excluding home occupations.

Fire Code Official. Wherever the Oregon Fire Code uses the term "Fire Code Official," it means the city of Gresham fire chief or fire marshal.

"Illegal occupancy" means any business occupying a building or premises without a city business license or the changing of an occupancy without proper building and planning department permits or certificate of occupancy.

Jurisdiction. Wherever the Oregon Fire Code uses the term "jurisdiction," it means the city of Troutdale.

Occupancy. The lawfully permitted purpose for which a building or part thereof is used or intended to be used.

(Ord. 787 § 1 Att. 1 (part), 2007)

15.12.030 Establishment and duties of the Fire and Life Safety Division.

The 2007 Oregon Fire Code shall be enforced by the Fire and Life Safety Division of Gresham Fire and Emergency Services, which shall be operated under the supervision of the fire marshal under the direction of the fire chief.

(Ord. 787 § 1 Att. 1 (part), 2007)

Commented [SD4]: Remove "2007"

Commented [SD5]: Remove "and Emergency Services" And replace with "Department" as we no longer are Gresham FES.

15.12.070 Amendments to the Oregon Fire Code.

The 2007 Oregon Fire Code is amended and changed as follows:

Commented [SD6]: Remove "2007"

Section 104.2 is amended to add:

Commented [SD7]: Change to "104.1"

The Jurisdiction shall establish the fees, if any, for special use permits. The fees shall be set by resolution.

Section 106.2 is amended to add:

Commented [SD8]: Change to "108.1"

The Jurisdiction shall establish the fees, if any, for initial business fire inspections, reinspections, failure to abate hazards and false alarms. The fees shall be set by resolution.

Section 308.3.1 is amended to read:

Commented [SD9]: Change to 308.1.4

Open-flame cooking devices. Charcoal burners and other open-flame cooking devices shall not be operated on combustible balconies or within ten feet of combustible construction.

Exceptions:

1. One and two family dwellings.
2. Where buildings, balconies and decks are protected by an automatic sprinkler system.

Section 308.3.1.1 is amended to read:

Commented [SD10]: Change to "308.1.6.2"

Liquefied-petroleum-gas-fueled cooking devices. LP-gas burners having an LP-gas container with a water capacity greater than 2.5 pounds (nominal 1 pound LP-gas capacity) shall not be operated on combustible balconies or within ten feet of combustible construction.

Exception: One and two family dwellings.

Section 505.1 is amended to read:

Address Numbers. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numerals or alphabet letters. Numbers shall be a minimum of six inches high with a minimum stroke width of 0.5 inch and larger when required by Gresham Fire and Emergency Services Standard Operating Guideline 3.1.5.

Section 804.1.1 is amended to read:

Commented [SD11]: Change to "806.1.1"

Restricted occupancies. Natural cut trees shall be prohibited in Group A, E, I-1, I-2, I-3, I-4, M, R-1, R-2, R-4 and SR occupancies.

Exceptions:

1. Trees located in areas protected by an approved automatic sprinkler system installed in accordance with Section 903.1.1 or 903.1.2 shall not be prohibited.
2. Within dwelling units of R-2 occupancies.

Section 3401.4 is amended to read:

Commented [SD12]: Change to "5701.4"

Permits. Permits for the installation of all flammable or combustible liquid tanks and/or storage of all flammable or combustible liquids within or outside of buildings are required within all areas of the city.

Section 3401.4.1 is amended to read:

Commented [SD13]: Change to "5701.6"

Plans. Construction documents shall be submitted with each permit application for flammable or combustible liquid tanks and/or the storage of the same.

Section 3801.2 is amended to read:

Permits. Permits for the installation of all liquefied petroleum gas (LPG) tanks and/or storage of all LPG are required within all areas of the city. Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the fire code official.

Commented [SD14]: Change to "6101.2"

Section 3801.3 is amended to read:

Plans. Plans shall be submitted with each permit application for liquefied petroleum gas (LPG) tanks and/or storage of the same.

Commented [SD15]: Change to "6101.3"

(Ord. 787 § 1 Att. 1 (part), 2007)

15.12.080 Appeals.

The appeals board specified in Section 108.1 of the Oregon Fire Code shall consist of the Troutdale building official, with the addition of a fire protection professional as designated by the fire code official.

Commented [SD16]: Change to "111.1"

(Ord. 787 § 1 Att. 1 (part), 2007)

15.12.090 Fire safety inspection program.

- A. Purpose and Scope. The purpose of this section is to set forth the requirements of a fire safety inspection program within the city of Troutdale for violations of the Oregon Fire Code. The provisions of this section shall apply to each business location of every business within the city of Troutdale.
- B. Hazard Level Designations. A hazard level designation for each individual business will be determined by the fire marshal based on occupancy classification and existing hazards. The fire marshal will utilize the hazard ratings issued for occupancy designations by the National Fire Protection Association (NFPA), 13, "Installation of Sprinkler System," and as designated by OFC Chapter 2. In cases of multiple occupancy classifications, hazard level placement will normally correspond to the occupancy classification with the highest rated hazard level.
- C. Fire Safety Inspections. Each business location of every business located within the city of Troutdale is subject to a fire safety inspection by Gresham FES each calendar year. Inspection fees, if any, shall be established by council resolution and correspond to the hazard level designation for each business location as determined by the fire marshal.
- D. Fire Safety Reinspections. When violations of the OFC are found in the course of an annual inspection, Gresham FES shall conduct a reinspection, after allowing the appropriate time for voluntary abatement of the violation. Fees for reinspection, if any, shall be established by council resolution.
- E. Failure to Abate OFC Violations. Failure to abate OFC violations shall constitute a public nuisance, and subject the violator to the nuisance abatement remedies established in Chapter 8.28 of this code including the imposition of an administrative enforcement fee for each month the violation continues. The administrative enforcement fee for inspection violations shall be established by Troutdale city council resolution. In addition to the imposition of an administrative enforcement fee, the city manager or the city manager's designee, may enforce abatement proceedings or civil action as provided in Chapter 8.28 of this code, or as otherwise authorized by law, including any enforcement remedies, orders, or powers under the OFC.
- E. Warrants. When an inspection is done pursuant to this chapter to enforce compliance with the Oregon Fire Code, as adopted herein; the person doing the inspection shall obtain consent or a warrant authorizing the entry into a building or structure, except in circumstances where a warrant or consent is not legally required.

Commented [SD17]: Change to "FD"

Commented [SD18]: Change to "FD"

F. Business License Inspections. Any person or business entity that applies for a license to conduct business in a physical location within the city of Troutdale must obtain a business license inspection by Gresham FES, and pay a fee for that inspection, if established by council resolution. Any person or business entity that applies for a renewal of any license to conduct business in a physical location within the city of Troutdale may be subject to a business license inspection by Gresham FES, and pay a fee for that inspection, if established by council resolution, if a history of OFC code violations has been found within said business location and a general fire safety inspection has not been completed there within the previous twelve months.

Commented [SD19]: Change to "FD"

Commented [SD20]: Change to "FD"

(Ord. 787 § 1 Att. 1 (part), 2007)

(Ord. No. 801, § 1, 1-11-2011)



STAFF REPORT

SUBJECT: Update on the Urban Flood Safety and Water Quality District (UFSWQD) Capital Funding.

MEETING TYPE: City Council - Regular Meeting **MEETING DATE:** March 12, 2024

PRESENTER: Erich Mueller, Finance Director
Councilor David Ripma **DEPARTMENT / AFFILIATION:** Finance Dept and Council

ACTION REQUIRED: Information / Discussion **PUBLIC HEARING:** No

COMMITTEE / COMMISSION RECOMMENDATION: N/A

STAFF RECOMMENDATION: N/A Advocacy prohibited per ORS 260.432

Exhibits: **A.** Bond Ballot Measure 26-243
B. Flood Safety & Water Quality Capital Investment Program Summary
C. LRC Executive Summary-Flood Risk Assessment Report Flood District Map

Subject Relates to:

☐ Council Goals ☐ Legislative ☐ Land Use / Development ☒ Other

Summary Points:

- The Portland Metro Levee System (PMLS) consists of 4 Legacy Drainage Districts along the Columbia River stretching from the Sandy River to the Willamette River.
- Extensive property, jobs, homes and population are protected by the levees.
- The PMLS no longer meets the Federal Emergency Management Agency (FEMA) levee accreditation requirements.
- The City has been an active participant in the Columbia River Levee recertification governance process for nearly a decade.
- Council President Ripma serves as the City Representative on the Levee Ready Columbia IGA Board (LRC), and City Representative on the Urban Flood Safety and Water Quality District Board (UFSWQD)
- The area is additionally represented by Tanney Staffenson who also serves on both boards as the Sandy Drainage Improvement Company (SDIC) representative.

Background:

The Columbia Corridor Drainage System covers 22,600 acres, stretches 18 miles along the Columbia River from the Sandy River to the Willamette River, and is currently protected from flooding to ensure the continued safety of the people, businesses, and other assets of the region. This area is the managed floodplain (MF) which is a critical regional economic area comprising the largest industrial area in the state, with 2,500 businesses employing 65,000 people, and over \$16 billion in annual economic activity, and the region's backup water supply.

The managed floodplain is protected by a 27-mile levee and pumping system stretching across the jurisdictions of the county, four cities, and four drainage districts. The levee system is operated by a single agency through a cooperative group of four legacy drainage districts. The Federal Emergency Management Agency (FEMA) and US Army Corps of Engineers' (USACE), regulate floodplains. The four legacy drainage districts were advised in 2012 that their FEMA levee accreditation would expire in 2013, and then 2017. Because the region has made steady progress in addressing accreditation challenges, FEMA has provided more time to complete the needed upgrades.



The Levee Ready Columbia (LRC) Partnership, of which the City was an active member, was formed in 2014 to collaborate in finding a solution for the FEMA challenges. The LRC has involved over 30 organizations including local, state, and federal government, and business, environmental, and community-based organizations who have taken a common approach to floodplain management, to ensure that the levee system continues to reduce the risk of flooding the area behind the levees.

At the urging of the LRC the 2019 Oregon State Legislature created new special district to consolidate the four legacy drainage districts and implement the necessary Portland Metro Levee System (PMLS) improvements required to maintain FEMA accreditation of the levees.



In 2019 the Urban Flood Safety And Water Quality District (UFSWQD) was enacted in Oregon Revised Statutes (ORS) Chapter 550. The Legislature created the new UFSWQD with both familiar activities and duties similar to the four legacy drainage districts. In addition, the legislature also directed the new agency to contribute to improved water quality, fish and wildlife habitat, floodplain restoration and landscape resilience; and to promote equity and social justice in all aspects of the district's operations.

ORS 550 charges the initial 17-member, governor-appointed District board with organizing the new District and with developing methods of funding for the FEMA reaccreditation. It was determined by the legislature that considering that the whole metro region benefits from a “dry” floodplain that the capital projects should be a cost shared by a larger area.

For the capital projects the initial board has referred a general obligation capital bond to voters to provide the required local match for about \$100 million in federal investments and to provide for other needed Capital Projects that must be completed to maintain FEMA accreditation.

CURRENT STATUS:

Capital Project Funding (see exhibit B)

The capital project needs include a combination of:

- the required \$60 million 35% local match for more than \$100 million in federal investment in PMLS projects,
- additional FEMA recertification projects,
- projects that will detain water from extreme weather events while also contributing to improved habitat,
- projects that will help businesses and homeowners adapt to climate change-driven weather events, and
- significant deferred capital replacement obligations of the four legacy drainage districts.

The capital projects are anticipated to be completed over a 10-year period with an estimated cost of \$295,000,000.

The funding for the \$295 million is composed of 3 parts:

- Subject to voter approval, Bond Ballot Measure 26-243: **\$150,000,000**
- Subject to local match, approved Federal funding through the USACE: **\$100,000,000**
- To be determined funding source(s) from the State: **\$45,000,000**

ANTICIPATED PROJECT LIST

Specific project activities may be adjusted within the bounds of the voter-approved bond purpose and program areas.

Proposed Flood Safety Projects	Estimated Project Sequencing		
	Phase I	Phase II	Phase III
Upgrade Aging infrastructure: Raise levees, improve floodwalls, pumps, pipes, and drains in the most vulnerable areas			\$268,086,000*
USACE PMLS Project **			
PMLS Complementary Projects			
FEMA Sunderland Levee Upgrade			
FEMA Salmon Creek Levee Rebuild			
FEMA Gate Tower Flow Structure			
Broadmoor Pump Station Upgrade ⁱ			
NE 181st Pump Station Upgrade ⁱ			
PIR Pump Station Replacement ** ⁱ			
Schmeer Rd Pump Station Upgrade ⁱ			
Levee Slope Resurfacing ⁱ			
Flood Safety Operations Center ⁱ			
Floodplain Restoration & Resilience Projects			\$27,222,000*
Floodplain Storage			
Levee Enhancements			
TOTAL			\$295,308,000

*Estimated funding allocation for each program area includes program administration, oversight, and contingency costs. Program administration and oversight is estimated to be between 5–10% of project costs.

**Projects that include federal match.

ⁱ District-led projects will, where possible, integrate design features for climate resilience, environmental improvement, equity, and cultural history.

State law seeks to prevent spending public funds on political activities. Once a ballot measure has been referred to the voters ORS 260.432 prohibits public employees from advocating, for or against, any petition, measure or candidate, if the public employee is considered to be acting in their “official capacity,” such as while providing this update to the Council. Staff seeks to provide facts about bond Measure 26-243 in an impartial and neutral manner. Staff can report on what official action has occurred, and what the ballot measure would provide, however, staff cannot urge you to vote for or against the matter.

On February 7, 2024 the 17-member initial District Board of the UFSWQD voted 14 yeas and 3 abstentions to refer a \$150 million general obligation bond to the voters within the new

District. It is important to note that the board members did not vote in “favor” of the bond, but rather voted to refer the matter to the voters of the District.



Measure 26-243 - Bonds to upgrade levees, floodwalls, water pumps, natural floodplain restoration.

Question: Shall Flood Safety District issue bonds to upgrade infrastructure, protect water quality, communities, businesses, environment from flooding; require independent oversight?

Attached is a copy of the referred ballot measure filed with the Multnomah County Elections Office and the Explanatory Statement (*See Exhibit A*), following are a couple of excerpts:

“Summary”

“If passed, bond proceeds would upgrade aging flood safety infrastructure along the Columbia River. The current system is over 100 years old. In a changing climate, the system does not meet federal requirements.”

“Congress authorized nearly \$100,000,000 for flood safety projects, which may be unlocked for a limited period with local match. This measure would authorize issuing up to \$150,000,000 in principal amount of general obligation bonds for Urban Flood Safety and Water Quality District.”

“Estimated annual tax rate for bonds would be \$0.11 per \$1,000 of assessed value. The owner of a home assessed at \$246,712 would pay approximately \$2.19 per month, \$26.67 annually. This is the average assessed home value in the District, according to County Assessor.”

<https://www.multco.us/elections/measure-26-243-bonds-upgrade-levees-floodwalls-water-pumps-natural-floodplain-restoration>

The Portland Metropolitan Chamber staff reports that the Chamber’s board will vote on a position on the referral in early March. Earlier, the Chamber’s Government Relations meeting voted 19 to 4 to endorse the referral.

The Legislature created the new UFSWQD in 2019 with a much larger property tax base for GO Bonds than that of the 4 legacy drainage districts. The entire UFSWQD encompasses all of Multnomah County within the Urban Growth Boundary. This area has an estimated \$85 billion tax base from which to fund the GO Bond, and hundreds of thousands of households and businesses who benefit.

Based on estimated assessed property values, Troutdale property taxpayers are estimated to be responsible for approximately 2% of the estimated annual debt service costs, with Portland property taxpayers at 84% and Gresham property taxpayers 10%.

Without the required local match, the approximately \$100 million of federal funding through the USACE for the PMLS projects will be unavailable. Without the local match the levees would either lose the FEMA accreditation, or we would have to pay for the PMLS projects ourselves.

With the loss of levee accreditation property values would likely fall in the managed floodplain, along with widespread job losses as businesses relocate or just close. The LRC and UFSWQD Boards and the region must **“keep our eyes on the prize”** of federal funding and reaccreditation, for the benefits both to our individual jurisdictions and the region.

Summary:

The immediate issue is the pursuit of funding for long overdue capital projects. The issue of ongoing operation funds for levee district is a separate topic. As previously reported to Council, there is no “perfect” operation funding solution, each option explored has deficiencies and a certain degree of unfairness. The message has been, and remains the same, unhappy message; the new District is going to cost more, and everybody in the District will be paying more than they are today. This is inevitable if we are to remain safe, and accredited. The pursuit of funding for capital projects is part of that equation.

If Bond Ballot Measure 26-243 passes all Troutdale property taxpayers would pay an estimated be \$0.11 per \$1,000 of assessed value.

For what is at risk see the attached Levee Ready Columbia Executive Summary of the Oregon Department of Geology & Mineral Industries *Flood Risk Assessment for the Columbia Corridor Drainage Districts in Multnomah County*. (Exhibit C)

There were many reasons that the East County Cities joined with Portland, Multnomah County, the Port of Portland, Metro, and the four legacy drainage districts to work collaboratively through the LRC partnership to improve the local flood safety system and how it is managed. Those reasons remain equally important today.

Reviewed and Approved by the City Manager: _____

A handwritten signature in blue ink, appearing to be "R. Lopez", written over a horizontal line.

BALLOT TITLE

BALLOT TITLE:

Caption

Bonds to upgrade levees, floodwalls, water pumps, natural floodplain restoration.

Question

Shall Flood Safety District issue bonds to upgrade infrastructure, protect water quality, communities, businesses, environment from flooding; require independent oversight?

If the bonds are approved, they will be payable from taxes on property or property ownership that are not subject to the limits of sections 11 and 11b, Article XI of the Oregon Constitution.

Summary

If passed, bond proceeds would upgrade aging flood safety infrastructure along the Columbia River. The current system is over 100 years old. In a changing climate, the system does not meet federal requirements.

Congress authorized nearly \$100,000,000 for flood safety projects, which may be unlocked for a limited period with local match. This measure would authorize issuing up to \$150,000,000 in principal amount of general obligation bonds for Urban Flood Safety and Water Quality District.

Estimated annual tax rate for bonds would be \$0.11 per \$1,000 of assessed value. The owner of a home assessed at \$246,712 would pay approximately \$2.19 per month, \$26.27 annually. This is the average assessed home value in the District, according to County Assessor. Bonds may be issued in multiple series, each maturing within 20 years of issuance.

This measure would finance capital costs for District purposes to protect communities, businesses, PDX airport, and the environment, including by:

- Raising levees, upgrading floodwalls, pumps, pipes, drains.
- Supporting natural floodplain restoration and resilience projects.

District would establish bond oversight committee. Audits required.

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DIRECTOR OF ELECTIONS

EXPLANATORY STATEMENT

Background

A system of flood safety infrastructure along the Columbia River – including 27 miles of levees, pump stations, pipes, drains, and wetlands – protects the Portland region from floods. The managed floodplain extends 13,000 acres from North Portland in the west to the Sandy River in the east. The area includes residential neighborhoods, more than 2,000 acres of natural areas and habitat, and the Portland International Airport. It is the largest industrial employment area in Oregon.

The flood safety system is over 100 years old. Many sections have not been upgraded since the 1948 flood that destroyed the city of Vanport. Extreme weather events are increasing in a changing climate, and the system no longer meets federal standards. Flooding could release toxic chemicals, raw sewage, and other hazardous materials into rivers and streams. Without infrastructure upgrades, the resulting cost of flood insurance could cause homeowners to move and small businesses to relocate or close.

Use of Funds

This measure would authorize the Flood Safety District to issue \$150 million in general obligation bonds if passed. The bonds would provide the required match to access nearly \$100 million in federal funds authorized by Congress for flood safety. The bonds would also provide funds needed to:

- Elevate and repair sections of the levees and floodwalls to address aging and under-built parts of the system, including raising portions of the levees, to provide consistent protection from flood events.
- Upgrade aging pump stations to increase pumping capacity and provide back-up power in case of electricity outages. Seven pump stations will undergo upgrades or full replacement, reducing the risk of local flooding during heavy rain.
- Integrate design features for climate resilience, environmental improvement, equity, cultural history, or other community values. Features would be tailored to the project location and opportunities, such as energy efficient design, fish and wildlife habitat, murals, or signage related to the cultural history of the floodplain.
- Provide natural protection from flooding through floodplain restoration. Approximately \$27 million of the funds will be dedicated to natural floodplain restoration and resilience projects to slow and store floodwaters and improve flood safety outcomes. These projects would contribute to improvements in water quality, fish and wildlife habitat. Floodplain restoration is a widespread practice in modern flood safety supported by federal agencies.

If passed, what would the bond cost?

The estimated annual tax rate for bonds would be \$0.11 per \$1,000 of assessed value. The owner of a home assessed at \$246,712 would pay approximately \$2.19 per month, or \$26.27 a year. This represents the average assessed property value in the District area, according to Multnomah County assessors.

Accountability and Oversight

An independent community oversight committee would review bond expenditure reports and provide annual reports. An independent public accounting firm would perform an annual audit of the District's financial statements, including expenditure of bond funds, and an elected Board of Directors will oversee projects and adopt annual budgets.

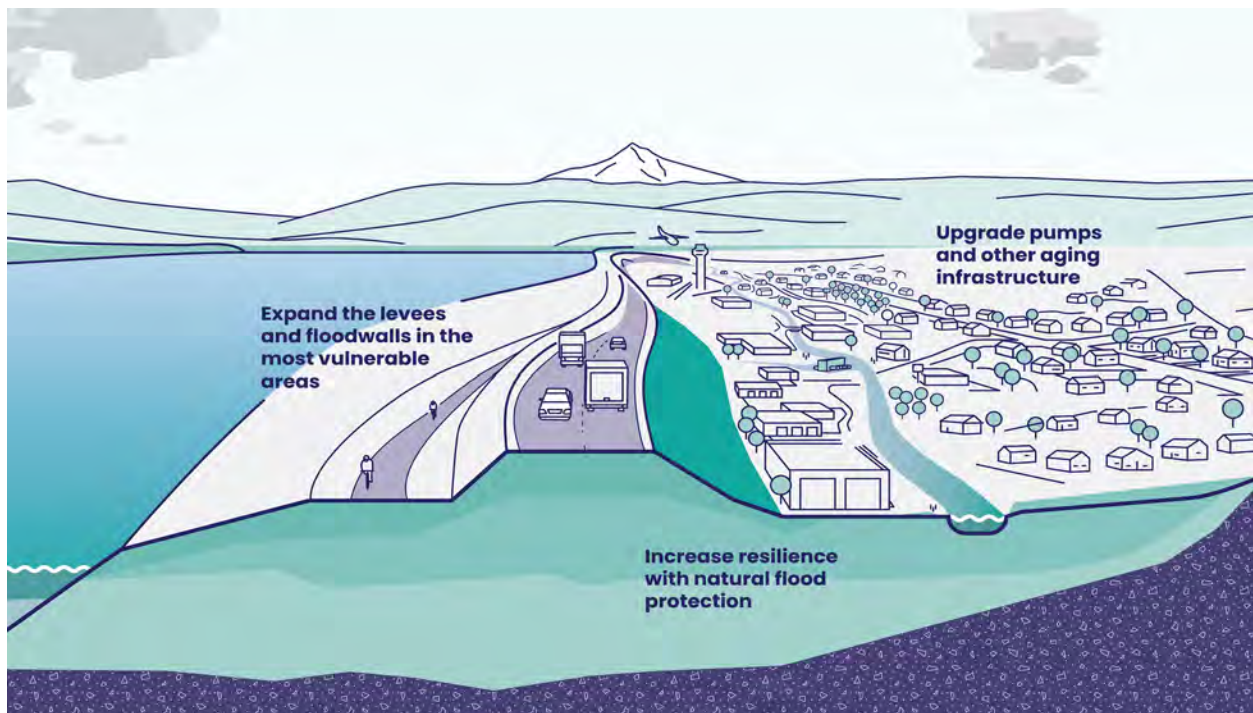
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DIRECTOR OF ELECTIONS



FLOOD SAFE COLUMBIA RIVER

Flood Safety & Water Quality Capital Investment Program Summary

February 2024



This document summarizes a proposed package of flood safety and water quality investments to protect vulnerable communities, water quality, jobs, and the environment. Proposed funding includes federal, state, and local sources. Local funding would come from a general obligation (GO) bond, proposed for referral to the voters of Multnomah County on the May 2024 ballot. State grants and federal funds pending legislative appropriations.



FLOOD SAFE COLUMBIA RIVER

Flood Safety & Water Quality Capital Investment Program Summary

Executive Summary

The climate is changing and extreme weather is more common. A major flood on the Columbia River would threaten vulnerable communities, water quality, jobs, and the environment in Multnomah County. Our flood safety infrastructure is more than 100 years old and requires upgrades. The proposed funding package, including general obligation bond, federal funding, and state grants, would fund improvements to protect vulnerable communities, water quality, jobs, and the environment. The needed improvements are straightforward and cost effective:

- Raise the levees and improve floodwalls in the most vulnerable areas.
- Upgrade aging infrastructure such as pipes, pumps, and drains.
- Restore floodplains that offer natural protection from flooding and habitat for fish and wildlife.

By acting now, we can unlock nearly \$100 million in federal funds, saving money and lives.

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FLOOD SAFE COLUMBIA RIVER

I. Introduction

The Columbia River is one of the world's largest, most powerful rivers. A system of flood control infrastructure – often hidden in plain sight – protects Multnomah County from devastating floods. The flood safety system includes pump stations, waterways, pipes, drains, and 27 miles of levee along the Columbia River and Columbia Slough protecting airports, homes, businesses, and other critical services. Much of the flood safety infrastructure is more than 100 years old.

Devastating floods have happened in the region before and can happen again. In just a few hours, the 1948 Columbia River Flood (often described as the Vanport flood) killed at least 15 people and displaced thousands. Today, the climate is changing, and the risk of extreme weather events has only increased. Flood disasters have battered the West Coast in recent years. It is only a matter of time before the Portland region experiences a similar threat. That threat could become a disaster if the region is not prepared.

Major floods could cost lives, threaten our water supply, pollute the environment, and impact thousands of jobs. Toxic materials, raw sewage, and other hazardous materials would pollute rivers and streams, harming fish and wildlife. The impacts would be felt throughout the region and vulnerable communities, homes, and businesses in the flood zone would be hardest hit.

Fortunately, there are simple, cost-effective solutions. By acting now, the community can save money and lives. The needed improvements are straightforward:

- Raise the levees and improve floodwalls in the most vulnerable areas.
- Upgrade aging infrastructure such as pumps, pipes, and drains.
- Integrate floodplain restoration, a nature-based solution that provides fish and wildlife habitat and natural protection from flooding.

Congress has authorized the construction of nearly \$150 million of projects. When constructed, nearly \$100 million of that will be federally funded. Those projects address needed improvements, and accessing those federal funds requires a local match. Voters will be asked to approve a bond measure to provide a portion of the required matching funds. Leaders in the state legislature have expressed support for seeking state grants to

fund the remaining balance. Addressing the problems now will reduce long-term costs and make the region safer.

A. Flood Safe Columbia River & the Flood Safety District

Flood Safe Columbia River¹ is an initiative to raise awareness about the flood protection system along the Columbia River, growing flood risks, and what the community can do about it. This initiative includes local agencies, businesses, and community groups committed to upgrading and improving our aged flood safety system and to preparing for extreme weather events in a changing climate. The projects and plans that form the basis of the flood safety and water quality capital investment program, and the associated general obligation (GO) bond proposal, were developed in collaboration with the Flood Safe Columbia River partners.

If a GO bond is approved by voters, bonds would be issued by the Urban Flood Safety and Water Quality District, which was established in 2019 under state law ORS550.² For over 100 years, the flood safety system has been maintained and managed by four drainage districts – Peninsula Drainage District #1, Peninsula Drainage District #2, Multnomah County Drainage District, and Sandy Drainage Improvement Company. The Urban Flood Safety and Water Quality District (District) will replace the drainage districts in 2024 and assume their assets, liabilities, and staff.

B. The Flood Safety System

The flood safety system protects lives, water quality, fish and wildlife habitat, tens of thousands of workers, and nearly 13,000 acres of land along the Columbia Slough and the lower Columbia River (Figure 1). The system includes levees, pump stations, flow control



Figure 1. The Flood Safety System Area

¹ Flood Safe Columbia River (website) 2023. Available at: <https://www.floodsafecolumbia.org>

² Or Laws 2019. Ch550, 150-440. Available at: https://www.oregonlegislature.gov/bills_laws/ors/ors550.html

structures, ditches, sloughs, and other waterways. Natural systems, like wetlands and floodplains, contribute to flood safety by helping to absorb, slow, and store flood waters.

II. Flood Safety & Water Quality Investment Program

To improve the region's safety from devastating floods and unlock nearly \$100 million in federal dollars, this report presents a package of flood safety and water quality capital investments to improve the overall flood safety system. This package covers the highest known flood risks; contributes to improved water quality, fish and wildlife habitat, floodplain restoration, and landscape resilience; and improves overall system resilience.

A. Anticipated Revenue Sources

Anticipated revenue sources are shown below. GO bond funding pending voter approval. State and federal funds pending legislative appropriation. All values estimated. Revenue values shown here are in addition to funds already received.

Anticipated Revenue Sources	Anticipated Value
Flood Safety GO Bond Revenue	\$150,000,000
State Grant Funds	\$45,000,000
Federal Funds*	\$100,308,000
Total	\$295,308,000

* Based on estimated federal contribution to US Army Corps of Engineers Portland Metro Levee Study and FEMA Hazard Mitigation Grants for PIR pump station replacement.

B. Major Capital Program Areas

The table below shows the program areas and planned funding allocations. Each program area is described further in Section 3.

Program Area*	Forecast Bond Expenditures*
Upgrade aging infrastructure. Raise levees, improve floodwalls, pumps, pipes, and drains in the most vulnerable areas. **	\$268,086,000
Floodplain restoration & resilience projects	\$27,222,000
Total	\$295,308,000

*Estimated funding allocation for each program area includes program administration, oversight, and contingency costs. Program administration and oversight is estimated to be between 5-10% of project costs.

**Where possible, District-led projects will integrate design features for climate resilience, environmental improvement, equity, cultural history, and other community values.

Improvements include:

- Upgrade seven failing, aging, or underperforming pump stations.
- Back-up power capacity to critical pump stations in case of a power failure.
- Improve safety and efficiency of infrastructure operations and maintenance.
- Elevate and repair vulnerable sections of the levee system.
- Build or reinforce floodwalls.
- Integrate design features for climate resilience, environmental improvement, equity, cultural history, and other community values where possible in District-led projects.
- Natural floodplain restoration and resilience projects to provide natural protection from flooding, benefit fish and wildlife, and contribute to improvements in water quality.

C. Bond Program Oversight & Accountability

If the bond is approved by voters, the board of directors will establish an independent Flood Safety Bond Community Oversight Committee to recommend performance targets and review progress in the implementation of the bond measure. This committee will report annually to the board and the public regarding progress toward and compliance with the purpose and projects of the bond measure, and to make recommendations, if any, for improving program efficiency, administration, or performance. The oversight committee provides the region's residents with an independent, outside review of GO bond implementation.

An annual financial audit of the expenditure of the bond proceeds will be conducted by a public accounting firm and the results will be published on the District's website.

The board of directors will receive the annual financial audit, an annual performance report from the Flood Safety Bond Community Oversight Committee, and regular financial updates. The board will review and approve all capital budgets through the annual budgeting process and annual approval of the 5-year Capital Improvement Plan.

D. Equity and Social Justice

The improvements and upgrades in this package are designed to raise the level of protection throughout the District to a consistent level, which is the first step toward achieving equitable flood risk outcomes because the most vulnerable communities are often those most at risk and disproportionately affected by flooding.

The Flood Safety Bond Community Oversight Committee provides an opportunity for process equity. The board could, for example, set the criteria for appointment consistent with the Flood Safe Columbia River Education & Engagement Workgroup to ensure

representation from the board and from communities of interest and historically underserved communities.

Staff also plan to provide recommendations to the board about how to update the District's procurement rules and procedures to help ensure there are more options available to purchase goods and services in a sustainable manner that provides environmental, social, and economic benefits. The staff will prepare recommendations about how best to increase access and remove barriers to hiring more Minority, Women and Emerging Small Businesses (MWESB), as permitted by law.³

Following additional board discussion and direction, staff also recommend the board consider developing partnerships when implementing integrated design efforts as part of flood safety projects. For example, working with existing workforce development programs and historically underserved communities including, but not limited to, low-income populations, communities of color, and people with disabilities. The board will need to provide significant input and provide oversight of the District's partnership work, in particular on the criteria for selecting partnerships and the expected deliverables of partnerships. Staff continues to believe partnerships are one of the most cost-effective ways to improve flood safety preparedness and awareness and to improve long-term community support for the District's operations.

III. Program Area Detail

A. Upgrade aging infrastructure: Raise levees, improve floodwalls, pumps, pipes, and drains in the most vulnerable areas.

In this program area, the District will use funds to make improvements with the goal of recertifying the levees and maintaining accreditation through the Federal Emergency Management Agency (FEMA) and reducing flood risk throughout the managed floodplain by bringing levees to federal standards through projects in partnership with the US Army Corps of Engineers (USACE).

Measures and actions related to recertification and maintaining accreditation have been scoped through extensive engineering analysis of system capacity, risks, solutions, and costs, in collaboration with USACE. The District plans to address a significant portion of these needs through a partnership with USACE. The bond and state grants funds are

³ The State of Oregon renamed its MWESB program to COBID, or Certification Office for Business Inclusion and Diversity.

the best pathway to securing nearly \$100 million in federal matching funds. The workplan is described in the Portland Metro Levee System Feasibility Study: Final Integrated Feasibility Report and Environmental Assessment.⁴

Improvements will include:

- Upgrade 7 failing, aging, or underperforming pump stations.
 - Replace or upgrade aging and undersized pump stations.
 - Add capacity and redundancy where needed.
 - Improvements to debris management improve reliability.
- Back-up power capacity to critical pump stations in case of a power failure
- Improve safety and efficiency of infrastructure operations and maintenance.
 - Improve access and safety of pump stations.
 - Provide a safe and efficient space to support operations and maintenance during normal conditions and emergencies.
- Elevate and repair vulnerable sections of the levee system. Build or reinforce floodwalls.
 - Address vulnerabilities in an estimated 9 miles of levees and floodwalls.
 - Making levees and floodwalls stronger and more reliable by filling in low spots and widening vulnerable sections.
 - Building a new levee and floodwall along the segment of the 1948 levee breach.
 - Improve levee surface to prevent erosion and support safe, reliable maintenance.
- Integrated design features for climate resilience, environmental improvement, equity, cultural history, and other community values. Where possible, District-led projects will integrate these project objectives during the design phase. An estimated \$4.13 million was budgeted for integrated design features on District-led projects.

B. Floodplain Restoration & Resilience Projects

This program area includes contributing to the conservation, enhancement, and restoration of natural floodplain features such as channels and wetlands to slow and store floodwaters, improving flood safety outcomes. These projects can also contribute to improvements in water quality, fish and wildlife habitat, floodplain restoration, or

⁴ US Army Corps of Engineers Portland District and Columbia Corridor Drainage Districts. 2021. Portland Metro Levee System Feasibility Study: Final Integrated Feasibility Report and Environmental Assessment. Available at: <https://www.nwp.usace.army.mil/missions/projects-and-plans/portland-metro-levee-system/>

landscape resilience restoration (Figure 2). Floodplain restoration is a widespread practice in modern flood safety and is supported by FEMA and USACE.^{5,6} Staff anticipate projects to include adding natural flood storage through floodplain restoration and enhancing near shore habitat on levees. Specific projects and additional opportunities to support flood safety with nature will be identified through the watershed planning process that is required by state law in ORS550.270.

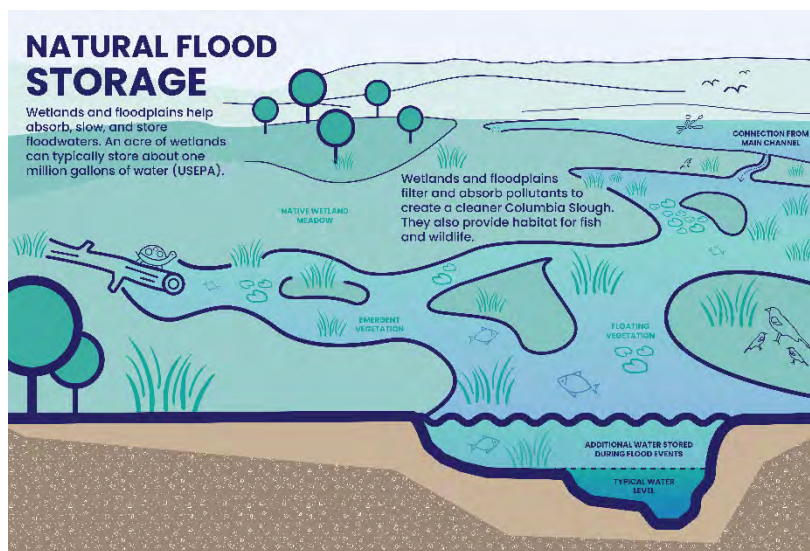


Figure 2. Natural flood storage supports the flood safety system.

Floodplain restoration projects reshape and recontour channels and adjacent areas to create complex channel forms, wetlands, and floodplain areas that expand conveyance capacity and provide habitat across a wide range of flows. Staged channels, meanders, and wetlands can be incorporated to maintain or create fish and wildlife

habitat while increasing storage and conveyance capacity in the stream corridor.

Levee toe enhancements include activities such as placing fill, large wood, and/or vegetation at the toe of a levee to improve riparian and near-shore habitat for fish and wildlife while bolstering levee safety or improving maintenance access. The Portland Metro Levee System is a federally authorized levee system and enhancements would be designed to comply with regulations set by the US Army Corps of Engineers, the authorities of the UFSWQD, practical considerations around access and long-term maintenance, and the cost of operations and maintenance.

⁵ USACE. Engineering with Nature Atlas Series. 2021. Accessed 4/14/23 at: <https://ewn.erdrc.dren.mil/atlas-series/>

⁶ FEMA. Webpage. Nature-Based Solutions. 2023. Accessed 4/14/23 at: <https://www.fema.gov/emergency-managers/risk-management/nature-based-solutions>

IV. Package Development

A. Identifying Projects & Priorities

The package described here includes high priority flood-safety investments, identified primarily from existing engineering reports including USACE Portland Metro Levee System project Final Integrated Feasibility Report,⁷ levee recertification engineering reports,^{8,9,10,11} the Drainage Districts' Assets and Liabilities Report,¹² Drainage Districts' Capital Improvement Plans,^{13,14,15,16} and Drainage Districts' Drainage Master Plans.^{17,18,19,20} These reports, based on information known at the time of their drafting, summarize planning efforts that analyze system capacity, known risks, solutions, and associated costs. Some items in the package reflect the legislative mandates for the UFSWQD from ORS 550 and the board adopted Mission, Vision, Values.²¹

Staff prioritized projects based on:

- a) Legislative mandates of ORS 550.
- b) System risk. Assets with a greater chance of failure and/or greater consequence from failure are prioritized.
- c) Asset condition and performance. District staff and engineering consultants applied industry best practices to estimate when each District-owned asset will reach the end of its useful life. All assets expected to reach the end of their useful life within the period of the bond were considered.
- d) Board policy and the UFSWQD's adopted Mission, Vision, Values.

⁷ Ibid., 4

⁸ Cornforth Consultants & WEST Consultants. 2014. PEN1. 1 Levee Engineering Assessment. October 2, 2014.

⁹ Cornforth Consultants & WEST Consultants. 2014. PEN 2 Levee Engineering Assessment. October 2, 2014.

¹⁰ Cornforth Consultants & WEST Consultants. 2018. MCDD Levee Engineering Assessment. April 17, 2018.

¹¹ Cornforth Consultants & WEST Consultants. 2018. SDIC Levee Engineering Assessment. April 17, 2018.

¹² MCDD, PEN1, PEN2, SDIC (2021) Assets and Liabilities Final Report. Available at: <https://tinyurl.com/ybp9nn8m>

¹³ MCDD (2022) MCDD FY23-27 Capital Improvement Plan. Available at <https://tinyurl.com/32zrrfbw>

¹⁴ PEN1 (2022) PEN1 FY23-27 Capital Improvement Plan. Available at: <https://tinyurl.com/537y947x>

¹⁵ PEN2 (2022) PEN2 FY23-27 Capital Improvement Plan. Available at: <https://tinyurl.com/yz4cv47h>

¹⁶ SDIC (2022) SDIC FY23-27 Capital Improvement Plan. Available at <https://tinyurl.com/yc4j9rj8>

¹⁷ MCDD (2022) MCDD FY23-27 Capital Improvement Plan. Available at <https://tinyurl.com/32zrrfbw>

¹⁸ PEN1 (2022) PEN 1 Drainage and Water Quality Master Plan. Available at: <https://tinyurl.com/mpa3kz3r>

¹⁹ PEN2 (2019). PEN 2 Drainage Master Plan. Available at: <https://tinyurl.com/4vr6mj8p>

²⁰ SDIC (2020) SDIC and City of Troutdale Drainage Master Plan. Available at: <https://tinyurl.com/4vr6mj8p>

²¹ UFSWQD (2022). UFSWQD Mission, Vision, Values. Available at: <https://tinyurl.com/mu8ff3r4>

B. Developing Cost Estimates

Cost estimates were taken from the engineering reports referenced above, adjusted for inflation, and reviewed by an independent third-party consultant. Project cost estimates were also adjusted to allow for integrating climate resilience, environmental improvement, equity, cultural history, and other community values, consistent with flood safety and board approval (see Section 4).^{22 23}

The bond's oversight committee and the board of directors will play an active role in providing oversight for project scopes and budgets following alternatives analyses (where applicable) and engineering and design work. Staff will provide financial and program to state and federal partners following the program requirements for each funding source.

²² Department of the Army, USACE (June 30, 2016). ER 1110-2-1302, Civil Works Cost Engineering. Washington, D.C. https://www.publications.usace.army.mil/Portals/76/Publications/EngineerRegulations/er_1110-2-1302.pdf

²³ AACE International (March 1, 2016). Recommended Practice No. 18R-97, Cost Estimating Classification System. Fairmont, WV. <https://www.austintexas.gov/edims/document.cfm?id=280770>



FLOOD SAFE
COLUMBIA RIVER

Appendix 1. Anticipated Project List

Specific project activities may be adjusted within the bounds of the voter-approved bond purpose and program areas.

Proposed Flood Safety Projects	Estimated Project Sequencing		
	Phase I	Phase II	Phase III
Upgrade Aging infrastructure: Raise levees, improve floodwalls, pumps, pipes, and drains in the most vulnerable areas			\$268,086,000*
USACE PMLS Project **			
PMLS Complementary Projects			
FEMA Sunderland Levee Upgrade			
FEMA Salmon Creek Levee Rebuild			
FEMA Gate Tower Flow Structure			
Broadmoor Pump Station Upgrade ⁱ			
NE 181st Pump Station Upgrade ⁱ			
PIR Pump Station Replacement ** ⁱ			
Schmeer Rd Pump Station Upgrade ⁱ			
Levee Slope Resurfacing ⁱ			
Flood Safety Operations Center ⁱ			
Floodplain Restoration & Resilience Projects			\$27,222,000*
Floodplain Storage			
Levee Enhancements			
TOTAL			\$295,308,000

*Estimated funding allocation for each program area includes program administration, oversight, and contingency costs. Program administration and oversight is estimated to be between 5-10% of project costs.

**Projects that include federal match.

ⁱ District-led projects will, where possible, integrate design features for climate resilience, environmental improvement, equity, and cultural history.

Executive Summary

LEVEE READY COLUMBIA EXECUTIVE SUMMARY
OF THE OREGON DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

Exhibit: C
Agenda Item 5
Council Mtg 03-12-2024

Flood Risk Assessment for the Columbia Corridor Drainage Districts in Multnomah County

Rivers and streams have been of great importance throughout human history. People have long elected to locate and build in flood-prone areas alongside waterways to access water for drinking and farming, transportation, trade, and more. Although living and working alongside these waterways has many benefits, it also comes with very real risks. In the Columbia River Basin, which covers much of the Pacific Northwest including most of Oregon, Washington, Idaho, and parts of Montana, Nevada, Utah, Wyoming, and British Columbia, dozens of dams and thousands of miles of levees were constructed over the last century to reduce the risk and consequences of flooding along the Columbia River and its tributaries.

Around Portland, the land along the Columbia River between the confluence of the Willamette and Sandy Rivers was historically made up of sloughs, lakes, and wetlands until 1917, when local farmers and business interests first constructed berms—raised banks along the river—to minimize flooding. At the same time, four drainage districts were also established along the Columbia River to manage drainage and keep water moving in the area.

Following the passage of the 1936 Flood Control Act by Congress, the US Army Corps of Engineers (USACE) began working to improve the flood reduction infrastructure around the country, including in the Portland area where they turned the Columbia River berms into federally engineered and authorized levees. They returned to repair and strengthen the local levee system following the historic Vanport Flood of 1948, which displaced over 18,000 residents, destroying what was once Oregon's second largest city in one day.

Records show that there have been five major floods in the area since 1894. Despite the region's history of flooding, very little has been known about the flood risk posed if a section of the levee system were to fail. To quantify the impacts of levee failure during a major flood, the Oregon Department of Geology and Mineral Industries (DOGAMI) completed an in-depth assessment of the flood risk in each of the districts and published their findings in a report entitled "Flood Risk Assessment for the Columbia Corridor Drainage Districts in Multnomah County, Oregon."

THE METHODOLOGY

The DOGAMI assessment examines the consequences of levee failure and flooding on the people and property behind the 27-mile Columbia Corridor levee system, quantifying damage to buildings, transportation systems, above ground infrastructure, community facilities, and parked cars, as well as the number of residents that would be displaced, jobs and wages that would be lost, hazardous materials exposed, and the amount of debris

that would be produced by a levee failure and flood in the Columbia Corridor. Their assessment was developed using the Federal Emergency Management Agency's Hazus-MH methodology, a standardized modeling system for estimating potential losses from earthquakes, floods, and hurricanes, which allows users to estimate physical, economic and social impacts of disasters. The potential impacts were assessed under two flooding scenarios: a 100-year flood and a 500-year flood.

WHAT'S AT RISK?

The DOGAMI study shows that while each of the drainage districts is vulnerable to flooding, the potential severity and amount of damage varies dramatically from district to district.

The US Army Corps of Engineers originally constructed the 27-mile levee system that runs from N. Portland out to the confluence of the Sandy and Columbia Rivers to operate in unison. This system includes a series of levees and cross-levees that are intended to create redundancy and reduce the risk of flooding throughout the system, even if one section of the system were to fail. Although the DOGAMI study specifically looks at the potential consequences of a levee failure in each individual district without aggregating the results across multiple districts, we know from the 1948 Vanport flood that a failure in one part of the system can create a domino effect, leading to failures in the neighboring parts of the system.

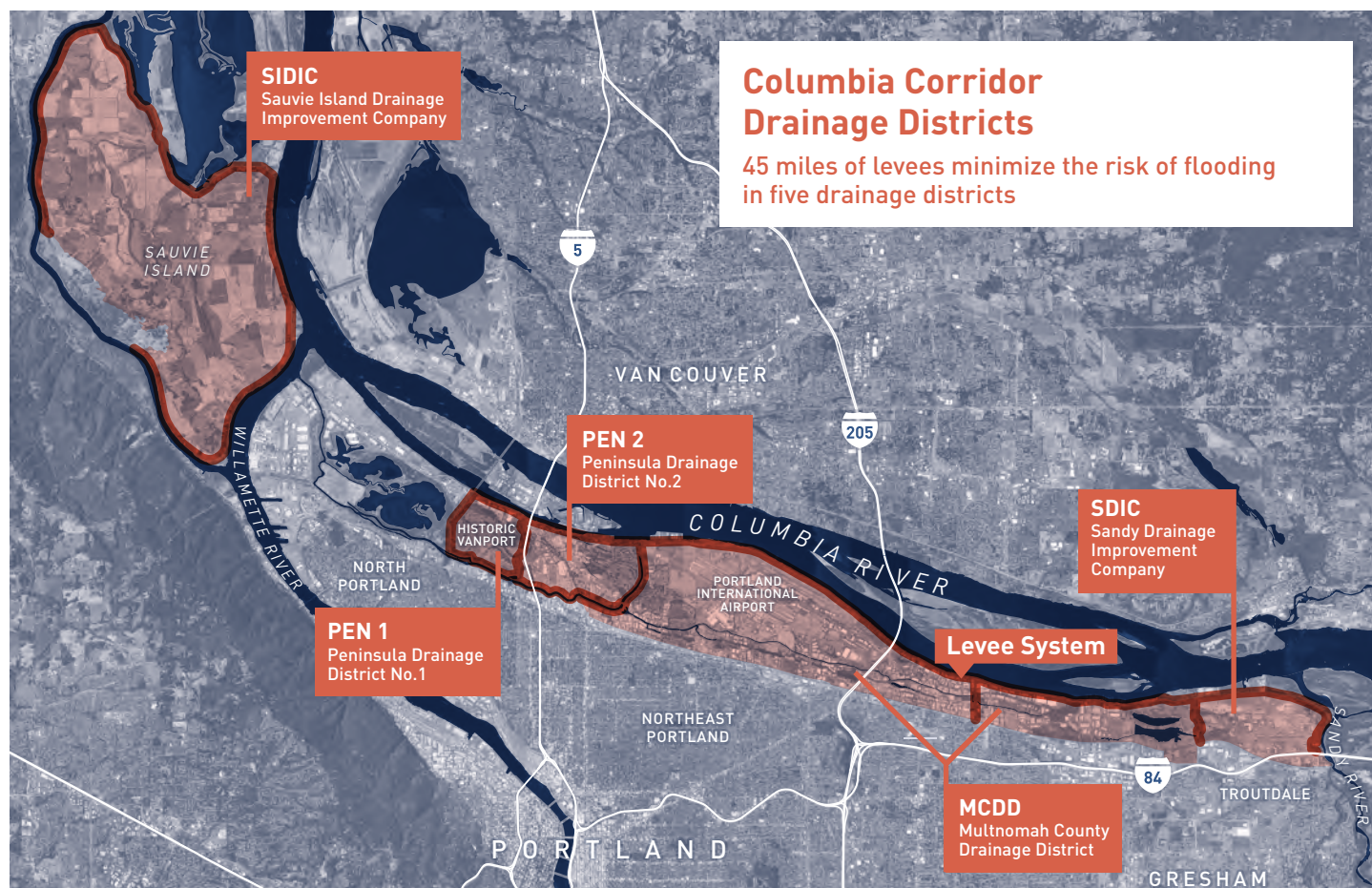
100- and 500-year floods: it's all about chance

Despite how they sound, the terms "100-year" and "500-year" floods do not refer to floods that only occur every one-hundred or five-hundred years. Instead, these terms are used to describe the statistical probability—or chance—of a flood happening within a specific geographical area during any given year.

In theory, a 100-year flood zone marks the area within a floodplain where there is a 1-in-100 (or 1%) chance of a flood occurring in any given year. Similarly, a 500-year flood zone is area where there is a 1-in-500 (or .2%) chance of a flood occurring in any given year. These terms describe the risk of flooding based on historical data regarding rainfall and river flows, which can be mapped to show the risk within a managed floodplain.

WHY THIS MATTERS

The Federal Emergency Management Agency (FEMA) uses these statistics to map floodplains around the country and estimate the level of risk for each property owner for the purposes of administering the National Flood Insurance Program (NFIP), which provides property owners in areas of low or moderate risk, more affordable flood insurance.

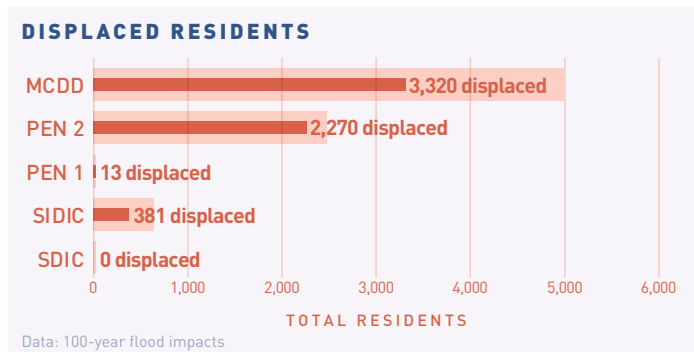


Columbia Corridor Drainage Districts

45 miles of levees minimize the risk of flooding
in five drainage districts

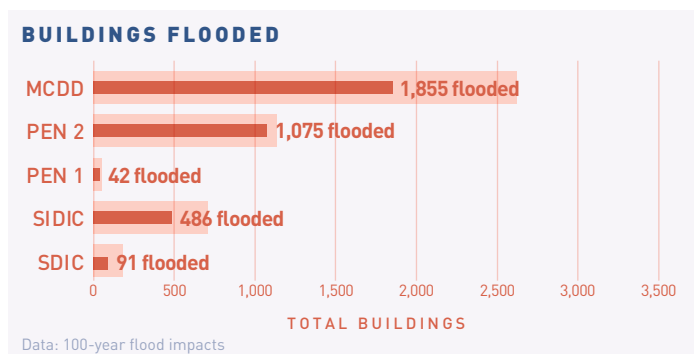
Residents

The majority of the approximately 8,000 people living behind the Columbia Corridor levees reside in PEN 2 and MCDD, including about 1400 people incarcerated in two prisons located in MCDD. Under either flood scenario, both prisons and over half of the homes in MCDD would sustain damage, with those located next to the Columbia Slough and southeast of Fairview Lake most heavily impacted. In PEN 2, over 90% of the approximately 2,500 residents would initially have to leave their homes. About 75% of those homes are expected to sustain damage, particularly in the low-lying eastern part of the district.



Development

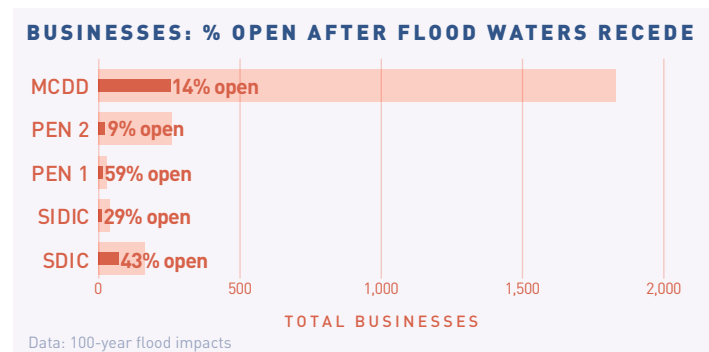
Between 65% and 75% of the buildings in the districts would be exposed to flooding if there was a levee failure in that district during either a 100- or 500-year flood, apart from PEN 2, which could see up to 95% of its buildings flooded. Under either flood scenario, MCDD would experience the highest cumulative loss with 1,855 to 2,038 of its 2,622 buildings experiencing flooding, which could cost up to \$2.8 billion to repair post flood. To repair the buildings and replace the contents and inventory, the cost could be as high as \$6.9 billion depending on the location of the levee failure and flooding.



Businesses, Employees & Wage Loss

Flooding associated with a levee failure would have serious consequences on businesses operating in the districts and their employees. Recovery time, and therefore how quickly employees get back to work and earning wages,

is expected to be dramatically different from one district to the next. MCDD has the largest number of businesses and employees by far and would experience the greatest overall loss due to flooding. Over 90% of the approximately 47,100 employees in MCDD would initially be out of work and lost wages could range from \$2.5 billion to \$3.4 billion over two years. SDIC has the second largest number of employees directly behind the levee with about 6,000 people working in the district. More than half of the businesses in SDIC would be forced to close due to a flood and about three-fourths of the employees would initially be out of work. Fortunately, the region is expected to recover relatively quickly and within one year between one-half and three-fourths of SDIC's displaced employees should be able to return to work.



Transportation Systems

The DOGAMI study also looked at the exposure of bus, light rail, trucking and emergency routes to flooding, which included over 140 miles of transportation road and rail. The routes in MCDD make up the greatest proportion of transportation lines within the districts and MCDD had the largest overall exposure ratio with approximately half of the transportation lines impacted or impassable during a 100-year flood.

Notable impacts include:

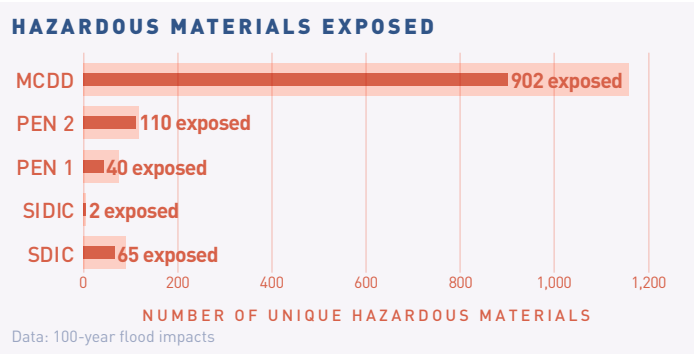
- Marine Drive is vulnerable to flooding throughout the districts, particularly in PEN 1 and PEN 2.
- Airport Way, NE 33rd, NE 82nd, NE 112nd and NE 223rd are all vulnerable to flooding in MCDD which will create challenges for companies in the area and those that need to access the Port of Portland facilities to move goods to market.
- Martin Luther King Boulevard, Highway 205, Columbia Boulevard, and Sandy Boulevard should remain widely passable as long as the railroad embankment on the far western side of PEN 1 remains intact.
- A section of I-84 in SDIC and I-5 in PEN 1 would be impassable during a 500-year flood
- All ten of the large parking lots in MCDD will experience 4-7 feet of flooding during a 100- or 500-year flood, which could result in complete destruction of cars, trucks, and SUVs.
- Bus lines along Marine Drive, Martin Luther King Jr. Boulevard, Vancouver Way, Airport Way, NE 105th

Avenue, NE 33rd Avenue and Frontage Road could be disrupted due to flooding along with portions of the Yellow and Red MAX light rail lines.

- Many of the designated emergency routes in each of the districts are projected to become impassable during a levee failure and flood. DOGAMI recommends developing alternative routes that can be used depending on where the levee failure takes place.

Hazardous Materials

Many businesses and individuals store hazardous materials in their buildings and homes, which can create significant risk during a flood. According to the Oregon Office of State Fire Marshals (OSFM), there are over 1,000 hazardous materials stored throughout the districts, ranging from flammable and combustible liquids to acute health hazards. MCDD has the highest risk with over 269 buildings containing 1,157 hazardous materials of which 95% would be exposed during a major flood due to a levee failure in the district.



Other Key Infrastructure

There is also above-ground infrastructure that will be exposed to flood waters during either a 100- or 500-year event. Perhaps most notable is the Columbia South Shore Well Field situated in MCDD, which provides drinking water for about 800,000 Oregonians, making it the second largest source of drinking water in the state.

The drainage districts, cities, and port operate pump stations throughout the districts, which move hundreds of a large amount of rain and storm water through the Columbia Slough and into the Columbia River annually. The majority of the pump stations are in areas that would be exposed to flood waters during a levee failure associated with a 100-year event, which will make it more challenging to respond to a flood. Two electrical substations and two natural gas facilities in MCDD would also be exposed to flooding if a levee failure occurred in that section of the system. In SDIC, four electrical substations and one water treatment facility could be exposed to floodwaters if a levee failure occurred on the eastern end of the system.

Community Assets

In this study, community assets are classified as key businesses; educational, nonprofit, government, and emergency services; and historical, recreational, and environmental sites within the districts. A majority of the assets identified by stakeholders and the public would be impacted by a 100-year or greater flood. A sample of those assets, include:

- The historic site of the City of Vanport
- The Portland International Airport and Troutdale Airport
- Three major interstates (I-5, I-205, and I-84)
- The 142nd Fighter Wing of the Air National Guard, which consists of more than 1,000 officers and airmen who guard the west coast from northern California to the border of Canada, and play a key role in responding to regional and national disasters on the west coast
- Schools and training centers including Bridge Middle School, Portland Police Bureau’s Training Division, Portland Fire Department’s Training Center, the International Brotherhood of Electrical Workers’ Training Center, and the Pacific NW Council of Carpenters’ Institute
- Recreational sites including the Expo Center, Portland International Raceway, Delta Park, Columbia Edgewater Country Club, Columbia Slough Trail, sections of the 40-mile Loop Trail, Columbia Children’s Arboretum, Colwood Golf Center, Blue Lake Regional Park, and many more.

Debris

One of the challenges to recovery following a flood is removal of the debris that is left behind when the flood waters recede. As a part of this assessment, DOGAMI estimated the amount of debris produced in each district following a levee break and 100-year flood. MCDD would experience the largest amount of debris at approximately 630,000 tons with PEN 2 following with about 200,000 tons. Sauvie Island is projected to produce 20,000 tons of debris followed by SDIC at 6,000 tons and PEN 1 at 5,000 tons.

CONCLUSION

In the Portland metro area, the levees along the Columbia River between the Willamette and Sandy Rivers were built when the area was historically farm and timber land. Today, however, thousands of residents, businesses, and employees rely on those same levees to reduce the risk of flooding. We know from past levee failures and floods around the country, that our levees cannot be taken for granted. Thanks to the DOGAMI risk assessment, we have a better understanding of the exact risk posed by levee failure and flooding within each of the drainage districts in the Columbia Corridor.

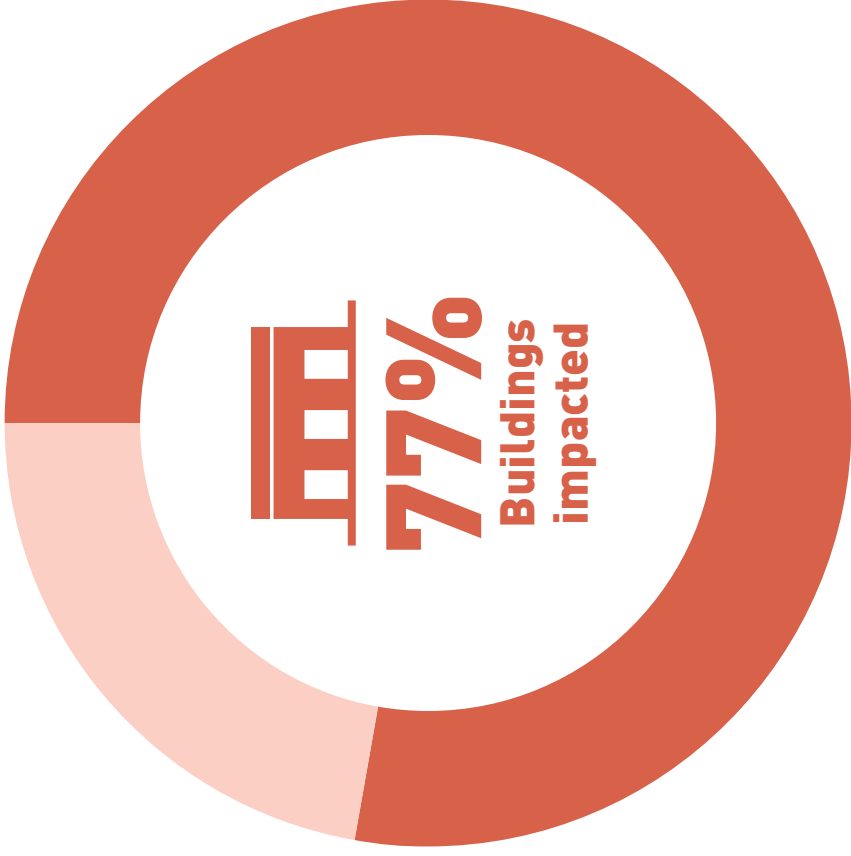
Snapshot

The potential consequences of a levee failure during a 100-year flood by district

		SIDIC	PEN 1	PEN 2	MCDD	SDIC
Initially Displaced Residents	Total Population	641	15	2,480	4,927	14
	# Displaced	381	13	2,270	3,320	0
	% Displaced	59%	87%	92%	67%	0%
Buildings Flooded	Total # of Buildings	709	54	1,137	2,622	180
	# Flooded	486	42	1,075	1,855	91
	% Flooded	69%	78%	95%	71%	51%
Cost to Repair Buildings	Building Value	\$203.1M	\$214.9M	\$763.7M	\$5.69B	\$537M
	Cost to Repair Buildings	\$56.2M-\$68.7M	\$11.5M-\$15.9M	\$286M-\$342.3M	\$1.57B-\$2.36B	\$76.5M-\$125.4M
Cost to Repair Building Contents & Inventory	Value of Contents & Inventory	\$174.5M	\$273.2M	\$625.1M	\$5.2B	\$630.7M
	Cost to Repair/Replace	\$77M-\$81.3M	\$21.7M-\$23.9M	\$386.6M-\$417.9M	\$3.1B-\$3.8B	\$179.9M-\$220.2M
Businesses Disrupted	Total # of Business	41	27	260	1,830	164
	% open once flood waters recede	29%	59%	8.8%	14%	43%
	% open within 1 year	78-93%	63-78%	21-36%	24-33%	61-79%
	% open within 2 years	100%	78-100%	57-100%	87-100%	97-100%
When employees return to work	Total # of Employees	405	1,167	4,506	47,119	6,062
	% back to work once flood waters recede	58%	23%	5%	9%	27%
	% back to work within 1 year	83-89%	86-93%	13-20%	20-28%	47-76%
	% back to work within 2 years	99-100%	93-100%	38-100%	87-100%	95-100%
Employee Wages	Current Employee Earnings	\$12.9M	\$66.5M	\$193.6M	\$2.3B	\$240.7M
	% earnings within 1 year	71-84%	56-87%	7-11%	16-22%	42-66%
	% earnings within 2 years	89-98%	94-96%	15-28%	36-67%	64-88%



Data: 100-Year Flood impacts if :
PEN1, PEN2, MCDD and SDIC flood

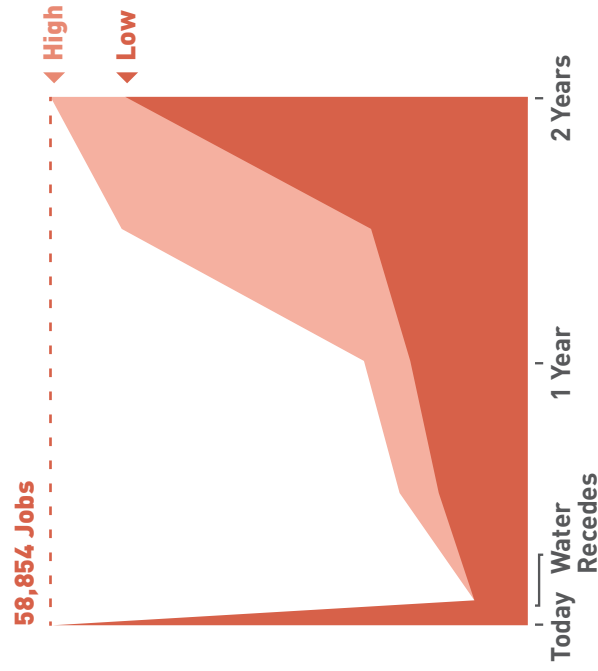


Data: 100-Year Flood impacts if :
PEN1, PEN2, MCDD and SDIC flood



Job loss and recovery

How fast will jobs recover if there is a major flood?

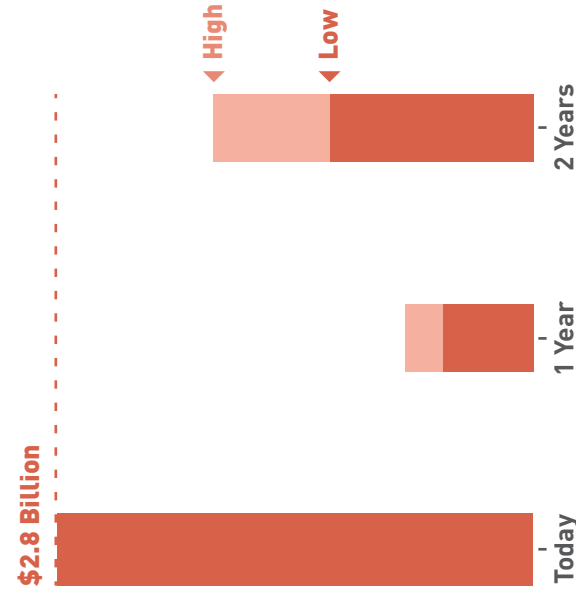


Data: 100-Year Flood impacts if PEN1, PEN2, MCDD and SDIC flood



Wage loss and recovery

How fast will wages recover if there is a major flood?

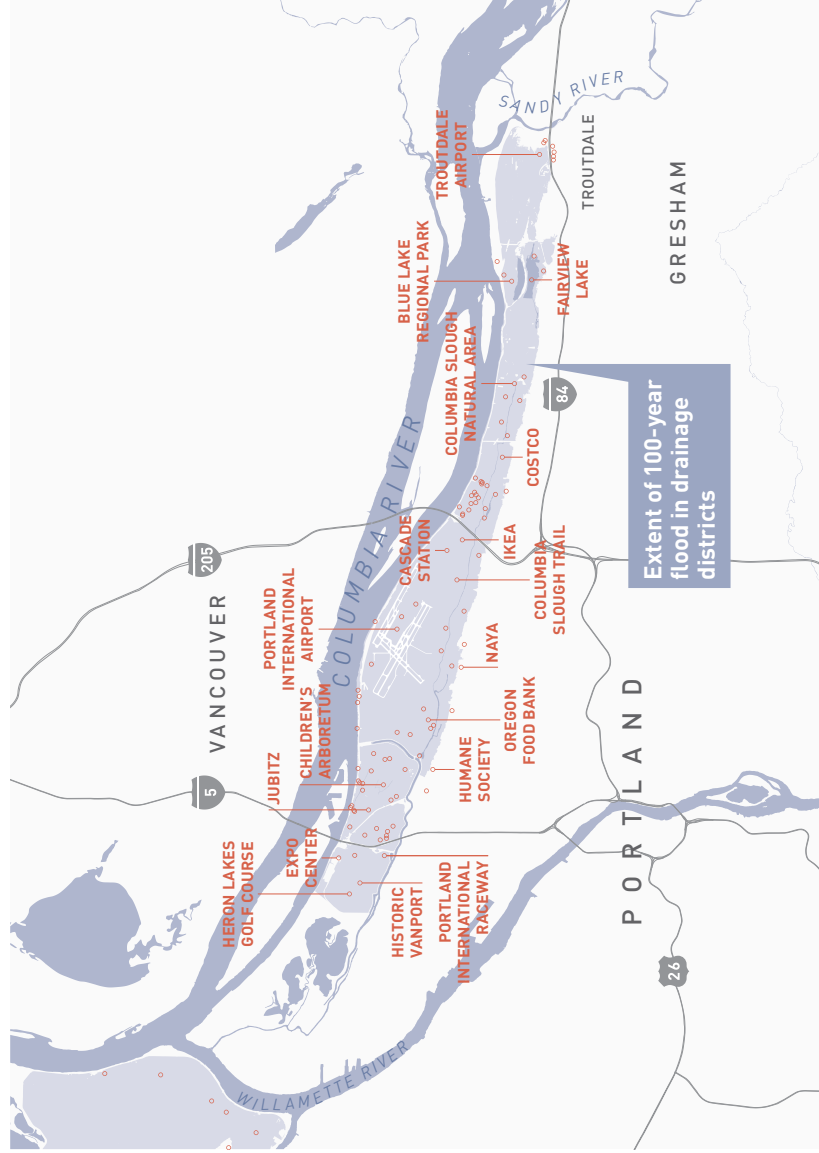


Data: 100-Year Flood impacts if PEN1, PEN2, MCDD and SDIC flood



Places we love

Which community resources could be impacted by flooding?



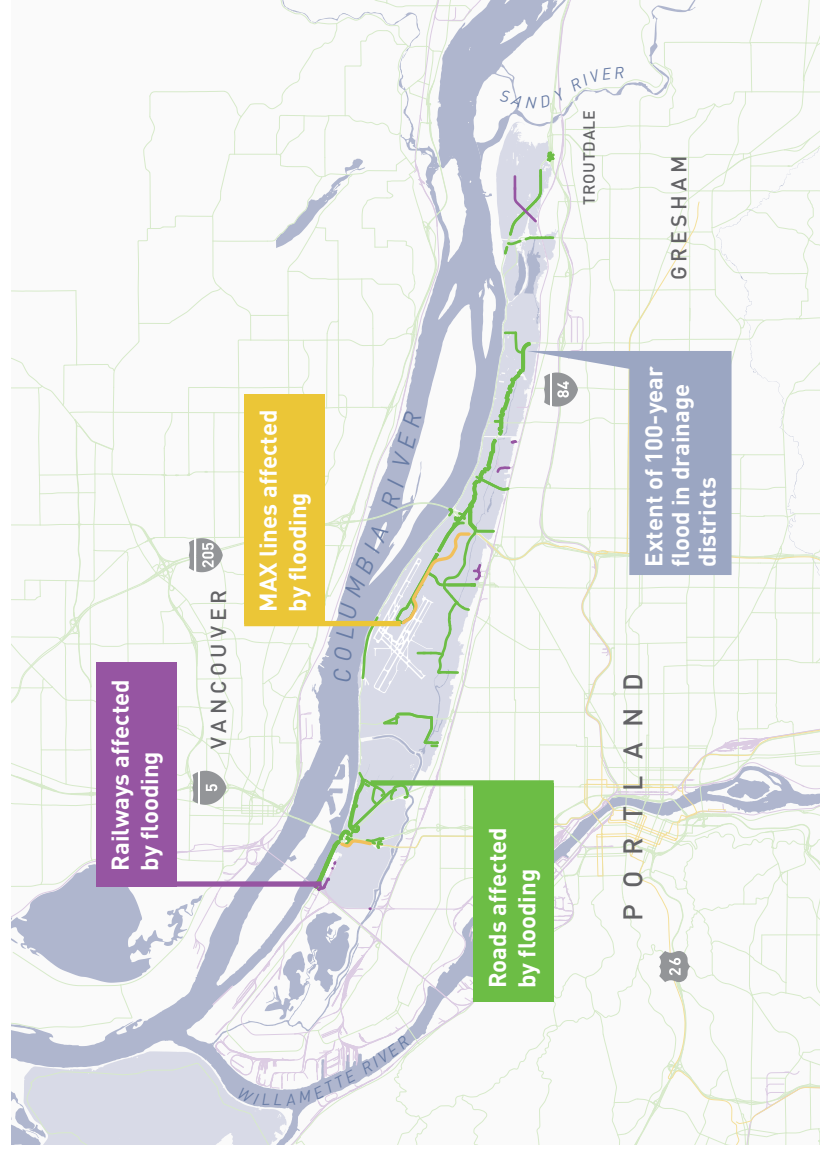


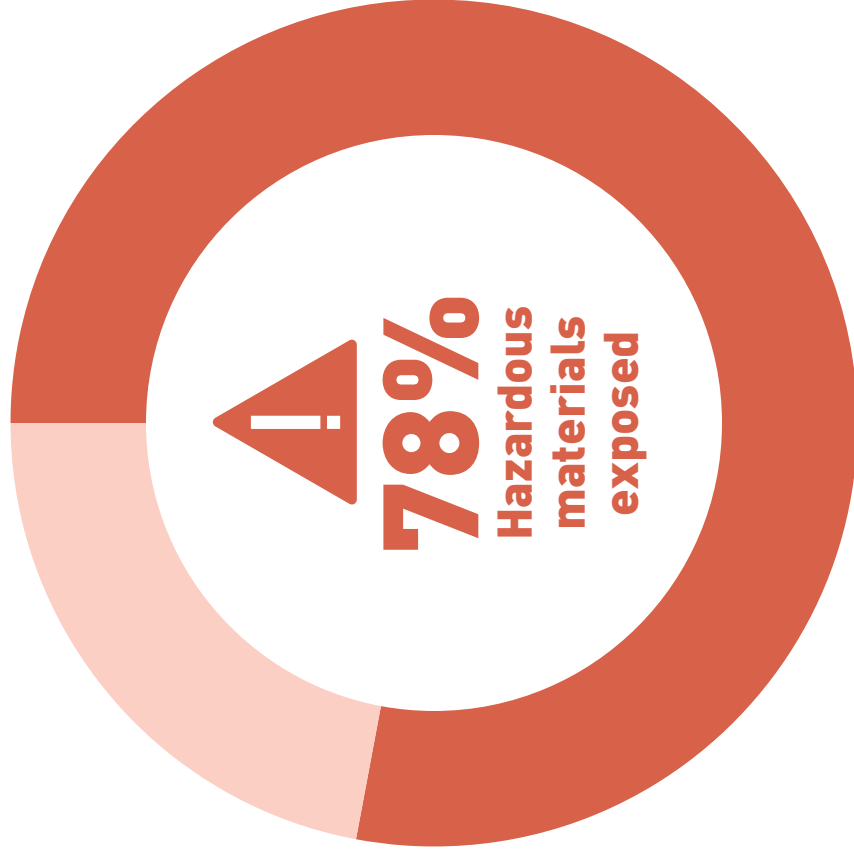
Data: 100-Year Flood impacts if :
PEN1, PEN2, MCDD and SDIC flood



Transportation impacts

What transportation assets will be exposed by flooding in the drainage districts?



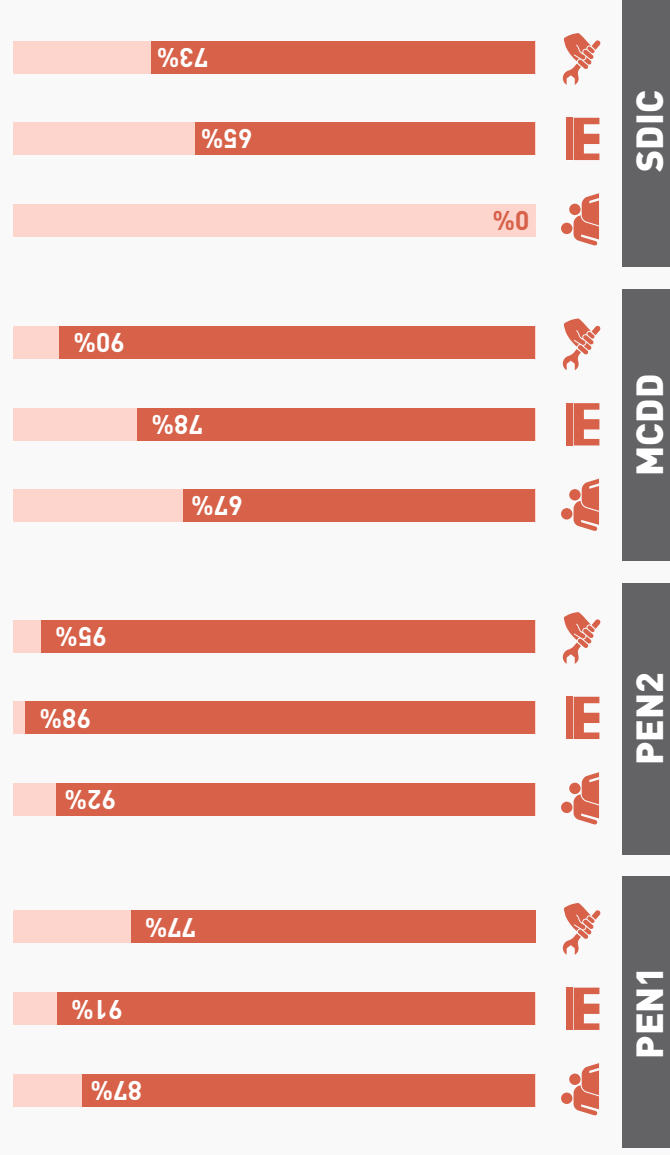
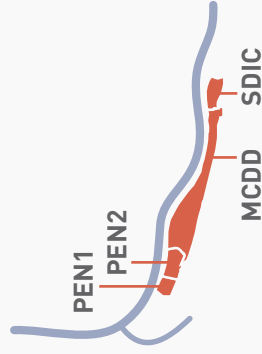


Data: 100-Year Flood impacts if :
PEN1, PEN2, MCDD and SDIC flood



Different districts—different impacts

Flooding could impact just one district—or several.
Here's how they measure up.



Data: 100-Year Flood impacts

RESOLUTION NO.

A RESOLUTION OF THE TROUTDALE CITY COUNCIL DECLARING ITS SUPPORT OF THE \$150,000,000 BOND MEASURE TO UPGRADE LEVEES, FLOODWALLS, WATER PUMPS, AND NATURAL FLOODPLAIN RESTORATION, BROUGHT BY THE URBAN FLOOD SAFETY AND WATER QUALITY DISTRICT, MEASURE 26-243.

THE TROUTDALE CITY COUNCIL FINDS AS FOLLOWS:

1. That the Columbia Corridor Drainage System covers 22,600 acres, stretches 18 miles along the Columbia River, and the managed floodplain is currently protected from flooding by levees to ensure the continued safety of the people, businesses, and other assets of the region.
2. That the levee system protects valuable businesses and critical regional infrastructure in Troutdale stretching southward from the Columbia River across the managed floodplain.
3. That the levee system protecting the managed floodplain dates back 100 years and can no longer meet the Federal Emergency Management Agency (FEMA) and US Army Corps of Engineers' (USACE) Federal levee accreditation standards without substantial capital upgrades.
4. That in addition to increased risk of loss of life, the loss of federal accreditation and being re-mapped as a high-risk flood zone would impact Troutdale with substantial decline in property values and new restrictive zoning and building codes to elevate buildings above the base flood elevation effectively preventing future development.
5. That the City has been an active member since 2014 of the Levee Ready Columbia (LRC) Partnership, to collaborate in finding a solution for the FEMA reaccreditation challenges.
6. That in 2019 the LRC was successful in persuading the Oregon Legislature to create the new the Urban Flood Safety and Water Quality District (UFSWQD) to consolidate the four legacy drainage districts and develop the required funding for both daily operations and the almost \$300 million of capital improvements necessary to maintain FEMA levee accreditation.

7. That the Legislature recognized that the of hundreds of thousands of households and businesses who in metro region benefit from a “dry” floodplain, and that the capital project costs should be shared by those who benefit, created the new UFSWQD with a much larger estimated \$85 billion tax base, from which to fund any voter approved General Obligation (GO) Bonds for the necessary capital improvements.

8. That if the required local match funding is raised, about \$100 million in federal investments through USACE has been authorized for the required capital projects that must be completed to maintain FEMA accreditation.

9. That time is of the essence in order to make the of capital improvements necessary to maintain FEMA accreditation, and obtain the \$100 million of authorized federal funding assistance, the UFSWQD has referred to the voters of the District a Ballot Measure requesting authorization for \$150 million of GO Bonds.

10. That it is hereby found that the capital projects necessary to maintain FEMA accreditation of the levees are in the vital public interest for the protection of the lives and property in Troutdale.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE CITY OF TROUTDALE:

Section 1. That it be spread upon the record and publicly know that in consideration of the above findings the Mayor and City Council of the City of Troutdale hereby declare their support and urge the voters of the UFSWQD to approve the Ballot Measure 26-243 authorizing \$150,000,000 of General Obligation Bonds.

Section 2. Upon adoption this Resolution shall take effect.

YEAS:
NAYS:
ABSTAINED:

Randy Lauer, Mayor
Date:

Sarah Skroch, City Recorder
Adopted:



STAFF REPORT

SUBJECT: A resolution calling for urgent ambulance staffing model reform in Multnomah County

MEETING TYPE: City Council - Regular Meeting

MEETING DATE: March 12, 2024

PRESENTER: Ray Young

DEPARTMENT / AFFILIATION: Executive

ACTION REQUIRED: Resolution

PUBLIC HEARING: No

COMMITTEE / COMMISSION RECOMMENDATION: N/A

STAFF RECOMMENDATION: Approval

Exhibits:

- A. News Article January 5th, 2024, Re Ambulance Service
- B. City of Portland Resolution Re Ambulance Service
- C. City of Gresham Resolution Re Ambulance Service
- D. Fire District 10 Resolution Re Ambulance Service
- E. Multnomah County Press Release February 29th, 2024, Re Ambulance Service
- F. Journal of Emergency Management Services Article Re Ambulance Staffing
- G. Journal of Prehospital and Disaster Medicine Re Ambulance Staffing
- H. Journal of Prehospital Emergency Care Re Ambulance Staffing

Subject Relates to:

☒ Council Goals ☐ Legislative ☐ Land Use / Development ☐ Other

Community Safety

Discussion Points:

- Is the community at risk due to slow ambulance response times
- Is the 2 paramedical staffing model better than one paramedic and one EMT
- Would a pilot program allowing 1 + 1 improve response times and maintain patient safety

Background:

Multnomah County is mandated under ORS 682.062 to develop and implement Ambulance and Emergency Medical Services (EMS) plans since 1994. The County made updates to the County Code in 2016 to refine governance over ambulance staffing. Despite these measures, the county has faced increasing medical 9-1-1 call volumes, revealing significant structural flaws in the EMS system. This has resulted in ambulance shortages, delayed response times, and reliance on a staffing model that has struggled to meet the community's needs. (See the news article Exhibit A)

The primary purpose of this resolution is to ensure all residents of Troutdale, particularly the most vulnerable and economically disadvantaged, have access to prompt and effective emergency medical services (EMS). By supporting the piloting of a new staffing model of one Paramedic and one Emergency Medical Technician (EMT) per ambulance, we are encouraging Multnomah County to address the critical shortage of ambulances and improve response times to medical emergencies. The anticipated outcome is a more efficient EMS system that can better serve the needs of our citizens, ultimately saving lives and enhancing community well-being. While Multnomah County seems to be considering reducing the problem, many believe they are acting too slowly. (Exhibit E)

The Cities of Portland and Gresham, and Fire District 10, have all called on Multnomah County to enact this pilot program. (Exhibits B, C, and D.) Substantial industry evidence suggests that there is no risk to our citizens by pursuing this model. (Exhibits F, G, and H) Staffing with one paramedic and one EMT is common in the Metro area, and around the United States. It should be implemented here.

Pros & Cons:

Pros:

- Provides faster ambulance response time for emergencies.

Cons:

- Multnomah County claims that the quality of the care received under the proposed staffing model is inferior to the current model.

Oversight:

- *Budget Impact:* ☐ Yes, current year (describe) ☐ Yes, future (describe) ☒ N/A
- *Community Involvement Process:* ☒ Yes (describe) ☒ N/A
- *Approval by City Attorney:* ☐ Yes ☒ N/A

Reviewed and Approved by the City Manager: _____



Paramedic Paradox: Unraveling Multnomah County's response time dilemma

by: Elise Haas Updated: Jan 5, 2024

Data show that AMR only gets to patients within eight minutes, 60% of the time

PORTLAND, Ore. (KOIN) – Imagine: You call 911 for an emergency for a loved one and there are zero ambulances available to come help you. This is the current reality in Multnomah County while AMR is down 58 paramedics, and that number is only expected to rise in the new year. Further, a local ambulance industry expert says the county's response times are about to get even worse.

Data from November 2023 show Multnomah County continues to regularly run out of ambulances to send to emergencies – only getting to patients within eight minutes, 60% of the time. The **half a million dollar fine the county issued against AMR in November** has had virtually no impact on speeding up response times, compliance data show.

“Multnomah County has one of the highest cardiac arrest survival rates in the country under this system,” one health department spokesperson told KOIN 6. “Changing the model will not fix response times.”

According to Dr. Stephen Dean, who worked in emergency medical services both in Portland and across the country for more than five decades and specialized in improving EMS systems, “people are going to get hurt if we don't fix the response time problem.”

Now retired in the Portland area, Dean said he can't help but see the impending catastrophe in Multnomah County.

“A concern you might have is, ‘What is the plan to fix the response times?’ And right now there is no plan. And we're getting ready to go into the flu season when it's going to make a difference,” Dean said.

Flu season typically lasts from October to April. Year after year, Oregon Health Authority data documents huge spikes in illness during this timeframe. This year's **data show the spread is starting to rise.**

Dean said the number of 911 calls typically correlate with this increase in illness.

“When the flu hits, it raises the whole system's call volume up, so you get more heart attacks, more respiratory problems, more of everything,” he said.

Dean warns of the chain of events to come: Emergency room overcrowding would lead to slow patient turnover at hospitals and limit available ambulances for emergency calls. Paramedics who call out sick would also result in higher caseloads and increased burnout.

“My top concern is that the response times will get longer, and response times matter in an EMS system. If they didn’t matter, the county wouldn’t have this eight-minute, 90% compliance,” he said. “As the response times get longer, the county must take action to help the system or help the patients, because it’s the patients who are getting the longer response times.”

Dean urges the county to change their two-paramedic requirement, adding that one paramedic and one EMT “can handle more than 98% of the calls that are received in the system.”

KOIN 6 has repeatedly asked top county health leaders for a year if they’d consider changing Multnomah County’s two-paramedic requirement to the national standard of one paramedic and one EMT, even temporarily. The answer has consistently been, ‘No.’

Multnomah County Commissioner Dr. Sharon Meieran also happens to be an emergency physician, and she said the county needs to “change [its] staffing model, period.” In fact, she recently **filed a written formal proposal** to change the ambulance staffing model after what she claims were months of verbal requests.

“I am an avid supporter of the one paramedic/one EMT staffing model for a variety of reasons,” Meieran said. “The evidence points to it. It is safe. It is effective, and it is the right combination of providers to provide the best care and the fastest way possible.”

In her proposal, she points to extensive research done within recent years that show the two-paramedic model is an outlier.

“It can be done in very, very unique circumstances. We don’t have any of the circumstances here. And so what we’re doing isn’t done anywhere else in the state,” Meieran said. “The most important thing is getting to the scene fast, starting whatever treatment you can start, and then getting someone to the ER. That’s what we need to be doing.”

She’s pushing for the Multnomah County chair and health leaders to reconsider their stance for the sake of patients, but both have long publicly supported keeping two paramedics per ambulance – **citing studies from abroad** that show better cardiac arrest outcomes. “I mean, I’m glad that Korea is doing whatever it is they’re doing,” Meieran said. **“They’re not applicable.”**

In a press release from November, the chair and health department director underscored that the dual paramedic “staffing requirement has helped ensure the county’s system has one of the highest cardiac arrest survival rates in the country.”

However, according to state records within the last five years, Clackamas County has a higher cardiac arrest survival rate than Multnomah County. Clackamas County operates with a one paramedic and one EMT model.

MULTNOMAH:

2018: 18.3%

2019: 14.6%

2020: 10.8%
2021: 11.8%
2022: 15.8%

CLACKAMAS:

2018: 19.8%
2019: 17.3%
2020: 13.4%
2021: 17.7%
2022: 18.6%

“The idea that we would wait for two paramedics to do something like that rather than get one paramedic and one EMT to a scene faster is ludicrous,” Meieran said.

KOIN 6 obtained the number of cardiac arrest incidents in Multnomah County within the last five years and found that, of the roughly 120,000 emergency calls they receive per year, about 700 are for cardiac arrest.

That means that cardiac arrest cases in Multnomah County account for 1% of the patients that AMR serves. An internal audit in 2023 showed that nearly all – 99.9% of the 1% – of patients experiencing cardiac arrest in the county received a response of one paramedic from Portland Fire & Rescue as well as two paramedics from AMR.

“So there actually is another paramedic there anyway, this is shocking to me that we haven’t done this already,” Meieran said.

Meieran initiated a formal process to convene experts on this topic, which she said could offer a solution within weeks. However, Multnomah County Chair Jessica Vega Pederson is on record at a recent board meeting saying otherwise.

“In and of itself, looking at the question of whether a two-paramedic model is still the viable model is a nine month process,” she said. “So the recommendation backed from our team was that if we’re going to be looking at the two-paramedic question, we might as well look at the entire ambulance service plan.”

Sharon Meieran said it should be done with more urgency, adding that “this is not something that needs to be nine months, and whoever is saying that is being inaccurate and misleading.”

A week after this meeting, **KOIN 6 obtained a letter** that Vega Pederson sent to the mayors of East County, who have begged her to change to the one paramedic and one EMT model.

“Our MCEMS team is undertaking a formal examination of the two-paramedic model to potentially change the staffing requirement, but that process will not yield a quick fix,” she wrote in the letter.

Meanwhile, AMR said that if Multnomah County moved to a one paramedic and one EMT system, they would immediately have half a dozen more ambulances out in the field and could be could fill the nearly 60 paramedic vacancies with EMTs within a few months.

“It’s literally life or death every single day, every hour,” Meieran said. “And the failure to act, in my view, is a moral outrage.”

This equally outrages residents like Dean, who said he dreads the day he or his family needs an ambulance in this part of Oregon. “These are very life threatening conditions,” he said. “These are the conditions where seconds and minutes really do matter.”

City of Portland Resolution 37652, February 21st, 2024

Urge Multnomah County Chair to pilot an ambulance response model to address paramedic staffing shortages and reduce instances when no ambulances are available to respond to emergencies.

Adopted

WHEREAS, Multnomah County, under ORS 682.062, is mandated to develop Ambulance and Emergency Medical Services (EMS) plans. These plans, subject to approval by the Oregon Health Authority, outline the provision and coordination of ambulance services within county jurisdictions, including staffing provisions.

WHEREAS, Multnomah County's Ambulance Service Plan (ASP), first implemented in 1994, designated the entire county as a unified ambulance service area. It mandated that all ambulances dispatched for Advanced Life Support (ALS) calls be staffed with two Paramedics and established a policy that ambulances shall reach ALS emergencies within 8 minutes 90% of the time.

WHEREAS, in 2016, the Multnomah County Board of Commissioners updated County Code Chapter 21, Section 406, granting exclusive authority over ambulance staffing, including any changes, to the EMS Medical Director, with the Multnomah County Chair as the sole individual empowered to demand action from department leadership, including the EMS Medical Director, in her capacity as the County's Chief Hiring Officer.

WHEREAS, a drastic rise in medical 9-1-1 calls over recent years has placed a much larger burden on medical first responders in Multnomah County. Major structural flaws in Multnomah County's emergency medical response system have been revealed, resulting in a critical ambulance shortage leading to unprecedented incidents of Level Zero (no ambulances available to respond to emergencies) and delayed ambulance response times.

WHEREAS, residents throughout Portland and Multnomah County who are experiencing perceived emergency medical conditions are at risk of worsening conditions and even death when they attempt to call for help but emergency medical care is delayed due to an insufficient number of ambulances available to respond.

WHEREAS, a staffing model of one Paramedic and one EMT (the "1:1" model) has become the standard across the nation to respond to virtually all medical emergencies. Multnomah County's ASP retains a two Paramedic staffing model despite challenges to train, recruit, and staff two Paramedics per ambulance. Most days, there is not an adequate supply of paramedics and ambulances available to respond to the increasing volume of medical calls.

WHEREAS, the increase in ALS calls and stagnation of any staffing model changes has had a profound negative impact on partner first responder agencies and workforce, particularly Portland Fire & Rescue.

WHEREAS, a proposal exists from Multnomah County's ambulance provider American Medical Rescue (AMR) to pilot a response model that would allow one Paramedic and one EMT (the "1:1" model) to operate together on a transport ambulance.

WHEREAS, Portland Fire & Rescue implores Multnomah County EMS to pilot this 1:1 staffing model. The status of transport ambulances in the City of Portland is critically insufficient, and a one EMT and one Paramedic model will make a difference in the number of ambulances available to serve Portlanders.

NOW, THEREFORE, BE IT RESOLVED that the Portland City Council calls on the County Chair to exercise her authority to direct the EMS Medical Director to order a change in ambulance staffing to allow for this 1:1 staffing model pilot to combat the critical lack of ambulances available to respond to emergencies in the City of Portland.

Impact Statement-Purpose of Proposed Legislation and Background Information

The rapidly increasing volume of medical calls within Multnomah County and the City of Portland coupled with paramedic shortages has led to inadequate ambulance response times and availability throughout the community. Many days, Multnomah County EMS will reach "Level Zero" meaning there are no ambulances available in the community to respond to life-threatening emergencies.

Supplemental medical responders to Multnomah County EMS such as Portland Fire & Rescue have experienced a skyrocketing and unsustainable workload responding to far more medical calls. American Medical Rescue (AMR), Multnomah County's ambulance provider, and the City of Gresham have urged the County to pilot a one-paramedic, one-EMT staffing model which would have an immediate and positive effect, with more ambulances available to serve Portlanders during life-threatening emergencies.

Community Impacts and Community Involvement

Switching from a two-paramedic, to a one-paramedic, one-EMT staffing model would provide much needed relief to the community, minimizing ambulance response times by increasing the number of crews available to respond to emergency medical calls.

Adopted

- Commissioner Carmen Rubio Absent
- Commissioner Dan Ryan Absent
- Commissioner Rene Gonzalez Yea
- Commissioner Mingus Mapps Yea
- Mayor Ted Wheeler Yea

RESOLUTION NO. 3590

**A RESOLUTION CALLING FOR URGENT AMBULANCE
STAFFING MODEL REFORM IN MULTNOMAH COUNTY**

The City of Gresham Finds:

WHEREAS, Multnomah County, under ORS 682.062, is mandated to develop Ambulance and Emergency Medical Services (EMS) plans. These plans, subject to approval by the Oregon Health Authority, outline the provision and coordination of ambulance services within county jurisdictions, including staffing provisions.

WHEREAS, Multnomah County's Ambulance Service Plan (ASP), first implemented in 1994, designated the entire county as a unified ambulance service area. It mandated that all ambulances dispatched for Advanced Life Support (ALS) calls be staffed with two Paramedics and established a policy that ambulances shall reach ALS emergencies within 8 minutes 90% of the time.

WHEREAS, In 2016, the Multnomah County Board of Commissioners updated County Code Chapter 21, Section 406, granting exclusive authority over ambulance staffing, including any changes, to the EMS Medical Director, with the Multnomah County Chair as the sole individual empowered to demand action from department leadership, including the EMS Medical Director, in her capacity as the County's Chief Hiring Officer.

WHEREAS, A drastic rise in medical 9-1-1 calls over recent years has placed an undue and extreme burden on medical first responders in Multnomah County. Major structural flaws in Multnomah County's emergency medical response system have been revealed, resulting in a critical ambulance shortage leading to unprecedented incidents of Level Zero (no ambulances available to respond to emergencies) and delayed ambulance response times, putting the lives of the Gresham community at risk.

WHEREAS, the City of Gresham is a community of great diversity, home to economically disadvantaged and marginalized populations, with a significant population of elderly residents who depend heavily on timely and efficient emergency medical services, necessitating a responsive, reliable, and equitable emergency medical service;

WHEREAS, The increase in ALS calls and stagnation of any staffing model changes has had a profound negative impact on partner first responder agencies and workforce, particularly Gresham Fire Department.

WHEREAS, A staffing model of one Paramedic and one EMT (the "1:1" model) has become the standard across the nation to respond to virtually all medical emergencies, and a proposal exists from Multnomah County's ambulance provider, American Medical Rescue (AMR), to pilot this model;

WHEREAS, Gresham Fire Department implores Multnomah County EMS to pilot this 1:1 staffing model. The status of transport ambulances in the City of Gresham is critically insufficient, and a one EMT and one Paramedic model will make a difference in the number of ambulances available to serve the Gresham community.

NOW, THEREFORE, BE IT RESOLVED:

The Gresham City Council calls on the County Chair to exercise her authority to direct the EMS Medical Director to order a change in ambulance staffing to allow for this 1:1 staffing model pilot to combat the critical lack of ambulances available to respond to emergencies in the City of Gresham.

Yes: _____

No: _____

Absent: _____

Abstain: _____

Passed by the Gresham City Council and effective on _____.

Eric Schmidt
Interim City Manager

Travis Stovall
Mayor

Approved as to Form:

Ellen Van Riper
City Attorney



**Multnomah Rural
Fire Protection
District No. 10**

Exhibit D

3/12/24 Council Mtg. Item #7

RECEIVED

FEB 29 2024 *SS*

CITY OF TROUTDALE
CITY RECORDER'S OFFICE
*Copied to Ray +
City Council*

February 27, 2024

Mayor Randy Lauer
City of Troutdale
219 E Historic Columbia River Hwy.
Troutdale, OR 97060

To Mayor Lauer,

The Board of Directors of the Multnomah County Rural Fire Protection District 10 is extremely concerned about the current situation of ambulance response times in Multnomah County. The situation is magnified in this district by the rural nature of our area and greater distance from ambulance services. The board feels it is important to speak up in agreement with Gresham Fire and Emergency Services, the City of Gresham, Portland Fire and Rescue, and the City of Portland on this urgent matter.

A special board meeting was called on Saturday, February 24, 2024 to discuss this matter and the board has adopted the enclosed resolution. The board feels this staffing model reform is urgently needed.

Thank you very much for your consideration of this resolution.

Sincerely,

Linda Rasmussen
Administrative Assistant

Enclosures

RESOLUTION R-2024-1

A RESOLUTION CALLING FOR URGENT AMBULANCE STAFFING MODEL REFORM IN MULTNOMAH COUNTY

The Multnomah County Rural Fire Protection District 10 Finds:

WHEREAS, Multnomah County, under ORS 682.062, is mandated to develop Ambulance and Emergency Medical Services (EMS) plans. These plans, subject to approval by the Oregon Health Authority, outline the provision and coordination of ambulance services within county jurisdictions, including staffing provisions.

WHEREAS, Multnomah County's Ambulance Service Plan (ASP), first implemented in 1994, designated the entire county as a unified ambulance service area. It mandated that all ambulances dispatched for Advanced Life Support (ALS) calls be staffed with two Paramedics and established a policy that ambulances shall reach ALS emergencies within 8 minutes 90% of the time.

WHEREAS, In 2016, the Multnomah County Board of Commissioners updated County Code Chapter 21, Section 406, granting exclusive authority over ambulance staffing, including any changes, to the EMS Medical Director, with the Multnomah County Chair as the sole individual empowered to demand action from department leadership, including the EMS Medical Director, in her capacity as the County's Chief Hiring Officer.

WHEREAS, A drastic rise in medical 9-1-1 calls over recent years has placed an undue and extreme burden on medical first responders in Multnomah County. Major structural flaws in Multnomah County's emergency medical response system have been revealed, resulting in a critical ambulance shortage leading to unprecedented incidents of Level Zero (no ambulances available to respond to emergencies) and delayed ambulance response times, putting the lives of the Multnomah County Rural Fire Protection District 10 community at risk.

WHEREAS, The Multnomah County Rural Fire Protection District 10 serves a large diverse rural community, with a significant population of residents who depend heavily on timely and efficient emergency medical services, necessitating a responsive, reliable, and equitable emergency medical service.

WHEREAS, The increase in ALS calls and stagnation of any staffing model changes has had a profound negative impact on partner first responder agencies and workforce, particularly Multnomah County Rural Fire Protection District 10 and its contract with Gresham Fire Department.

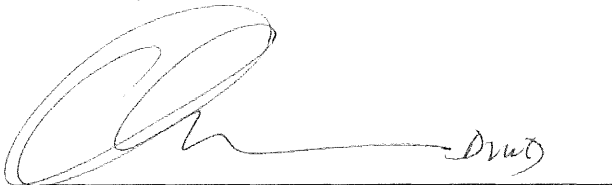
WHEREAS, A staffing model of one Paramedic and one EMT (the "1:1" model) has become the standard across the nation to respond to virtually all medical emergencies, and a proposal exists from Multnomah County's ambulance provider, American Medical Rescue (AMR), to pilot this model;

WHEREAS, Multnomah County Rural Fire Protection District 10 Board of Directors implores Multnomah County EMS to pilot this 1:1 staffing model. The status of transport ambulances in Multnomah County Rural Fire Protection District 10 is critically insufficient, and a one EMT and one Paramedic model will make a difference in the number of ambulances available to serve the District 10 community.

NOW, THEREFORE, BE IT RESOLVED:

The Board of Directors of Multnomah County Rural Fire Protection District 10 calls on the County Chair to exercise her authority to direct the EMS Medical Director to order a change in ambulance staffing to allow for this 1:1 staffing model pilot to combat the critical lack of ambulances available to respond to emergencies in Multnomah County Rural Fire Protection District 10.

The above resolution statements were approved and declared adopted on this 24th day of February, 2024

A handwritten signature in black ink, appearing to read 'Michael McKeel', is written over a horizontal line.

Michael McKeel DMD
Chair, Multnomah County Rural Fire Protection District 10

Ray Young

From: sarah.dean@multco.us on behalf of Press Office <pressoffice@multco.us>
Sent: Thursday, February 29, 2024 3:59 PM
To: Press Office
Subject: NEWS RELEASE: Board votes to re-evaluate Ambulance Service Plan; expresses concern for slow ambulance response times



For immediate release: Feb. 29, 2024

Media contact: Sarah Dean, pressoffice@multco.us

This release is online [here](#).

Board votes to re-evaluate Ambulance Service Plan; expresses concern for slow ambulance response times

Multnomah County, Ore. (Feb. 29, 2024) — The Multnomah County Board of Commissioners on Thursday, Feb. 29 voted to re-evaluate the Ambulance Service Plan (ASP) — two years ahead of schedule. Revising the 2016 Plan is needed so that the County's Emergency Medical Services team can make informed recommendations to the Board of Commissioners on material changes to the system.

Thursday's vote approved the Health Department's request for \$167,086 from the County's General Fund contingency to immediately initiate an early review of the Plan. That work includes hiring an expert consultant, analyzing data, and extensive interviews, focus groups and meetings with stakeholders such as fire departments, first responders and emergency departments. The goal of this process is to ensure that all partners can weigh in, and the public understands the impact of any changes to ambulance services to the emergency medical system, including staffing.

Chair [Jessica Vega Pederson](#) acknowledged several fundamental policy issues around the County's current Ambulance Service Plan — including appropriate staffing, required ambulance response times, the 911 dispatch system and the formal and informal roles of fire agencies — that the Board, jurisdictional partners and other stakeholders want to reevaluate.

The state requires each county to have an ambulance plan that specifies how emergency medical services are delivered, including the role of fire agencies, ambulance deployment, staffing, response times, medical direction and quality improvement.

Re-evaluating the Plan is one part of Chair Vega Pederson's four-point plan to address the Ambulance Service crisis that was [announced](#) on Feb. 20.

"The appropriate and responsible process to examine these major elements of our emergency medical system is an assessment of our Ambulance Service Plan," said Chair Vega Pederson. "To do that full picture analysis, the ASP assessment process is the appropriate tool and we should start now, because it is — by nature and by necessity — an in-depth process."

Reviewing the plan requires both Health Department staff and an external consultant with subject matter expertise in emergency medical service systems. Emergency Medical Services administrator Aaron Monnig explained the assessment will identify the strengths and challenges of the County's current system, explore possible system wide changes — including potential benefits and tradeoffs — and produce recommendations to build a stronger County EMS system.

Monnig said the assessment is the appropriate process to reexamine major elements of our system. "Typically, we would do this within the contract term of our ambulance service provider, which would be assessed in 2026 to 2028, but it is clear there is urgency to evaluate these big system questions sooner than that," said Monnig.

Monnig explained the ASP assessment is a consultant-facilitated process that includes stakeholder engagement and data analysis and review. "The ASP assessment is expected to take around nine months, and at the conclusion of the assessment phase, recommendations would come to the Board of County Commissioners for consideration," said Monnig.

During the Board meeting, four local paramedics and Portland Fire Chief Ryan Gillespie testified in support of a full assessment of the Plan.

"It is time for change. Our EMS professionals deserve better. Our community deserves better," said Tim Mollwan, a current Multnomah County paramedic who has 25 years of EMS experience. "Allocating these funds is the first step in creating an EMS system that serves the people, not only the profit margin. Today you have the opportunity to take the first steps in positive change for our communities. Reducing the quality of care your neighbor, your friend, or your family receives is a step in the wrong direction."

Chair Vega Pederson outlined several actions she has asked the County's ambulance service provider to take to improve their contract compliance with ambulance availability and response times including:

- Shore up their staffing by subcontracting;
- Provide hiring and retention incentives to hire and retain staff in Multnomah County;
- Fully staff Basic Life Support ambulances to take pressure off the system — there is still a lot of room to fully realize the benefits of this program.

"With today's action, we are one step closer to where we need to be and my hope is that this will pay off in a resolution to this crisis that meets both the needs of our providers and the needs of our community," said Chair Vega Pederson.

###

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JEMS-Journal of Emergency Management Services

Ambulance Crew Configuration: Are Two Paramedics Better Than One?

Understanding ideal crew configuration is vital to maintain EMS systems from a financial, legal and patient care perspective. This article gives an overview of the evidence as well as the cost implications for different combinations of providers.

[David Shotwell, JD, MICP](#), [Mark A. Merlin, DO, EMT-P, FACEP](#), [Vincent D. Robbins, FACPE, FACHE](#)
10.08.2018

The appropriate complement of ambulance crews has long been debated in the United States. From the very beginning of modern day EMS, circa 1966, we've failed to agree on the most efficacious number of crew members who should staff an ambulance, as well as their appropriate combined scope of practice.^{1,2}

Numerous models exist around the country, differing in both the number of practitioners that compose a crew, and the levels of training each possesses.³ Levels of EMS practitioners have been well-defined through state regulations and national standards. Published reports have concluded the essential nature of EMS, the improved patient outcomes which result from such services and their positive economic impact upon our society. However, there's no consensus on the best complement of practitioners necessary for EMS systems to function at an optimal level.⁴⁻⁸

Although most agree that basic life Support (BLS) and advanced life support (ALS) services should be available to every community and every patient, this isn't necessarily the case nationwide.³

Neither is the organizational structure, design of the delivery systems for these two EMS tiers, or how they interact with each other.⁹

Some communities utilize all ALS ambulances in a single-tier system, sending these units to all requests for EMS. Others use separate response ALS units (with partial, or all ALS crews, which may or may not be vehicles with the ability to transport patients) and BLS ambulances, dispatched together and converging on the scene to treat a subpopulation of all EMS patients considered as the most seriously ill or injured.

In these systems, BLS ambulances are sent without ALS units on cases considered less serious or non-life-threatening. Even other systems use first response, non-transport units staffed with ALS practitioners and separate ambulances with ALS, or partial ALS, crews.²⁻⁴

One standard that does appear ubiquitous, is that it's assumed a minimum of two crew members are necessary to staff the EMS unit that transports a patient to definitive care. This is the case

regardless of the level of EMS provided or the individual crew members' individual scopes of practice; it's based on the simple logic that during transport to a hospital, one member would need to operate the vehicle, while the other needs to attend the patient providing ongoing care.² Little has been written regarding the need for more than one provider to attend to serious or critical cases in the patient compartment.

It appears this will remain the case for the foreseeable future, at least until technology permits autonomously functioning ambulances to be operated without a human driver. However, the optimal training or certification level, and the scope of practice, for each of these two crew members has remained debatable.

However, when we focus more specifically on the crew configuration for ALS services operating in a multitiered EMS system, it's not axiomatic that the crew needs to be staffed by more than one person. And, when the ALS unit also transports the patient, so that at least two crew members are needed, it's not self-evident that all personnel need to be ALS practitioners.

When determining the most appropriate complement of ALS crews, serious consideration should be given to five key factors that may significantly influence patient outcomes and system viability:

1. *ALS practitioner proficiency*: The first consideration is whether the proficiency of a practitioner's skill performance improves with increasing experience and patient contact volume. This is especially important to assess regarding critical skills less often used and more difficult to perform, such as endotracheal intubation, IV insertion, rapid sequence intubation or cricothyrotomy.
2. *Treatment time*: The second consideration is the impact of the number of ALS providers composing the crew has regarding treatment time at the scene, thereby affecting transport to definitive care, and any resulting impact on the morbidity and mortality of patients.
3. *Error rates*: The third consideration to assess is whether the number of ALS providers treating a patient in the field affects the errors committed by those practitioners in the assessment of patients, medications administered or skills performed.
4. *Practitioner shortage*: Reports are now commonplace regarding the shortage of paramedics in the country. Modifying ALS crew configuration could expand or contract the labor pool and impact a system's ability to fully staff necessary units.
5. *Financial sustainability of the EMS system*: Because EMS systems use an intense amount of human resources, the cost of which compose a majority of the annual operating expenses for most systems, crew complement is an important consideration for the long-term financial viability of EMS. Does the ALS crew complement substantially affect the cost of operations?

Taking these considerations into account, this article examines the fundamental question: Is an ALS ambulance crew complement of two practitioners, one certified/licensed to the level of emergency medical technician—basic (BLS Provider) and the other to paramedic (ALS provider), adequate to result in acceptable patient outcomes? Further, is this model equal to, worse than or superior to a crew complement of two paramedics?

The Current Literature

A search on best models of ambulance crew configurations yields little in terms of original research trials. Most likely this is because of the difficulty in studying patients who received two ALS providers vs. one ALS provider during the same acute medical condition.

Several publications exist outside of the U.S., with vastly different EMS systems, which makes comparisons of various numbers of ALS providers extremely challenging.

In 1999, the Canadian OPALS study demonstrated no benefit of ALS over BLS for cardiac arrest.¹⁰ However, that was based on a BLS system with early defibrillation and significant bystander CPR.

Similarly, in a 2003 *USA Today* survey of 50 major cities, the lowest number of paramedics per capita had the highest cardiac arrest survival rates.¹¹

Additionally, worse outcomes are associated with trauma provided by ALS, which is most likely due to additional procedures performed by ALS and increased scene times. One study found that provider skills for intubation is based on frequency of the skill performed and its association with cardiac arrest survival.^{12,13} Based on increased utilization and success of CPAP as well as the deprioritization of intubation during cardiac arrest, the overall utilization of intubation is decreasing, yet the need for paramedic expertise in intubation remains the same.

A study conducted with the Mississippi Department of Health evaluated the volume-outcome relationship of paramedics.¹⁴ This 14-year study estimated the relationship between experience accumulation and performance of paramedics who responded to approximately 175,000 general trauma calls. A greater volume of paramedic experience was significantly related to reduced total prehospital time and time on scene. The authors concluded that retention of skills is accomplished by increased volume.

A 2010 study of 10,298 out-of-hospital cardiac arrests evaluated whether more paramedics (three or more vs. two paramedics) resulted in improved outcomes. No difference was found in survival to discharge, and return of spontaneous circulation wasn't associated with a greater number of paramedics.¹⁵

A similar paper evaluated two paramedic vs. single paramedic crews in simulated cardiac arrest scenarios. They found that additional paramedics on the crews resulted in more errors than with single paramedic crews.¹⁶

An unpublished thesis paper in 2006, a three-year retrospective review of the Wake County EMS System, compared a two paramedic crew vs. a one paramedic crew. During the years studies, half of Wake County had one paramedic per crew and half of their system had two ALS providers per crew. Inclusion criteria were cardiac arrests, respiratory emergencies, cardiac emergencies and traumas that required emergent transport utilizing lights and sirens. No statistically significant difference was found regarding scene times, intubation success and first-

pass success. Not surprisingly, the two paramedic crews had a high rate of statistically significant IV success (0.89 vs. 0.87; $p=0.04$), but not first attempt success.¹⁷

An Australian study evaluated scene time difference in 1,537 prehospital cases with all-paramedic crews vs. mixed crews. All-paramedic crews had a statistically significant longer scene time than mixed crews (16.92 min. vs. 15.95 min.; $p=0.002$). There were no differences in procedure failure rates including intubation and intravenous insertion.¹⁸

Researchers in Columbus, Ohio, retrospectively studied ambulance staffing models in a metropolitan, fire-based EMS system. Paramedic-basic (PB) crews were compared with paramedic-paramedic (PP) crews. There were no differences between PB vs. PP crews in times to ALS interventions, time to IV insertion, IV success rates and protocol violation rates. PP crews did have shorter median scene times than PB crews ($p=0.01$).¹⁹

In 2017, Santa Cruz, Calif., reported a complete change of their EMS system from a dual paramedic crew configuration system to a single paramedic crew configuration.²⁰

Legal Considerations

A review of state statutes and regulations show the majority of states require only a single paramedic on the crew that will staff an ALS ambulance. Two states, New Jersey²¹ and Delaware,²² mandate two paramedics staff an ALS unit, but don't require the ALS unit be capable of transporting patients.^{21,22}

Massachusetts, Wisconsin and Utah laws require the assignment of two paramedics to a response, but don't require the paramedics to be on the same unit.^{23–25}

Among the states requiring only a single paramedic ALS unit, regulations for non-paramedic crew members vary. For example, South Dakota and West Virginia regulations allow an ALS ambulance to operate with a paramedic and a driver meeting requirements established by the Department of Health.^{26,27} Oklahoma regulations are similar, specifying the driver must be certified as an emergency medical responder.²⁸

Other states and territories, such as Oregon, Virginia and Washington D.C., specify that an ALS ambulance must have a paramedic and another crew member certified at or above the EMT-basic level.^{29–31}

Arizona varies the requirement for the crew member depending on whether the ambulance crew services a rural or wilderness area and also considers recent census data.³²

A review by the New Jersey state legislature's Office of Legislative Services in 2013, determined the following:

- “A majority of states require staffing [of ALS units] by two EMTs”□ but “do not specify whether both”□ must be capable of performing paramedic skills.”□

- “Several other states require ALS ambulances to be staffed by only one certified emergency medical responder—i.e., one paramedic or one EMT.
- “In summary, “¹ it does not appear that any other state [except New Jersey] requires ALS vehicles to be staffed by a minimum of two paramedics”¹”□

Local governments and agencies typically have latitude to impose staffing requirements that exceed the state requirements and may staff ambulances with two or more paramedics.

Financial Considerations & Impact of ALS Crew Configuration

A basic analysis of the financial impact on an EMS system can be done concerning the complement of ALS crews. Based on several fundamental assumptions, annual expense calculations can be performed to determine the operating costs of the crew complement configurations considered in this article.

The following assumptions are based on general industry knowledge about operating expenses and common elements present in most organizations. Some variance exists, depending on the organizational design, corporate structure and deployment models that are employed throughout the country.

One of the most widely variable costs are those associated with benefits provided to staff by the employer. These include health plan benefits, paid time off, uniform allowances, tuition reimbursement, retirement plans, payroll taxes and others.^{33,34} However, a general assumption can be used based on average experience reported by the U.S. Department of Labor.³⁴

For the purpose of this analysis, operating and capital costs, other than personnel expenses, weren't included, since crew complement does not necessarily affect them.

The assumptions used for this analysis included the following:

- The calculations are based on one full-time ALS unit;
- A full-time unit is defined as one unit operating 24/7/365;
- The average wage used for a paramedic is \$23.50 per hour;³³
- The average wage used for an EMT-basic is \$18.48 per hour;³³
- Overtime is calculated at 10% of total annual hours (876 hours annually);
- Overtime wages are calculated at time and a half (\$35.25 per hour for paramedics and \$27.72 per hour for EMT-basics); and
- The cost of benefits is calculated at 46.5% of base wages, or 31.7% of total compensation.³⁴

This brief analysis shows that an ALS crew complement of one ALS practitioner with one BLS provider is 10% less expensive annually than a two ALS crew member team. In addition, a single ALS practitioner crew is 44% less expensive than a two-member crew composed of one ALS provider and one BLS member. In a system of 10 ALS units with two paramedic providers this equates to a savings of approximately \$750,000 per year to the healthcare system.

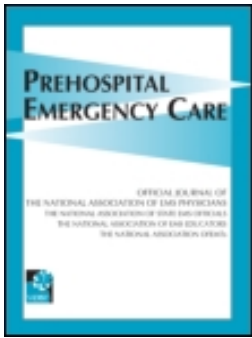
Conclusion

Understanding ideal crew configuration is vital to maintain EMS systems. There's a lack of evidence demonstrating the need for a second ALS provider on a general ALS response. Implications of overstaffing may result in more patient care errors and draining of financial resources which could be spent on additional state-of-the-art medical equipment or number of units resulting in better system performance and patient care.

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IMPACT OF AMBULANCE CREW CONFIGURATION ON SIMULATED CARDIAC ARREST RESUSCITATION

Ryan Bayley, EMT-P, BA, Matthew Weinger, MD, Stephen Meador, EMT-P, Corey Slovis, MD

ABSTRACT

Background. Despite the widespread use of both two paramedic and single paramedic ambulance crews, there is little evidence regarding differences between these two staffing configurations in the delivery of patient care. **Objectives.** To determine potential differences in care provided by each of these ambulance configurations in the resuscitation of a cardiac arrest victim in ventricular fibrillation. **Methods.** Fifteen paramedic-paramedic and 15 paramedic-EMT crews were recruited to perform resuscitation on a high-fidelity human simulator (Laerdal SimMan™). Errors and their nature, time to critical interventions, and compliance with continuous cardiopulmonary resuscitation (CPR) were captured by the simulator and videotape. **Results.** Two paramedic crews averaged 0.7 ± 0.5 more errors of commission, 0.5 ± 0.4 more errors of sequence, and 0.8 ± 0.8 more total errors per resuscitation ($\pm 95\%$ CI; $p = 0.008, 0.017$, and 0.036 , respectively). For all interventions analyzed, only time required to achieve intubation differed between the two configurations, with two paramedic crews intubating 63.9 ± 45.8 seconds more quickly ($p = 0.009$). CPR compliance was highly variable, and a meaningful statistical difference could not be determined, although performance overall was poor, with both configurations averaging less than 50% compliance. **Conclusion.** Two paramedic crews were more error-prone and did not perform most interventions more rapidly with the exception of intubation. These data do not support the proposition that two paramedic crews provide higher quality cardiac care than paramedic-EMT crews in a simulated ventricular fibrillation arrest. **Key words:** ambulance crews; paramedic; technician; out-of-hospital; cardiac arrest; mannequin.

PREHOSPITAL EMERGENCY CARE 2008;12:62–68

INTRODUCTION

Emergency Medical Services (EMS) systems within the United States and abroad are challenged to provide the

highest level of care to the patients they serve while at the same time minimizing costs and maximizing efficiency. As these systems face increasing economic constraints and paramedic staffing shortages, many have reduced the number of paramedics per advanced life support (ALS) ambulance from two to one in an effort to maintain or increase the number of ALS ambulances within their systems. Recent examples include the Fire Department of New York (FDNY) and the District of Columbia Fire Department (DCFD).^{1,2} It is not surprising that these measures have drawn scrutiny from both the lay public and EMS providers themselves regarding possible effects on the quality of patient care.^{1–3}

Currently, approximately 40% of ALS ambulances in the United States are staffed by two paramedics. The remainder have one paramedic and a lesser-trained emergency medical technician (EMT).⁴ Unlike their paramedic counterparts, EMTs are not trained in Advanced Cardiovascular Life Support (ACLS) and thus do not perform interventions such as cardiac medication administration or intubation.⁵ It has been hypothesized that during critical scenarios where multiple interventions must be carried out in a time-sensitive manner, paramedic-EMT crews may perform more slowly than paramedic-paramedic crews because of the EMTs reduced skill set.³ It has also been argued that when both providers are ACLS-trained and certified paramedics, there exists a redundancy in critical care decision making that may reduce errors.²

The few relevant studies to date have only indirectly analyzed crew configuration by using “on-scene time” as a proxy for team efficiency. One study found that reducing the number of paramedics from three to two per ambulance greatly increased both on-scene time and the time required to complete interventions.⁶ On the basis of these findings, it has been hypothesized that further reduction from two paramedics to a single paramedic paired with an EMT might further increase on-scene time and time per intervention. In contrast, an Australian study found that for a similar number of interventions, paramedic-EMT crews actually spent *less* time on-scene versus paramedic-paramedic crews.³ However, the study concluded that the difference was so small as to be of clinical irrelevance. Thus, there are insufficient data to assess the potential impact of different crew configurations on response efficiency. Furthermore, extant studies do not address differences in the *quality* of interventions or types of errors performed by different crew configurations.

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The present study sought to directly compare paramedic-paramedic and paramedic-EMT crews in their ability to execute one standardized critical scenario—specifically, the resuscitation of a patient in ventricular fibrillation. Using high-fidelity simulation, crews were compared for critical errors, time to complete interventions, and continuous CPR compliance when evaluated against the then current American Heart Association 2000 ACLS guidelines.

METHODS AND MATERIALS

Study Design

Thirty full-time ALS ambulance crews were solicited from the Nashville-Davidson County Fire and EMS system (NFD-EMS) for participation in this study. This large, urban EMS system is a single-provider fire-based service covering 500 square miles. It employs 200 EMS paramedics and EMTs and responds to approximately 60,000 EMS calls per year. In this system, roughly half of ambulances are staffed by paramedic-EMT crews, where the EMTs have training and experience that closely approximates that of the nationally recognized EMT-Intermediate classification.⁴ The other half of ambulances are staffed by two paramedics.

A power analysis, assuming a type I error of 5%, calculated that 15 crews of each configuration would provide a 97% chance to detect a 30-second difference in the time required to execute the complete resuscitation assuming a standard deviation of 30 seconds. These assumptions were based on data of simulated two-rescuer ACLS studies using a similar methodology.^{7,8} This same sample size would also provide a 97% chance to detect a 15% difference in CPR compliance (assuming a 15% standard deviation) and 97% chance to detect a difference of 0.5 errors per scenario (assuming a standard deviation of 0.5 errors). Sample size calculations were performed by using the PS Power and Sample Size Program.⁹

The first 15 crews of each configuration to volunteer were chosen with no exclusion criteria. All employees in the NFD-EMS system work full-time, and all paramedics are required to maintain current ACLS certification. At the time of this study, ACLS certification was based on the AHA 2000 ECC guidelines. Crews were blinded to the nature of the simulated emergency (ventricular fibrillation arrest) and to the variables being evaluated, including staffing configuration.

Each crew member signed a written informed consent acknowledging that he or she would be video-recorded and was compensated \$50.00 for participation in the study, which lasted approximately 1 hour. This study design was approved by Vanderbilt's Institutional Review Board.

Experimental Protocol

On the day of simulation, crews were provided a scripted 10-minute orientation to the SimManTM Patient Simulator (Laerdal, Norway, software v3.1). The script reviewed the airway, breathing, and circulatory capabilities of the SimManTM as well as how to perform all ACLS interventions on the mannequin. Crews were then given their standard issue defibrillator/monitor (Zoll M series) and jump bags with sufficient equipment and medications to perform all ACLS algorithms. The defibrillator was modified with Laerdal hands-free defibrillation snaps coupled with a Zoll-compatible adaptor to allow for full-energy defibrillation to be performed directly on the simulator. Crews were given time to ask questions and configure the equipment to their own personal preferences before the simulation commenced.

Crews were then asked to wait outside a room in which the SimManTM was readied and placed supine on the floor 15 feet from the door. When ready, crews were told to enter the room, assess the patient, and perform interventions as dictated by their current standing protocols.

The SimManTM was programmed to generate a rhythm of refractory ventricular fibrillation until the administration of a ventricular antiarrhythmic medication followed by appropriate defibrillation as detailed under Outcome Measures. This was the standing protocol for NFD-EMS during the study period and conformed to the then current 2000 AHA ACLS guidelines with which all crews had many years of experience.¹⁰ The SimManTM logged the occurrence and time of all pulse checks, defibrillations, and intervals during which chest compressions were performed. A video camera recorded the resuscitation on digital videotape (Sony DVCam DSR-1500) with time-coding provided by a Horita RM 50 II unit. The video data were imported to digital files in video-editing software (Macintosh Final Cut Pro 4). Frame-by-frame video analysis allowed for validation of the SimManTM data and crews' performance elements including the number of chest compressions and times to intubation, IV access, and each medication administration.

After the simulation, participants completed a brief survey and information sheet, intended to assess additional variables that might impact performance such as experience level, instructor experience, frequency working with other crew member, and date of most recent ACLS refresher training.

Outcome Measures

Three categories of outcomes were measured: errors, time required to complete interventions, and compliance with continuous CPR.

Errors were quantified by using an 11-item checklist of ordered clinical actions derived directly from the AHA 2000 ECC/ACLS guidelines. This checklist was similar to standardized tools used in ACLS practical skills assessment for the management of ventricular fibrillation.^{10,11} Per the checklist, each team was expected to (in order): check pulses, administer three defibrillations, intubate, initiate IV access, administer 1 mg epinephrine, defibrillate, administer 300 mg amiodarone, defibrillate a fifth time, and perform a final pulse check after rhythm change. Each team's actions, as recorded by the SimManTM log, were compared to this checklist. For each of these 11 actions absent from the SimManTM log, an error of omission was recorded. Actions recorded by the log that were superfluous to these 11 actions were recorded as errors of commission. Once corrected for commission and omission errors, each log was reviewed for the correct order of interventions, with each out-of-order intervention counting as one sequence error. Total errors was the sum of errors of commission, omission, and sequence for each team. For this categorical analysis, all errors were given equal weight.

Time required to complete each intervention was defined as the time elapsed from completion of one intervention to the completion of the next intervention in the sequence. This was calculated by using the time stamps of the SimManTM log. Time to complete the whole resuscitation was calculated similarly. If a crew failed to complete the scenario to the point of ROSC, a cutoff time of 12 minutes was used as the time to complete the scenario.

The third outcome measure, compliance with continuous CPR, was calculated as the total aggregate time during which chest compressions were performed, divided by the total time from scenario start to ROSC. The SimManTM mannequin registered each chest compression meeting a threshold depth of approximately one inch. Intervals of continuous compressions were calculated as time periods during which there was a no greater than 5-second pause during compressions (intended to allow for ventilation). No time corrections were made for actions during which chest compressions were correctly suspended (e.g., defibrillation). This method is consistent with other prehospital studies of CPR performance during resuscitation.¹² Compression rate per minute was also calculated, by dividing the total number of effective compressions for the scenario by the total aggregate time in minutes during which chest compressions were performed.

Data Analysis

Descriptive statistics for the two groups and the results of each outcome measure as described above were tested for normal distribution using the D'Agostino-Pearson test for non-normality. Descriptive statistics,

time to complete each intervention variables, and CPR compliance were consistent with a normal distribution. All measures of error were found not to be consistent with a normal distribution. Data for variables consistent with a normal distribution were compared by using a one-way ANOVA. Data for all error variables were analyzed by using the Kruskal-Wallis rank sum test, which does not assume a normal distribution. For non-normal data, 95% confidence intervals and their means were generated via an Efron bootstrap calculation which does not assume a normal distribution.

Multivariate linear regressions were also run by using time to complete each intervention and total scenario time as dependant variables. Independent variables included team configuration, CPR compliance, individual and combined years of experience of the EMS providers, instructor status, and frequency with which providers worked with each other as self-reported on a five-point Likert scale. Given the size of the data set, each of the above independent variables was individually investigated by regression, along with team configuration, against time required per intervention.

With the exception of bootstrap sampling, analysis was carried out by using the CoStat software package (CoHort Software, Monterey, CA, PC version 6.311). Bootstrap sampling was performed with Resampling Procedures Software (University of Vermont, Burlington, VT, PC version 1.3) at 5,000 resamplings per calculation. For all calculations, a $p \leq 0.05$ was considered significant. Unless otherwise stated, normally distributed data are presented as means \pm standard deviation, and non-normal data are presented as median and 95% confidence interval.

RESULTS

Fifteen paramedic-paramedic crews and 14 paramedic-EMT crews were included in the final analysis. One

TABLE 1. Descriptive Statistics for Each Crew Configuration

	Paramedic -Paramedic	Paramedic -EMT
Total Years of Experience	16 \pm 9.1	18 \pm 8.4
ACLS Instructors per team	0.4 \pm 0.5	0.3 \pm 0.5
Total errors per resuscitation ^{‡*}	1 (0.8-2.0)	0 (0.1-1.1)
Errors of commission ^{‡*}	1 (0.4-1.2)	0 (-0.1-0.3)
Errors of omission [‡]	0 (-0.1-0.3)	0 (0.1-0.8)
Errors of sequence ^{‡*}	0 (0.1-0.8)	0 (0-0) **
Continuous CPR compliance	48% \pm 20%	44% \pm 20%
Compressions (rate/min)	82 \pm 22	90 \pm 18
Completion of scenario (sec)	519 \pm 101	516 \pm 86

Statistics regarding crew experience, instructor status, and basic performance in regard to errors, CPR compliance, and speed are presented. Statistical differences in the number of total errors, commission errors, and sequence errors are noted.

[‡]Reported as median value (95% confidence interval), otherwise mean \pm 1 SD.

*Statistically significant difference; see Figure 1.

**Paramedic-EMT crews performed no sequence errors during the study.

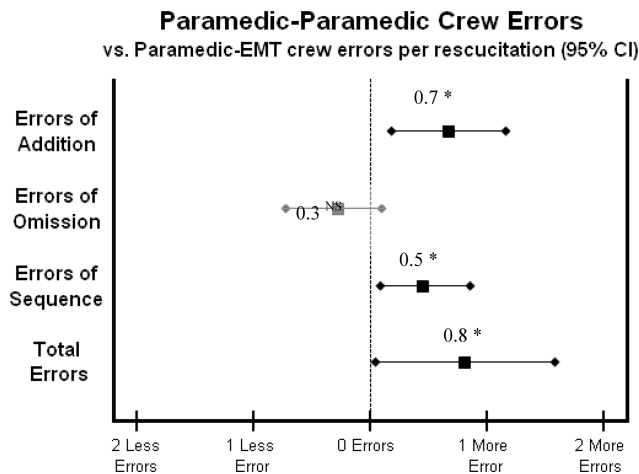


FIGURE 1. Comparison of error rate per resuscitation. The 95% confidence intervals for the mean difference in errors performed by each crew type are presented and contrasted, showing that paramedic-paramedic crews perform significantly more total errors, errors of addition, and errors of sequence.

paramedic-EMT team was excluded because of a simulator malfunction where a loose ECG connector resulted in no rhythm generation on the crew's monitor/defibrillator, which they interpreted as asystole.

Descriptive statistics for the two different crew configurations are summarized in Table 1. The two configurations did not differ significantly in total years of experience or instructor status. Intragroup performance was highly variable. Crews ranged from zero to four errors per resuscitation, required anywhere from 323 to 702 seconds to complete the resuscitation, and had continuous CPR compliance ranging from 1.6% to 84%.

A wide range of types of errors were observed (Table 2). Paramedic-paramedic crews had significantly more commission errors, sequence errors, and total errors than paramedic-EMT crews (Figure 1).

The two configurations were next compared regarding the elapsed time to complete each intervention (Table 3). The only time point for which a statistically significant difference was detected was the time required to achieve intubation, with paramedic-

paramedic crews averaging 149 seconds versus 209 seconds for paramedic-EMT crews ($p = 0.018$). More important perhaps was the substantial variability within each group (see standard deviations of time required per intervention in Table 3).

To determine if factors other than team configuration might be predominantly driving the time required to complete certain interventions, multivariable regressions were performed by using independent variables including CPR compliance, individual and combined years of experience of the EMS providers, instructor status, and frequency with which providers worked with each other. Controlling statistically for each of these independent variables did not significantly affect the results.

There was appreciable intragroup variation in CPR compliance. Paramedic-paramedic crews averaged $48 \pm 20\%$ compliance versus $44 \pm 20\%$ compliance for paramedic-EMT crews (mean ± 1 SD), with a non-significant 95% confidence interval difference of $3.8 \pm 14.2\%$. Adjustment for individual and combined years of experience of the EMS providers, instructor status, and frequency with which providers worked with each other did not significantly impact the CPR adherence results.

DISCUSSION

This controlled simulation study of prehospital cardiac resuscitation provides additional insight into factors that affect the ACLS performance of two-person ambulance crews. The results do not support an assertion for superiority of paramedic-paramedic crews. Moreover, the most notable finding was the substantial range of performance of operational crews.

Errors

Paramedic-paramedic crews averaged almost one whole error more per resuscitation. These crews had

TABLE 2. Examples of Error

Errors of omission:
• Failure to administer medication such as epinephrine (4 crews)
• Failure to follow-up drug administration with defibrillation (1 team)
Errors of addition:
• Performing an extra defibrillation in addition to the initial 3 stacked defibrillations and "drug-shock" combinations (10 crews)
Errors of sequence:
• Intubation before initial defibrillation (2 crews)
• Performing defibrillation followed by drug administration instead of drug administration followed by 30–60 sec of CPR and then defibrillation (3 crews)

Examples of the more common errors for each category of error analyzed are provided.

TABLE 3. Elapsed Time to Complete Intervention as a Function of Crew Configuration

	Paramedic –Paramedic	Paramedic –EMT	P value
Scenario start to initial pulse check	15 \pm 6.5	32 \pm 29	0.101
Initial pulse check to defib #1	55 \pm 26	51 \pm 32	0.466
Defib #1 to defib #2	17 \pm 6.0	19 \pm 6.6	0.252
Defib #2 to defib #3	32 \pm 6.1	36 \pm 7.8	0.257
Defib #3 to intubation	149 \pm 23	209 \pm 71	.0179 *
Defib #3 to IV access	294 \pm 79	275 \pm 71	0.489
Defib #3 to epinephrine	193 \pm 57	234 \pm 65	0.105
Epinephrine to defib #4	38 \pm 16	46 \pm 32	0.644
Defib #4 to amiodarone	167 \pm 46	173 \pm 138	0.215
Amiodarone to defib #5	102 \pm 51	119 \pm 87	0.870
Defib #5 to ROSC pulse check	10 \pm 9.7	16 \pm 28	0.570
Total time to complete scenario	510 \pm 79	524 \pm 106	0.678

Regression outcomes using crew configuration as the independent variable and elapsed time to complete each intervention as the dependant variable. All values are means ± 1 SD (sec).

more commission, sequence, and total errors, but did not differ significantly in omission errors.

On the basis of a qualitative review of the data, the authors speculate that this counterintuitive result may be due in part to differences in how the members of each crew configuration interact. When two paramedics are present, both providers may act as equals contributing to the resuscitation. Without a clear leadership hierarchy, each provider may be more likely to contribute to the resuscitation as each sees fit. This may create an environment permissive to redundancy and erroneous sequencing.

In contrast, there is a clear leader of the paramedic-EMT configuration, leading to better organization. However, the demands on a single paramedic may be so onerous at times that tasks can be delayed or inadvertently omitted. This supposition is supported by the slower time to intubation in the paramedic-EMT group. Further human factor studies are warranted in this area.

Little data exist quantifying the individual impact of many of these interventions on patient outcome. In fact, only defibrillation and CPR have been clearly shown to improve patient outcome.¹³ It is thus difficult to ascertain the impact per error or assert unequivocally that one type of error is more clinically significant than another. Eighty-three percent (10 of 12) of the additional interventions performed by paramedic-paramedic crews were defibrillations, which one might argue may be less detrimental to a patient than would be the omission, for example, of an antiarrhythmic drug, or a sequence error, such as intubation before initial defibrillation. Regardless, this study shows a substantial incidence of care process deviations, which many clinical and patient safety experts believe are a meaningful proxy for lower quality care.

Speed of Interventions

There were no significant differences between the two crew configurations in terms of the efficiency with which most interventions were performed, with the exception of time required to complete intubation. There are limited data to suggest that time to intubation may independently affect patient outcome. When intubation times are controlled for other variables and analyzed by quartiles, one study found that patients whose intubation time was in the fastest quartile were twice as likely to survive.¹⁴ In our study, six of the seven crews in the fastest quartile were paramedic-paramedic crews.

In comparison with cardiac medication administration or defibrillation, intubation requires significant time to not only perform but also to prepare for it. Having two providers who perform intubation regularly and thus are familiar with the setup and execution well may facilitate the speed with which it is accomplished. Other interventions that may similarly benefit from the involvement of advanced providers might in-

clude intraosseous infusion and needle cricothyroidotomy. Because intubation and these other complex clinical skills are performed during only a minority of EMS responses, it is understandable why other studies that used total scene time as a proxy for efficiency may not have detected any differences between crew configurations.

CPR Compliance

Total mean compliance for all crews was poor at 46%. There was also large intragroup variation in both the CPR compliance rate and compressions per minute. Thus, this study found no significant difference between CPR compliance rates for the two configurations.

These results are similar to those of a study of CPR performance during actual prehospital cardiac arrests. Using a device to measure CPR compliance during prehospital resuscitations, Wik and colleagues (2005) found that European EMS providers performed CPR only 52% of the time during actual cardiac resuscitations using the same 2000 ACLS guidelines as this study.

Research emphasizes the importance of continuous CPR using a high-compression rate.¹⁵ There is a large body of evidence showing that slow compressions, frequent interruptions, and significant "hands-off" time during CPR precludes adequate cardiac and cerebral perfusion pressures, thus adversely affecting outcome.^{12,16,17} Thus, it is notable that neither crew configuration was able to accomplish CPR that would likely have been of clinical benefit to an actual patient.

Why did some crews dramatically outperform others regardless of crew configuration? In the early minutes of a resuscitation, CPR compliance may be poor due to providers dividing their time between CPR performance and completion of all of the other ACLS interventions. However, CPR compliance does not improve dramatically even after all of these other interventions are completed.¹⁸ While the large variability in CPR compliance in this study could be an artifact of it being a simulated study, our experience with in-hospital resuscitations suggests otherwise and further study seems warranted, particularly with the increased focus on CPR in the 2005 ECC guidelines.

Study Limitations

This study used the 2000 ACLS guidelines, because it was initiated just prior to publication of the 2005 ACLS guidelines and the crews were still operating under the 2000 guidelines. Some states did not revise their EMS protocols with the new guidelines until early 2007,¹⁹ and some providers will not undergo formal ACLS recertification under the new guidelines until early 2008. The use of guidelines with which crews had years of experience in actual clinical encounters is advantageous in that results are less likely to be driven by

crew unfamiliarity or lack of clinical experience with recently changed guidelines. However, given the 2005 ACLS guidelines' emphasis on CPR and attempts to streamline other interventions, the results of this study cannot be assumed to carry over to the new guidelines and must be reconfirmed.

A second limitation is that this was a simulation. Simulator-based studies allow the direct observation of participants under highly controlled and reproducible circumstances. However, participants may act differently than they might during actual patient care. The nature of this confound is unknown: participants may regard a simulation less seriously because it is not "real," or they may perform with more diligence knowing that they are being observed and reimbursed. Furthermore, participants who volunteer in any study may differ from the actual population. Nevertheless, the results of this study do corroborate those of prior field studies of prehospital cardiac resuscitation.

A third limitation of this pilot hypothesis-generating study was that it had a relatively small sample size. Furthermore, the intragroup variability observed was greater than assumed when making initial power calculations. Regardless, the study was sufficiently powered to detect statistical differences in the error rates between the two crew configurations. For the resuscitation time overall and the times to complete many major interventions, differences between the two configurations as small as 20% would likely have been detected if present. The study was not sufficiently powered to detect meaningful statistical differences in CPR compliance. However, the high variability demonstrated is itself noteworthy and serves to highlight future directions for research.

CONCLUSION

This study does not support the assertion that paramedic-paramedic crew configurations provide better resuscitation care than paramedic-EMT crews. In contrast, paramedic-paramedic crews in this study exhibited more total errors, more errors of commission, and more errors of sequence per resuscitation. Moreover, the two configurations did not differ significantly in terms of speed to perform most interventions. Paramedic-paramedic crews did, however, outperform their paramedic-EMT counterparts in the efficiency with which intubation was performed. Whether these findings continue to hold true during actual resuscitations under the new 2005 ACLS guidelines or are sufficient to affect actual patient outcomes requires further investigation. In regards to CPR compliance, the wide intragroup variations reduced the power of this study to detect meaningful statistical differences. However, the data show that crews of both configurations fail to achieve high compliance with CPR guidelines. Notably, the crews in this study demonstrated marked

variability in all aspects of performance regardless of crew configuration.

The results of this study suggest other possibilities for future investigation. Larger multicenter simulator-based studies could be undertaken to further elucidate possible differences between crew configurations in terms of efficiency. The differences in error rate noted in this study could be further elucidated by using field data to try to quantify their actual impact on patient care, if any. Perhaps the most important avenue for future research is delineation of the causes of the wide variation in performance and interventions to decrease it. In both configurations, a minority of crews were able to achieve error-free resuscitation with high CPR compliance. These crews could not be reliably identified by any of the independent variables collected including crew configuration or experience. Understanding the factors driving this variability and developing interventions to ensure maximal performance and decreased variability could provide significant benefit to EMS systems regardless of the crew configuration employed.

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The Effect of Ambulance Staffing Models in a Metropolitan, Fire-Based EMS System

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Conflicts of interest: none

Keywords: ambulance; Emergency Medical Service; emergency medical technician

Abbreviations:

ALS: Advanced Life Support
BLS: Basic Life Support
CFD: Columbus Division of Fire
EKG: electrocardiogram
EMS: Emergency Medical Services
EMT: emergency medical technician
IV: intravenous
PB: paramedic-basic
PP: paramedic-paramedic

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Abstract

Introduction: The staffing of ambulances with different levels of Emergency Medical Service (EMS) providers is a difficult decision with evidence being mixed on the benefit of each model.

Hypothesis/Problem: The objective of this study was to describe a pilot program evaluating alternative staffing on two ambulances utilizing the paramedic-basic (PB) model (staffed with one paramedic and one emergency medical technician[EMT]).

Methods: This was a retrospective study conducted from September 17, 2013 through December 31, 2013. The PB ambulances were compared to geographically matched ambulances staffed with paramedic-paramedic (PP ambulances). One PP and one PB ambulance were based at Station A; one PP and one PB ambulance were based at Station B. The primary outcome was total on-scene time. Secondary outcomes included time-to-electrocardiogram (EKG), time-to-intravenous (IV) line insertion, IV-line success rate, and percentage of protocol violations. Inclusion criteria were all patients requesting prehospital services that were attended to by these teams. Patients were excluded if they were not attended to by the study ambulance vehicles. Descriptive statistics were reported as medians and interquartile ranges (IQR). Proportions were reported with 95% confidence intervals (CI). The Mann-Whitney U test was used for significance testing ($P < .05$).

Results: Median on-scene times at Station A for the PP ambulance were shorter than the PB ambulance team (PP: 10.1 minutes, IQR 6.0-15; PB: 13.0 minutes, IQR 8.1-18; $P = .01$). This finding also was noted at Station B (PP: 13.5 minutes, IQR 8.5-19; PB: 14.3 minutes, IQR 9.9-20; $P = .01$). There were no differences between PP and PB ambulance teams at Station A or Station B in time-to-EKG, time-to-IV insertion, IV success rate, and protocol violation rates.

Conclusion: In the setting of a well-developed EMS system utilizing an all-Advanced Life Support (ALS) response, this study suggests that PB ambulance teams may function well when compared to PP ambulances. Though longer scene times were observed, differences in time to ALS interventions and protocol violation rates were not different. Hybrid ambulance teams may be an effective staffing alternative, but decisions to use this model must address clinical and operational concerns.

Cortez EJ, Panchal AR, Davis JE, Keseg DP. The effect of ambulance staffing models in a metropolitan, fire-based EMS system. *Prehosp Disaster Med.* 2017;32(2):175-179.

Introduction

Highly functioning Emergency Medical Service (EMS) agencies are characterized by clinical sophistication, response time reliability, and economic efficiency.¹ One of the most important determinants of the EMS system performance is the scope of practice of the prehospital providers. The decision to deliver Basic Life Support (BLS) or Advanced Life Support (ALS) services requires deliberate evaluation while considering whether the response is tiered or uniform, or which providers will perform patient transportation.¹

When compared, optimally-utilized, all-ALS systems appear to provide faster response times, are more operationally efficient, have simpler dispatch functions, and are fiscally advantageous.² The prominent drawback of all-ALS systems is the dilution of provider skills and experience.² Though the advantages of ALS systems appear numerous, recent evidence has demonstrated that BLS providers (emergency medical technicians [EMTs];

providers capable of delivering life-supporting measures that are non-invasive¹ can safely respond alone to low-risk calls,³ and mixed crews (BLS and ALS providers) have shorter on-scene times than all-ALS crews.⁴ In cases of urban trauma, cardiac arrest, myocardial infarction, and altered mental status, ALS care demonstrated no significant benefit over BLS staffing models.⁵ Further examination of this issue demonstrated variable performance of ALS and BLS crews depended on the mechanism of injury and presenting complaint with ALS care improving survival in non-traumatic cardiac arrests but having no impact on survival in trauma patients.⁵⁻⁷ Recently, in an observational study comparing ALS and BLS care, ALS care was associated with higher mortality than BLS care in patients with various time-critical diagnoses.⁸ This controversy suggests that the decision to use an ALS versus BLS staffing model may be more complicated than simply patient presentation and available treatment options by the prehospital team. The exact determining factor for choosing between these staffing models is unclear, but each may serve a role for different EMS agencies.

Given the uncertain efficacy of alternative staffing models for EMS systems, this study in a large, metropolitan, fire-based EMS system was conducted to compare the use of a paramedic-basic (PB) staffing model (one paramedic teamed with one EMT) with the traditional paramedic-paramedic (PP) staffing model. This evaluation was done in the setting of a well-developed EMS system that has utilized an all-ALS response (PP staffing model) for the previous 18 years.

Methods

Study Setting

This evaluation was a retrospective review comparing the performance of two ambulance staffing models in the City of Columbus, Division of Fire (CFD; Columbus, Ohio USA) from September 17, 2013 through December 31, 2013. This study was part of a quality improvement project, which was approved by The Ohio State University Institutional Review Board (Columbus, Ohio USA).

The CFD is the primary EMS provider for the metropolitan area of Columbus, serving over 822,000 constituents covering 217 square miles. There are approximately 130,000 calls requesting EMS services per year. The system includes 32 ALS ambulances (PP) and 32 ALS engine trucks (one paramedic with EMTs) that are managed by seven EMS supervisors handling EMS operations in their respective battalions.

The ambulance staffing model used in the City of Columbus is two paramedics per each ALS ambulance. Every patient encounter in the service area is attended to by an ALS ambulance.

Study Design and Population

The purpose of this pilot study was to compare the performance of standard ALS-staffed ambulances (the PP ambulances) with ambulances staffed with a paramedic and an EMT (the PB ambulances). The EMTs were experienced clinical providers that volunteered overtime hours to staff the PB ambulances. As part of the study design, each PB ambulance was compared to a PP ambulance at the same station controlling for service area and call volume.

During the study period, the PB ambulances were in service between 11:00 AM to 11:00 PM, Tuesday through Saturday, and served as additional ALS ambulances and attended to patient encounters independently. One PB ambulance was positioned at

Station A and one PB ambulance was positioned at Station B. As above, each PB ambulance was compared to the corresponding PP ambulance at the respective station. Station A and Station B were located in geographically distinct regions of the city to ensure no crossover between ambulances and no sharing of patients.

The study population included all patients requesting pre-hospital services. Patient encounters not attended to by the study ambulances were excluded.

Primary Outcomes

The overall goal of this study was to evaluate the performance of PB ambulances versus the standard of PP ambulances across the full spectrum of patient encounters. The primary outcome measure was the total on-scene time for the ambulance units. Other secondary outcomes evaluated include time-to-electrocardiogram (EKG), time-to-intravenous (IV) line insertion, IV-line success rate, and percentage of patient encounters with protocol violations. Time intervals were measured utilizing a computer-aided dispatch system synchronized with a standard time reference. Primary and secondary outcome measures were calculated based on automatically recorded time intervals.

Protocol violations were defined as failure to follow the applicable standard operating procedures, as determined by study authors (EC and DPK) or EMS supervisor. Examples of protocol violations included not administering aspirin to patients with chest pain, not measuring a blood glucose level in patients with seizures, and not documenting a pulse oximetry reading in patients with respiratory complaints.

Rather than exclusively focusing on cardiac arrest, penetrating trauma, respiratory failure, and other high-acuity conditions, the full spectrum of patient encounters was studied for two reasons. First, the study's EMS system utilizes an all-ALS response. In high-acuity encounters, additional ALS vehicles are on-scene with PB ambulances. Second, additional paramedics on engine vehicles and EMS supervisor vehicles also are dispatched on higher acuity patient encounters, but not on lower acuity encounters. Therefore, hypothesis testing was not limited to higher acuity patient encounters.

Data Analysis

Prehospital data were extracted from the electronic patient care report (Safety PAD, OPEN, Inc.; Minneapolis, Minnesota USA). A data sheet was created for study variables. Chart reviews were performed by one of the authors (EC). All extracted variables were present as discrete data points in the medical records and did not require interpretation by the abstractor. Therefore, inter-rater reliability was not performed. Analysis was performed using Microsoft Excel (Microsoft Corporation; Redmond, Washington USA) and STATA v.12 (STATA Corp; College Station, Texas USA). Data were reported as proportions with 95% confidence intervals (CI) and medians with interquartile ranges (IQR). Significance was evaluated utilizing the Mann-Whitney U Test.

Results

During the study period, the ambulances at Station A were involved in a total of 1,639 encounters while ambulances at Station B were involved in a total of 1,576 encounters. At Station A, the PP ambulance accounted for 1,229 (75%) of the patient encounters while the PB ambulance accounted for 410 (25%) of the patient encounters. At Station B, the PP ambulance accounted for

	PP Ambulance (n = 934)	PB Ambulance (n = 348)	P Value
Age - Median (IQR)	43 (27-53)	45 (27-59)	.08
Gender - Females (%)	487 (52)	200 (57)	.11
Race (%)			
White	534 (57)	197 (56)	.38
African-American	168 (17)	51 (15)	
Hispanic	8 (1)	3 (1)	
Asian	1 (1)	2 (1)	
Other	7 (1)	19 (6)	
Missing	216 (23)	76 (21)	

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Table 1. Station A Demographic Information

Abbreviations: PB, paramedic-emergency medical technician; PP, paramedic-paramedic.

	PP Ambulance n = 971	PB Ambulance n = 366	P Value
Age - Median (IQR)	49 (30-70)	49 (29-67)	.19
Gender - Females (%)	588 (60)	231 (63)	.32
Race (%)			
White	372 (38)	167 (45)	<.01
African-American	231 (23)	92 (25)	
Hispanic	20 (3)	10 (3)	
Asian	3 (1)	2 (2)	
Other	26 (3)	13 (3)	
Missing	319 (32)	82 (22)	

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Table 2. Station B Demographic Information

Abbreviations: PB, paramedic-emergency medical technician; PP, paramedic-paramedic.

1,150 (73%) of the patient encounters while the PB ambulance accounted for 426 (27%) of the encounters.

Patient demographic information was compared at each station between the PP ambulance and the PB ambulance. At Station A, there was no difference between patient age, gender, and race (Table 1). There was no difference in chief complaints of the encounters between groups ($P = .21$). At Station B, there was no difference between patient age, gender, and race (Table 2). There also was no difference in chief complaints of the encounters between groups ($P = .85$).

Primary outcomes and secondary outcomes for Station A and Station B are noted in Tables 3 and 4, respectively. Median on-scene time at Station A was shorter for the PP ambulances than the PB ambulances (PP: 10.1 minutes, IQR 6.0-15; PB: 13.0, IQR 8.1-18; $P < .001$). This also was true for Station B with median on-scene times of 13.5 minutes for PP ambulances

(IQR 8.5-19) versus 14.3 minutes for the PB ambulances (IQR 9.9-20; $P = .01$). There were no differences in any secondary outcome measures between PP and PB ambulances at Station A (Table 3) or Station B (Table 4). Protocol violations were noted with chest pain (no EKG performed, no aspirin administered, or no supplemental oxygen administered), respiratory distress (no pulse oximetry measurement or no albuterol therapy), trauma (no cervical collar applied or transport to a non-trauma center), seizures (no blood glucose level documented), and alcohol intoxication (non-transport).

Discussion

In this comparison of traditionally staffed PP ambulances with alternatively staffed PB ambulances, the on-scene time was found to be longer for the PB ambulances. The differences in on-scene times were statistically significant at both Station A and Station B.

	PP Ambulance	PB Ambulance	P Value
Median On-Scene Time Median, IQR	10.1 minutes (6-15)	13.0 minutes (8-18)	<.001
Time-to-EKG Median, IQR	11 minutes (8-20)	12 minutes (8-19)	.99
Time-to-IV Insertion Median, IQR	15 minutes (10-21)	12 minutes (6-20)	.21
IV Success Rate %, 95% CI	72% (66%-78%)	66% (56%-75%)	.12
Protocol Violation %, 95% CI	0.5% (0.1%-0.9%)	1.1% (0.2%-2.1%)	.07

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Table 3. Station A Secondary Outcome Measures

Note: Total number of EKG's performed (PP ambulance = 89; PB ambulance = 41). Total number of IV lines performed (PP ambulance = 207; PB ambulance = 97).

Abbreviations: EKG, electrocardiogram; IV, intravenous line; PB, paramedic-emergency medical technician; PP, paramedic-paramedic.

	PP Ambulance	PB Ambulance	P Value
Median On-Scene Time Median, IQR	13.5 minutes (9-19)	14.3 minutes (8-18)	.01
Time-to-EKG Median, IQR	11 minutes (7-22)	16 minutes (6-27)	.23
Time-to-IV Insertion Median, IQR	14 minutes (9-23)	17 minutes (12-26)	.39
IV Success Rate %, 95% CI	69% (63%-74%)	68% (59%-76%)	.42
Protocol Violation %, 95% CI	1.6% (0.9%-2.3%)	1.3% (0.3%-2.3%)	.33

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Table 4. Station B Secondary Outcome Measures

Note: Total number of EKG's performed (PP ambulance = 95; PB ambulance = 59). Total number of IV lines performed (PP ambulance = 260; PB ambulance = 111).

Abbreviations: EKG, electrocardiogram; IV, intravenous line; PB, paramedic-emergency medical technician; PP, paramedic-paramedic.

However, the clinical significance of these differences is questionable.

Several different factors may have attributed to longer on-scene times for the PB ambulances. First, the personnel staffing the PB ambulances varied throughout the study. Several different paramedics and EMTs rotated on the PB ambulances. This may have led to unfamiliarity among crewmembers. Second, only the paramedics on the PB ambulances were permitted to complete patient care reports. Therefore, the paramedics were tasked with assessing the patient, delivering ALS-level interventions, and documenting in the patient care report. In the PP ambulances, many of these responsibilities are shared between the two paramedics. Third, the personnel on the PB ambulances were aware that the study personnel reviewed every patient encounter. Therefore, on-scene times may have been increased secondary to a Hawthorne effect.

It is difficult to determine whether the longer on-scene times for the PB ambulances were clinically significant. Clinical significance is based on several different factors, including the type of diagnosis, the number of ALS interventions required to stabilize the patient,

and general scene dynamics. For example, longer on-scene times for out-of-hospital cardiac arrest may be justified; however, on-scene delays for penetrating trauma may be detrimental.

However, the results of the secondary analysis suggest that the clinical significance of the increased on-scene times for the PB ambulances is low. The ALS interventions included in the secondary analysis were chosen because they were the most common interventions performed by CFD across the full spectrum of patient encounters in this all-ALS system. Additionally, these ALS interventions are time-sensitive procedures most often completed in critically ill patients. Other ALS interventions, such as defibrillation and endotracheal intubation, were not included because the incidence of these procedures is exceedingly rare, and additional paramedics assist the PB ambulances when patients are in cardiopulmonary arrest.

The protocol violation rate also was similar between PB ambulances and PP ambulances. Since patient outcome information was not evaluated in this pilot study, the protocol violation rate served as a quality measure for the PB ambulances.

This finding is reassuring but additional quality concerns not detected by the protocol violation are possible.

Several studies have evaluated different response models on out-of-hospital cardiac arrest parameters. Eschmann and colleagues determined whether the number of ALS personnel on scene of an out-of-hospital cardiac arrest was associated with return of spontaneous circulation or survival to hospital discharge.⁹ The authors concluded that more than two paramedics on-scene was not predictive of improved outcomes.⁹ Persse and colleagues compared cardiac arrest outcomes between tiered-response and uniformed-response models and reported better outcomes for patients treated with tiered-response.¹⁰ Additional studies have found that BLS providers can safely respond alone to low-risk calls,³ and mixed crews (BLS and ALS providers) have shorter on-scene times than all-ALS crews.⁴

Isenberg and Bissell provided a summary of crew configuration differences in a 2005 literature review. The authors report no benefits of ALS care compared to BLS care for urban trauma, cardiac arrest, myocardial infarction, and altered mental status.⁵ Further, most of the studies suggested an increased mortality rate for trauma patients managed by ALS providers.⁵ Ryynanen and colleagues suggested in a 2010 systemic review that ALS care might benefit patients suffering myocardial infarctions, blunt head injuries, multi-trauma, seizures, and respiratory distress whereas BLS care was better suited for penetrating injuries.⁶ Bakalos and colleagues performed a meta-analysis in 2011 and concluded that ALS care can increase survival in non-traumatic cardiac arrests, but ALS is not associated with increased survival in trauma patients.⁷

This study illustrates several key operational principles related to EMS. The PP ambulances at each station included in this study have traditionally demonstrated high run volumes in recent years. The additional resources created by the PB ambulances decreased the workload of the PP ambulances. Such dissipation of call volumes experienced by busy ambulances may have positive effects on employee morale, patient satisfaction, and patient safety.

Further, additional ambulances in busy urban areas during peak-demand hours may improve important operational parameters such as fractile response times, time-to-EKG for acute myocardial infarctions, and time-to-defibrillation for out-of-hospital cardiac arrests.

Limitations

The study was limited in several ways. First, this was a retrospective chart review that served as a pilot program for changes to ambulance staffing. Second, the data extractor was not blinded to the results of the study and no inter-rater reliability was calculated. Third, the study was developed collaboratively between all stakeholders, including EMTs, paramedics, administration personnel, and legal counsel. Therefore, the EMS personnel participating in the study were not blinded, which may have created a possible Hawthorne effect. Fourth, the study did not account for the influence of additional paramedics on engine and EMS supervisor vehicles during higher acuity patient encounters. Secondary to pre-existing system operations, such influences could not be addressed in the study design. However, this also was one of the strengths of the study because it represented the typical prehospital patient encounter. Fifth, the EMTs on the PB ambulances were highly motivated volunteers, and may not have been representative of the typical EMT in the system. Therefore, selection bias may have been present.

Conclusion

In the setting of a well-developed EMS system utilizing an all-ALS response, this study suggests that PB ambulance teams may function well when compared to PP ambulances. Though longer scene times were observed, differences in time to ALS interventions (EKG, IV insertion, and IV success rate) and protocol violation rates were not different. Hybrid ambulance teams may be an effective staffing alternative, but decisions to use this model must address operation, economic, and community concerns.

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About the Project

Agenda Item #8
3/12/24 Council Meeting

Multnomah County will be making safety improvements to S.W. 257th Drive to make it easier and safer for all users to get around the corridor. S.W. 257th is one of the most heavily traveled roads in Troutdale and provides an important connection to I-84 and US 26.

Currently, S.W. 257th is not a comfortable street for the community. Sidewalks are partially blocked by utility poles and vegetation, and bike lanes are narrow and adjacent to fast-moving traffic. Heavy traffic from vehicles and large trucks, low visibility, and a high posted speed contribute to safety issues in this corridor.

Improvements, which are described in detail on the following page, will include bike boxes, enhanced pedestrian crossings, pedestrian push buttons and radar feedback signs.

The \$8 million project is mostly funded by the Multnomah County Transportation Division with \$600,000 contributed from Mid-County Lighting District for lighting improvements. The County also received \$45,000 in grant funds to construct green bike boxes on S.W. 257th and S.W. Sturges Drive.

Bike Box



Enhanced Pedestrian Crossing



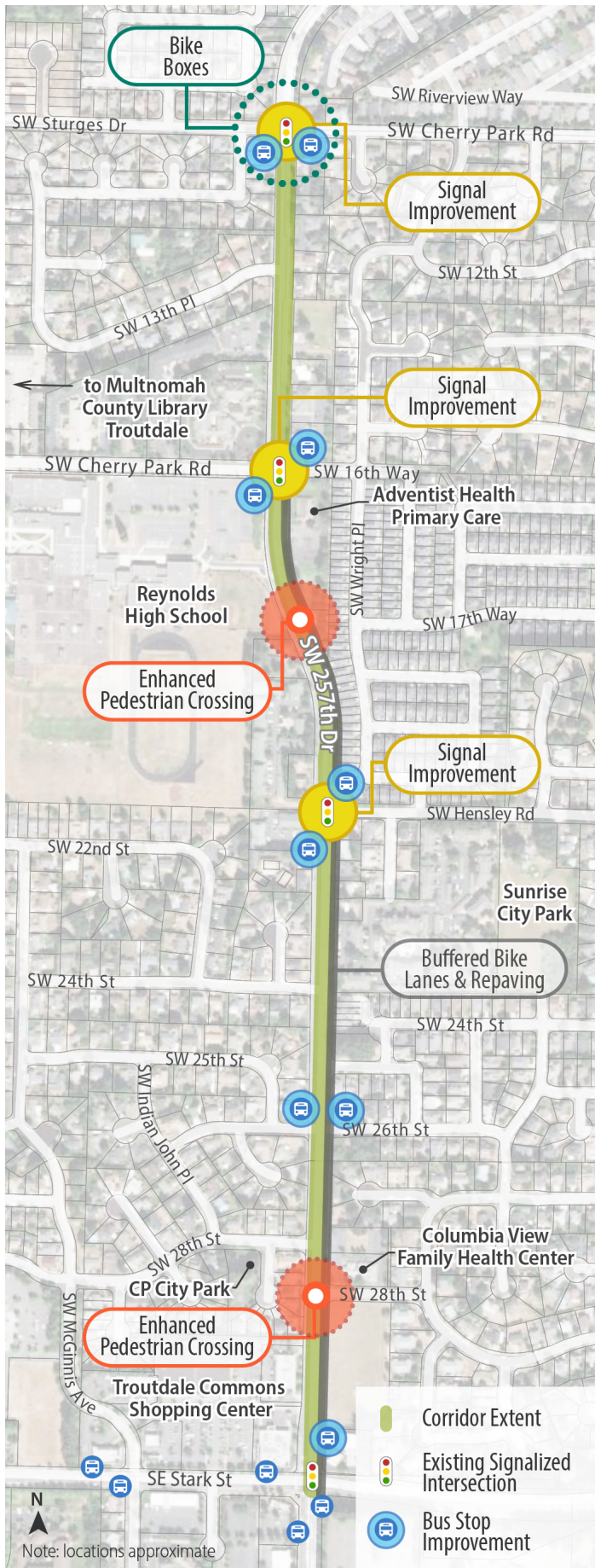
Pedestrian Push Button



Radar Feedback Sign



S.W. 257th Drive Corridor Safety Improvements



Bike Boxes

Install bicycle boxes at S.W. Sturges Dr./S.W. Cherry Park Rd. A bicycle box is a designated area of green pavement markings at an intersection that provides bicyclists with a safer and more visible way to stop and wait ahead of vehicles during a red light.

Bus Stop Improvements

Widen the sidewalk adjacent to bus stops and improve bus stop signs for clear visibility and access.

Enhanced Pedestrian Crossings

Install new enhanced crossings in key locations along the corridor at S.W. 17th Way Connection and S.W. 28th St. These crossing enhancements include pedestrian-activated signals to stop traffic.

Signal Improvements

Install ADA-compliant accessible pedestrian signal push-buttons and upgraded pedestrian signal equipment.

Accessibility Improvements

Upgrade all sidewalk corners with Americans with Disabilities Act (ADA)-compliant curb ramps.

Lighting

Replace street lights to improve visibility at night along S.W. 257th Dr. for all users.

Traffic Calming

Install radar feedback signs and narrow the vehicle travel lanes. These changes can encourage drivers to slow down.

Buffered Bike Lanes

Widen bike lanes and add striping. Buffered bike lanes, from S.W. 16th Way to S.E. Stark St., will increase bike comfort and add extra space between cyclists and motor vehicles.

Repaving

Resurfacing of the existing pavement from north side of S.W. 16th Way to S.E. Stark St.



SW 257th Dr. Corridor Safety Improvements

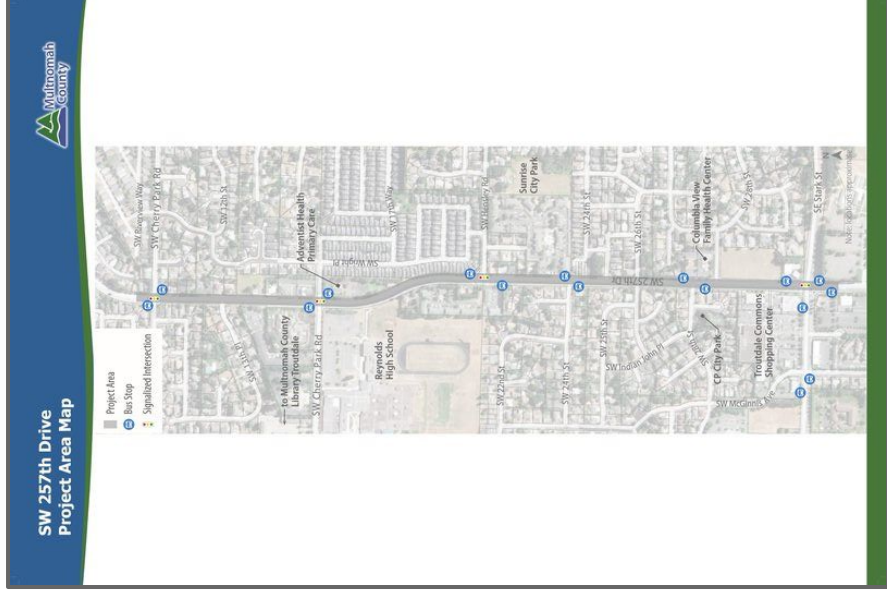
Project Update - Troutdale City Council

Stephen McWilliams & Sarah Hurwitz

August 22, 2023

Multnomah County Transportation

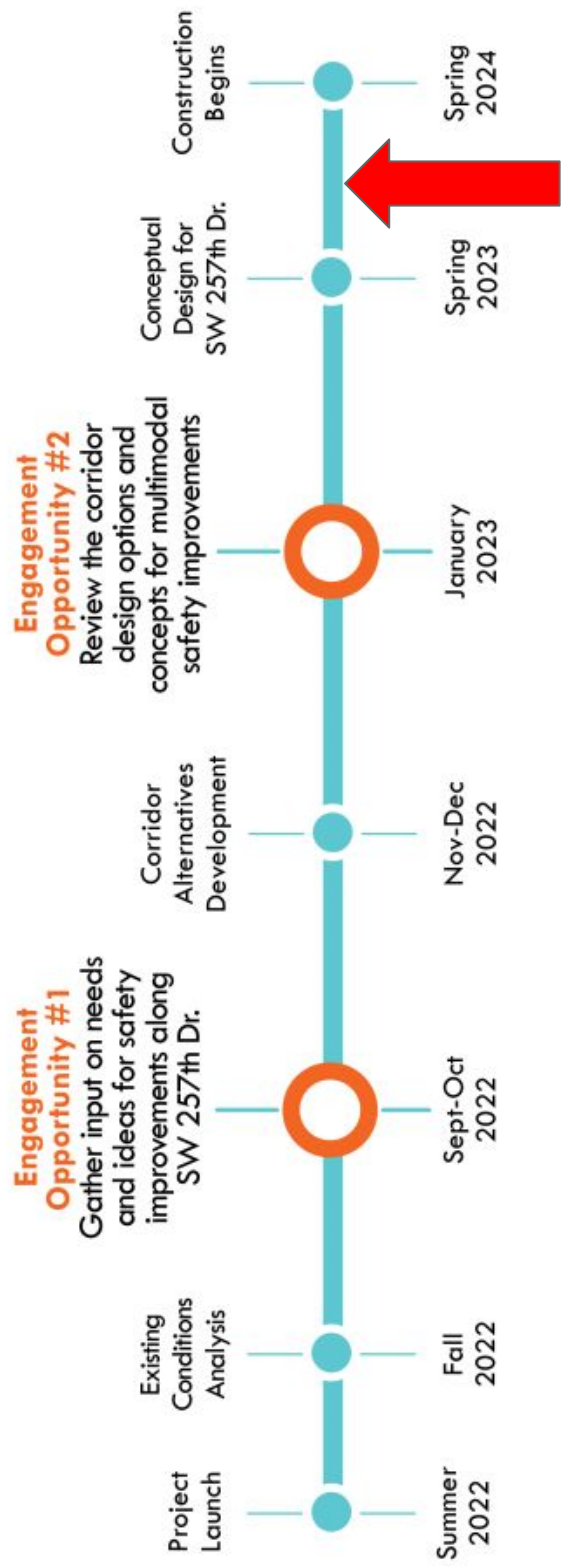
- Multimodal safety improvements from SW Sturges Drive to SE Stark Street
- Average daily traffic is 18,000 vehicles per day, 60% cars, 40% trucks/busses
- Estimated Cost: Approx. \$8 million
 - \$45,000 in Grant Funds
 - \$600,000 from Mid-County Lighting District



Project Goals

- Improve safety for everyone who uses the corridor, including those walking, using a mobility device, bicycling, driving or using the bus.
- Create comfortable space for people walking, using a mobility device, bicycling or using the bus.
- Maximize community benefits by building the highest priority improvements.
- Build community support through early outreach with the 257th community.
- Maintain County roads for user safety and freight access.

Project Timeline

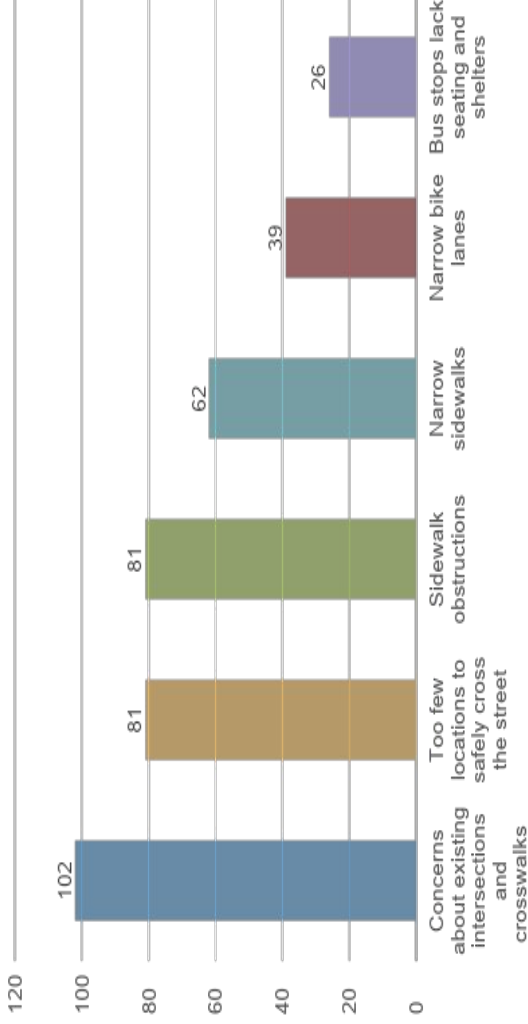


WE ARE HERE

Reviewed conceptual designs and selected improvements based on community priorities and funding feasibility



Which issue do you think is most important to address first?



Top concerns: crossings and intersections, too few places to safely cross the street.

- **227 total unique responses**
- Most survey participants travel 257th daily or several times a week (86%)
- Most participants drive (88%), with smaller portions who regularly walk (16%), bike (9%) and take transit (6%).
- Most feel uncomfortable biking the corridor or would choose not to bike.
- Most are at least somewhat comfortable with walking, but many are not.
- Respondents were 79% white, 89% speak English at home, and 20% have a disability

Community Outreach – Phase 1 Summary

September 21 to October 31, 2022

Methods and by the numbers...

Communications

- ✓ **3,045** postcards mailed to residents along the corridor
- ✓ Over **200** flyers distributed
- ✓ **490** web page views, many public comments
- ✓ Online survey with **227** responses, in English and Spanish

Events

- ✓ **2** walking tours with over **20** participants
- ✓ **4** focus groups with East County residents – in Spanish, Arabic, Russian and Vietnamese
- ✓ **6** project briefings with interested committees and organizations
- ✓ **2** community tabling events



Phase 1 – Focus Groups Discussion

What we heard...

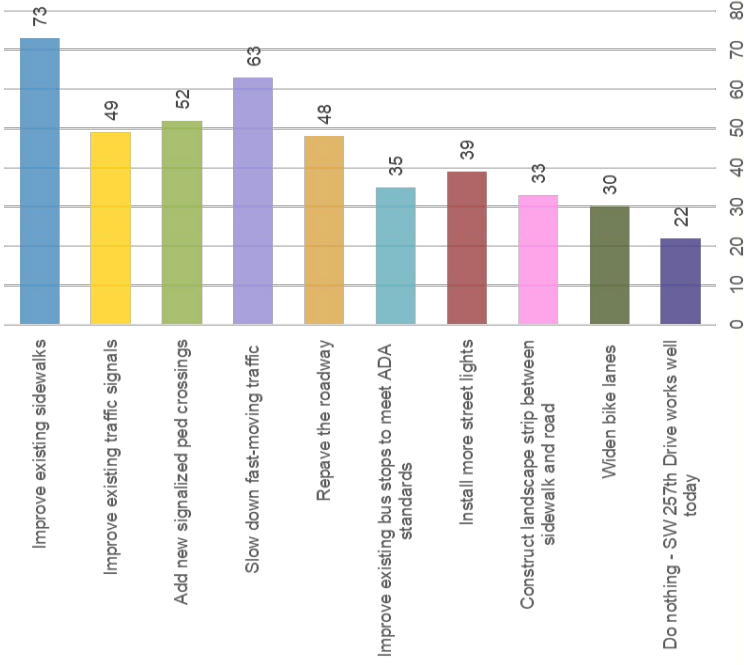
- Nearly all participants drive exclusively
- Top issues include better lighting, address speeding, widen sidewalks, replace curb ramps
- Strong support for better crossings with ped-activated signals
- Opposition to Glisan and Division safety projects – reduce number of lanes, add center median, on street parking
- Concerns about traffic congestion and accidents on 257th
- Desire for tech solutions to speeding (in place of police enforcement) – red light cameras, radar feedback signs

✓ Four events in October 2022
✓ Held in Vietnamese, Arabic, Spanish, Russian



Community Outreach – Phase 2 Summary

Which improvements do you think are most important to making SW 257th Drive safer for people walking, rolling, biking and driving?



January 9 to February 3, 2023

Top improvements:

1. **Improve existing sidewalks**
2. **Slow down fast-moving traffic**
3. **Add new signalized pedestrian crossings**
4. **Improve existing traffic signals**
5. **Repave the roadway**

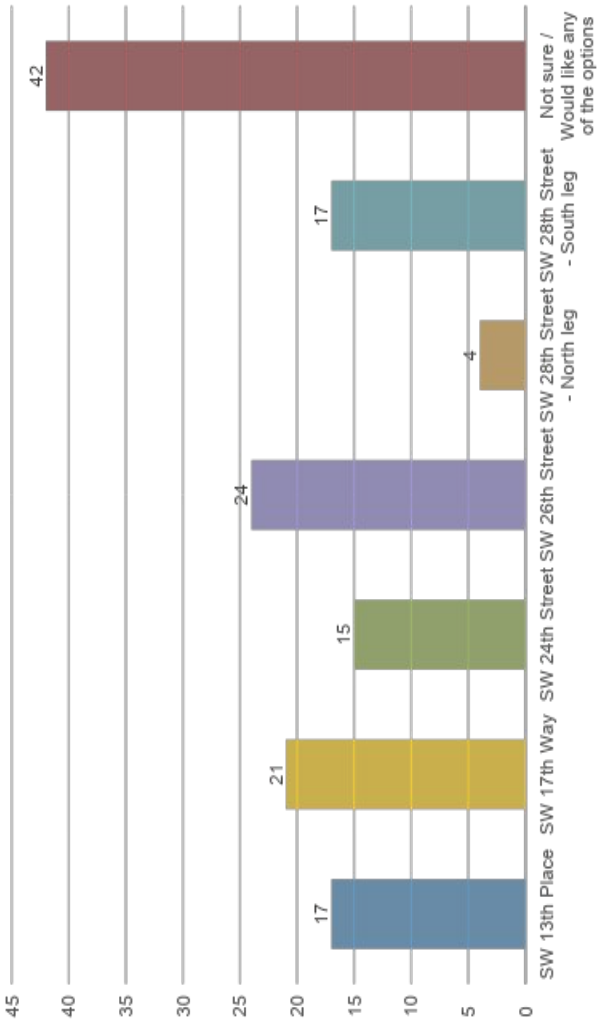
- **860** webpage views, many public comments
- Online survey with **152** responses
- Limited English proficiency survey assistance yielded **36** responses

**Based on top three ranking choices*



Phase 2 – Online Survey Results

If the County has the funding available to add a signalized crossing on SW 257th Drive, where should this new crossing be located?



- Top crossings:*
- 1. Any of the Options
 - 2. SW 26th Street
 - 3. SW 17th Way

*Based on top choice



Safety Improvement Examples

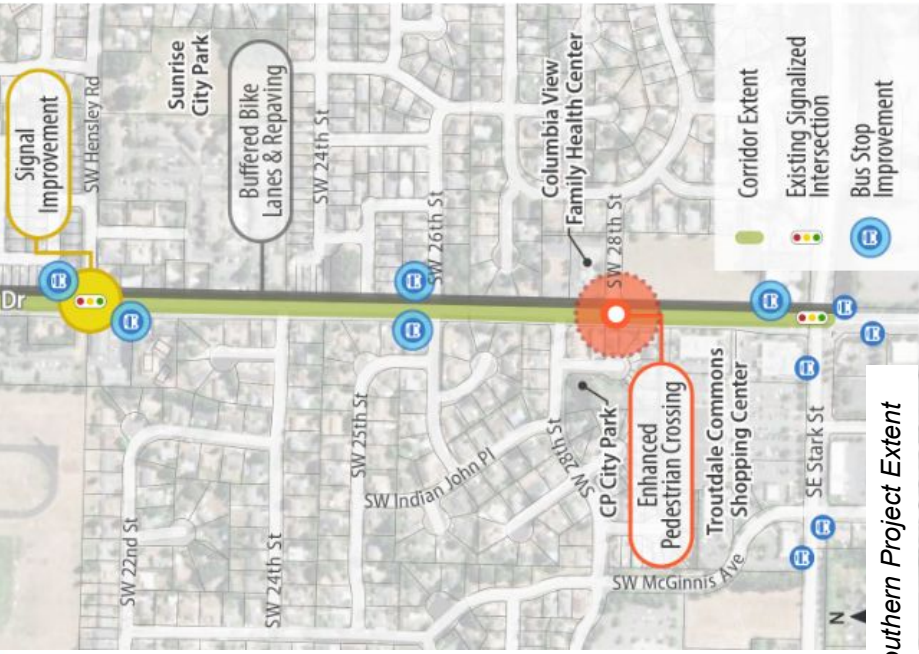


- Bike Boxes at Sturges and 257th
- Bus Stop Improvements
- Enhanced Pedestrian Crossings
- Signal Improvements
- Sidewalk Accessibility Improvements
- Lighting
- Traffic Calming (Narrower Non-Freight Lanes and Radar Feedback Signage)
- Widened Bike Lanes
- Repaving

Safety Improvements



Northern Project Extent



Southern Project Extent

Thank you!

