



ODOT Region 5

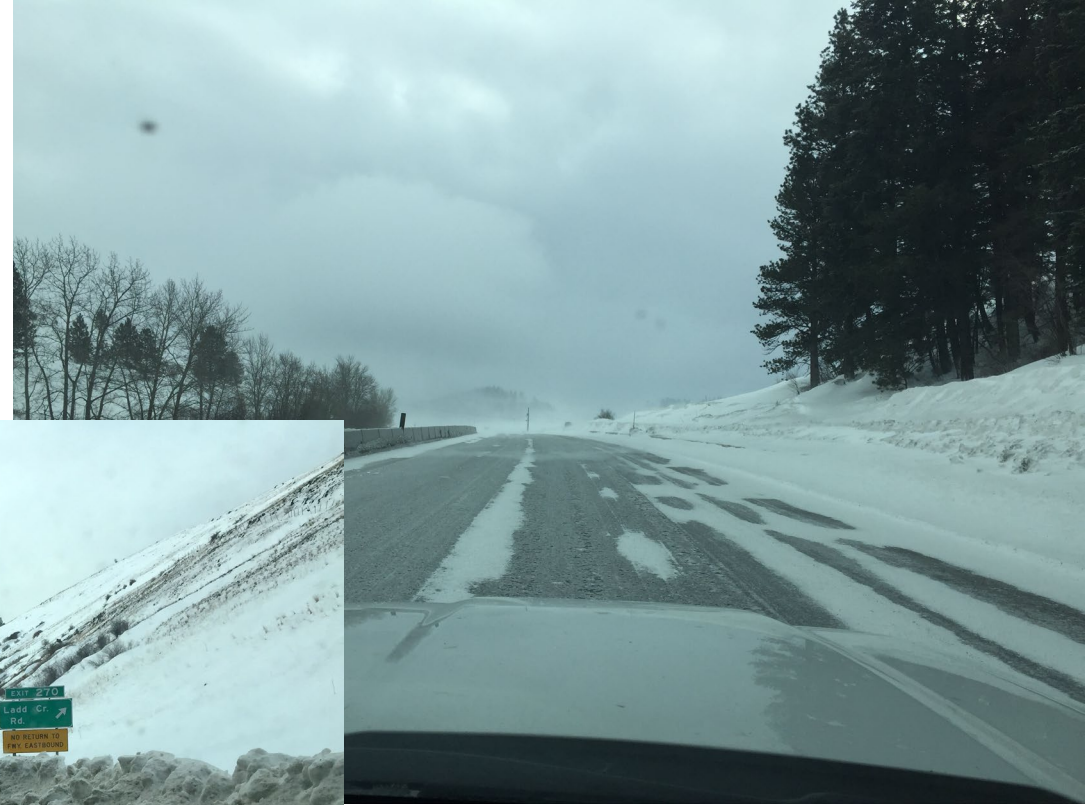
Winter Maintenance & Operations Improvements

- Ace Clark, P.E.
- Oregon Department of Transportation
- District 13 Manager (La Grande)
- Ace.W.CLARK@odot.Oregon.gov

Winter Conditions in Eastern Oregon



Winter Conditions in Eastern Oregon



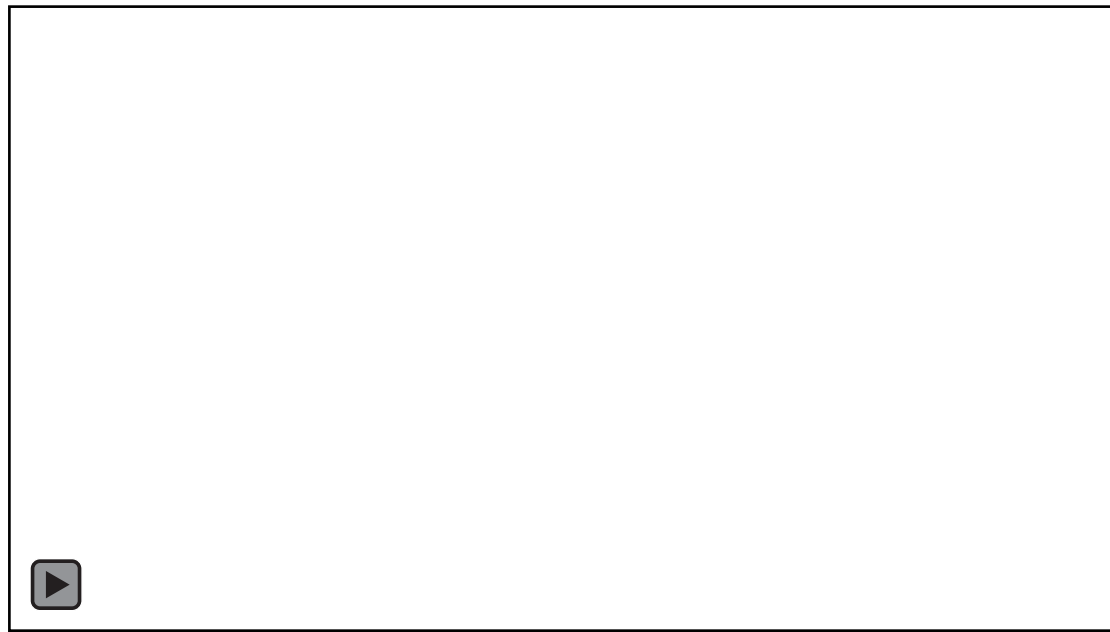
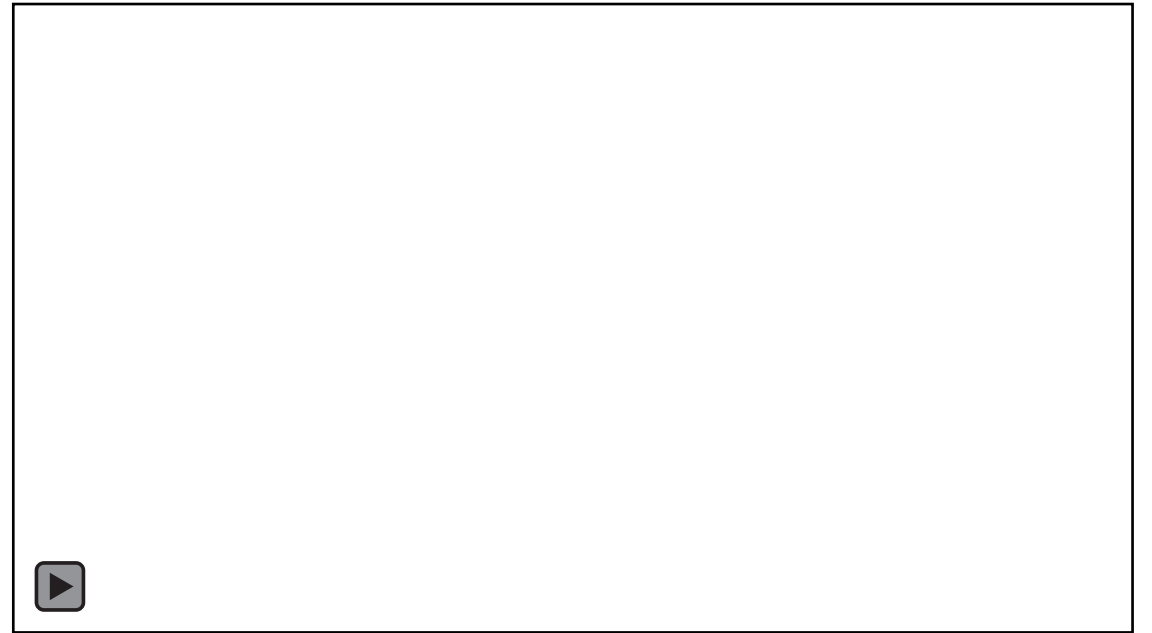
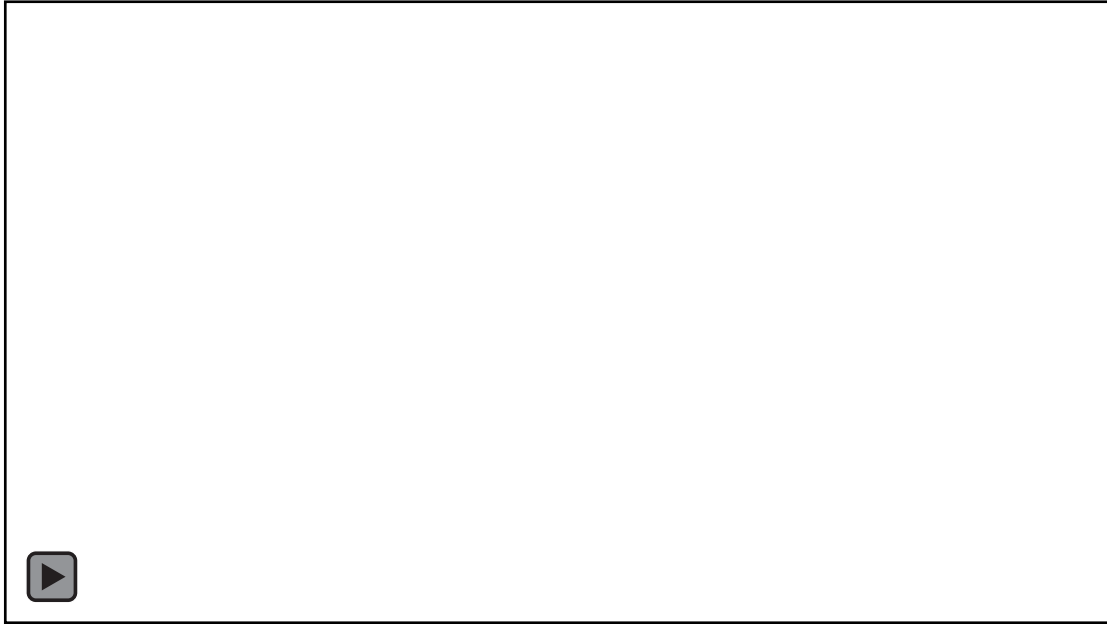
Winter Conditions in Eastern Oregon



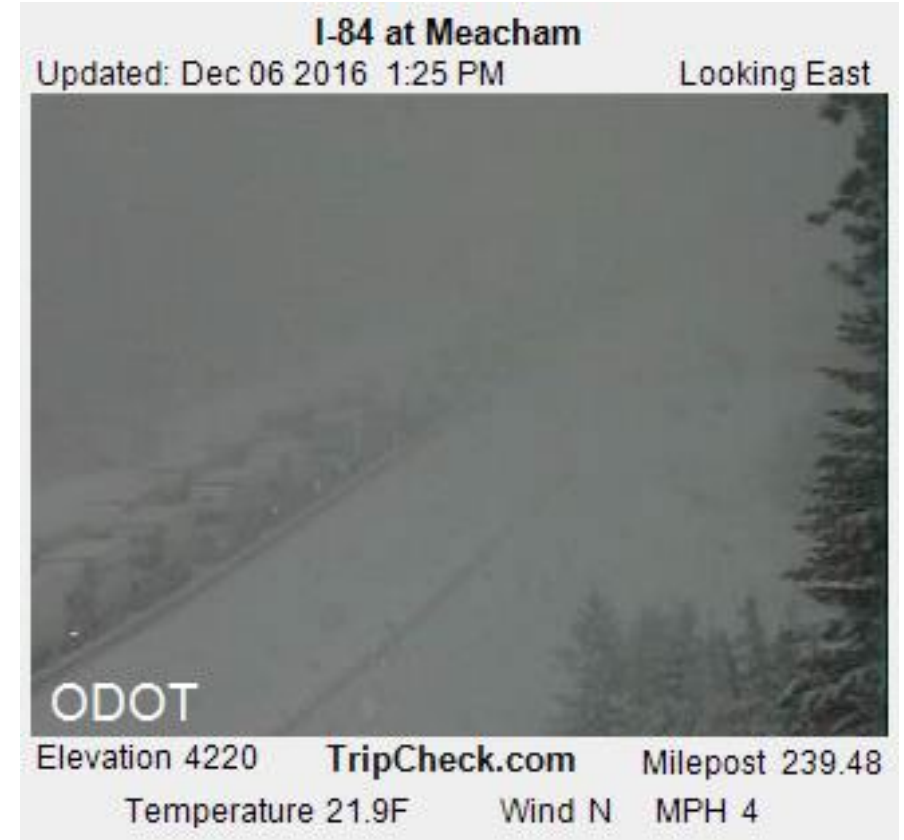
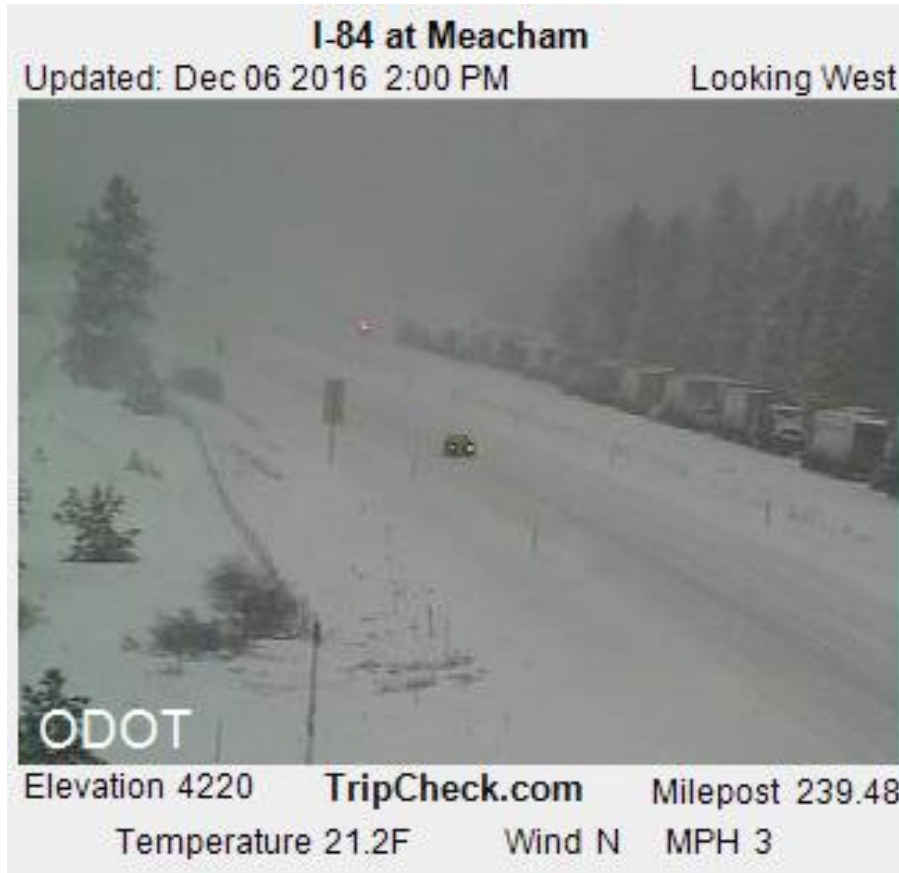
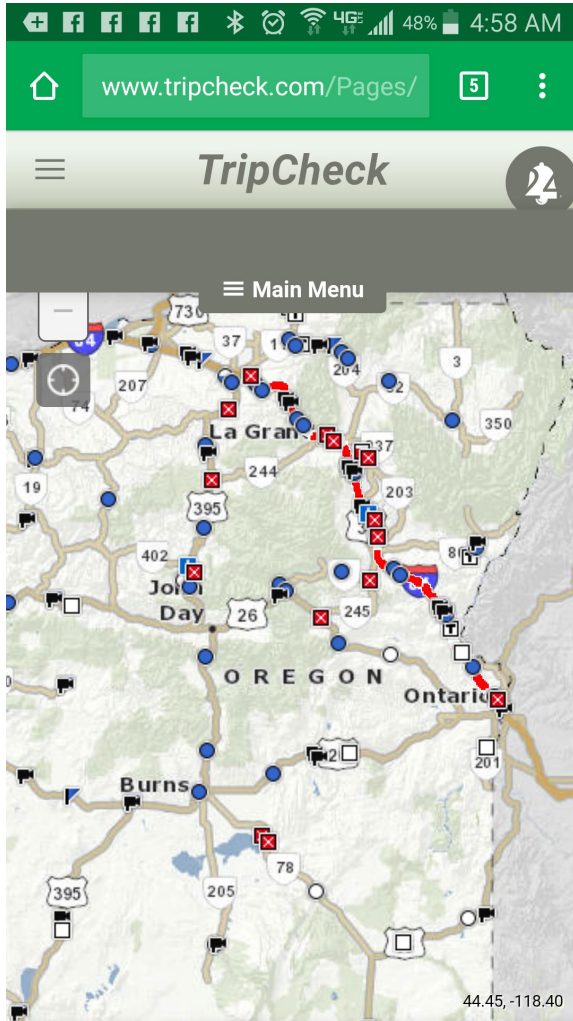
Winter Conditions in Eastern Oregon



Winter Conditions in Eastern Oregon



Winter Conditions in Eastern Oregon



Winter Conditions in Eastern Oregon



Oregon Department of Transportation

January 7, 2017 · 🌐

Weather conditions continue to worsen and ALL STATE HIGHWAYS IN UNION COUNTY ARE CLOSED, including I-84, due to blizzard condition creating zero visibility, snow drifts across the roadway and slippery, unsafe conditions. Highway closures are likely to continue through the evening. In some areas snow plows are not able to travel faster than 5 mph, making it impossible to keep roads passable. Other routes are unsafe even for plows at this time. Travelers are warned to find a safe place to wait out the storm, fill up gas tanks and be prepared to stay put through the evening. If you do head out on highways in the Union County area, it is likely you will be stranded without hope of rescue until the storm passes. STAY HOME. STAY SAFE.

Check TripCheck.com or call 511 / 800-977-6368 for update conditions. Outside Oregon call 503-588-2941.



Risk of Stranded Motorists

I-84 reopens, ending closure that stranded hundreds

People Rescued But Highways Still Closed

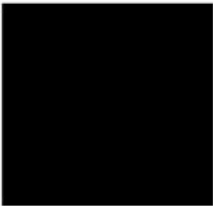
FEBRUARY 16, 2007 / 5:22 AM / CBS/AP



WEATHER

Heavy snow traps 600 vehicles on State Route 38 between Angelus Oaks, Big Bear

The Saddleridge fire is closing these freeways and roads in Sylmar, Granada Hills, Porter Ranch and Santa Clarita



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Thousands Of Drivers Stranded As Grapevine Contends With Snow, Ice

February 18, 2019 at 11:54 am Filed Under: Grapevine

The last of hundreds of motorists who had been stranded on Interstate 78 were finally sprung loose Friday morning but the highway remained shut down as crews struggled to clear ice and snow from the road surface.

Winter storm, ill-prepared travelers, highway closures leave Lake Tahoe drivers stuck for hours

News | January 7, 2019

Risk of Stranded Motorists

Effective Date 12/31/2021

































Highway #: 006 OLD OREGON TRAIL Hwy

Beginning Mile Point	Roadway	Mileage Type	Overlap Code	Dir Code	AADT Volume	AADT 20 YR Volume	ATR Count	Design Hour Factor	Ton Mileage Factor				
207.47	1			E	18411	19700	N	11.1	9.2				
Vehicle Class Percentage	Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7	Class 8	Class 9	Class 10	Class 11	Class 12	Class 13
	0.20	56.20	19.40	0.40	1.70	1.10	0.10	0.10	16.30	2.40	0.10	0.20	1.80
Volume	37	10347	3572	74	313	203	18	18	3001	442	18	37	331

Fatal crash along I-84 east of Pendleton kills two, shuts down road for 19 hours, police say

Updated Mar 4, 2014; Posted Mar 4, 2014

FIGURE C-1 FHWA 13 VEHICLE CATEGORY CLASSIFICATION

Class 1 Motorcycles		Class 7 Four or more axle, single unit	
Class 2 Passenger cars		Class 8 Four or less axle, single trailer	
			
			
Class 3 Four tire, single unit		Class 9 5-Axle tractor semitrailer	
			
Class 4 Buses		Class 10 Six or more axle, single trailer	
			
			
Class 5 Two axle, six tire, single unit		Class 11 Five or less axle, multi trailer	
			
			
Class 6 Three axle, single unit		Class 12 Six axle, multi-trailer	
			
			
			
		Class 13 Seven or more axle, multi-trailer	

- EXAMPLE: MP 207 – Pendleton on I-84
 - heavy vehicle traffic (25%), light traffic (75%)
 - heavy vehicle traffic 4,603, light traffic 13,808
 - general length of semi-truck trailer 75ft
 - general length of car/pickup 17ft
 - general space between parked vehicles 10ft
 - 19 hours = 3,644 trucks, 309,740ft, 59 miles of traffic
 - 19 hours = 10,931 cars, 295,137ft, 56 miles of traffic

LARGE AND SEERIOUS CRASHES ON I-84

BOISE WEEKLY

News » Citydesk

\$700 Million Suit Filed As One-Year Anniversary of I-84 Bus Crash Approaches

A new lawsuit is accusing the Oregon Transportation Department of failing to make the stretch of I-84 through the Blue Mountains safe.

by George Prentice
December 27, 2013



As the **one-year anniversary of a horrific bus crash** on an icy stretch of Interstate 84 that killed nine and injured 38 more approaches, a Canadian lawyer representing 12 of the victims has filed a \$700 million lawsuit, alleging negligence.

Oregon bus crash: The tragedy focuses attention on the treacherous I-84 pass

Updated Jan 5, 2013; Posted Jan 4, 2013



Rescue workers use ropes to bring survivors up to Interstate 84 in the aftermath of Sunday's bus accident 13 miles east of Pendleton.

LARGE AND SEERIOUS CRASHES ON I-84

2 dead after trucks crash on I-84 in Eastern Oregon

by Associated Press | Monday, March 3rd 2014



Fatal crash along I-84 east of Pendleton kills two, shuts down road for 19 hours, police say

Updated Mar 4, 2014; Posted Mar 4, 2014

Comment

By [Shane Dixon Kavanaugh | The Oregonian](#)

I-84 crash near Pendleton.jpg

Heavy fog and icy roads along Interstate 84 are believed to have caused a four-truck pileup east of Pendleton that killed two driver, police said.

(Oregon State Police)

A four-truck pileup along an icy stretch of Interstate 84 in eastern Oregon killed two drivers and shuttered westbound lanes for nearly 19 hours, [state police](#) said Monday.

LARGE AND SEERIOUS CRASHES ON I-84

Cabbage Hill Truck Pile Up 12/5/2014



LARGE AND SEERIOUS CRASHES ON I-84

12 injured in 26-vehicle pileup on I-84 in eastern Oregon

by Steve Benham KATU.com Staff and Cory Marshall KATU News | Friday, January 16th 2015



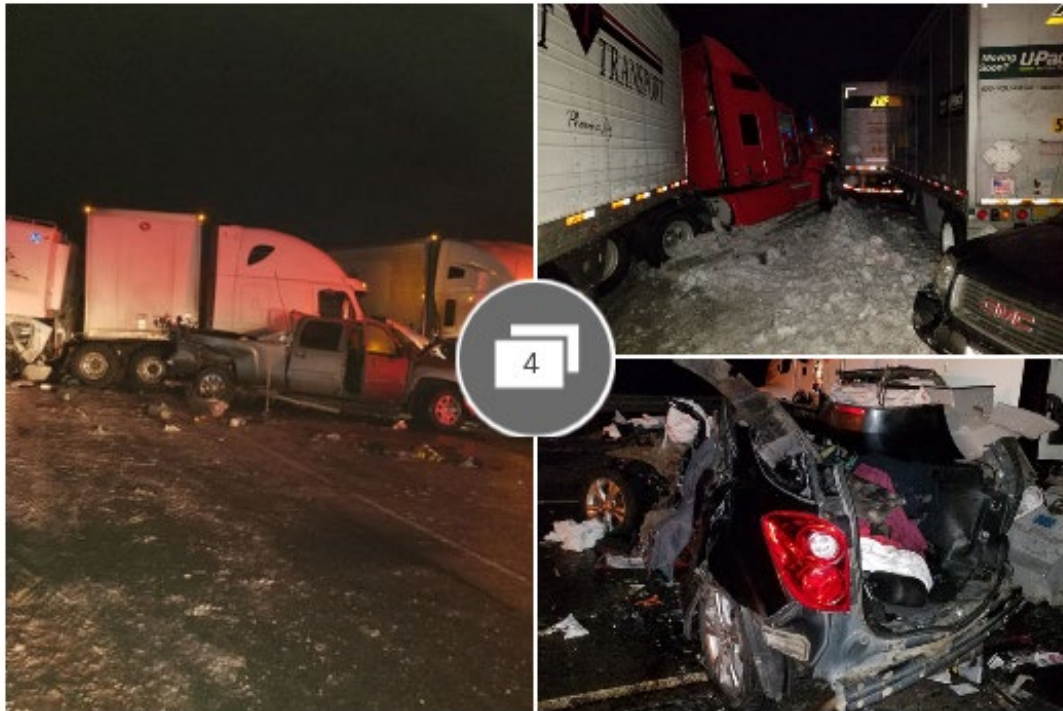
Published Jan. 18, 2015 at 10:15AM / Updated February 13, 2016 at 06:24PM

Black ice blamed for I-84 pileup

LARGE AND SEERIOUS CRASHES ON I-84

20-vehicle pileup east of Pendleton injures nine, closes westbound I-84 for 12 hours

Posted Mar 4, 2018



Gallery: 20-car pileup in Umatilla County

Pendleton woman dies from injuries suffered in 20-car pileup on I-84



Police said 9 people were injured - 5 of them seriously - in a 20-car pileup on Cabbage Hill on Interstate 84, east of Pendleton near the Deadman's Pass Lookout Area. (OSP)

LARGE AND SEERIOUS CRASHES ON I-84

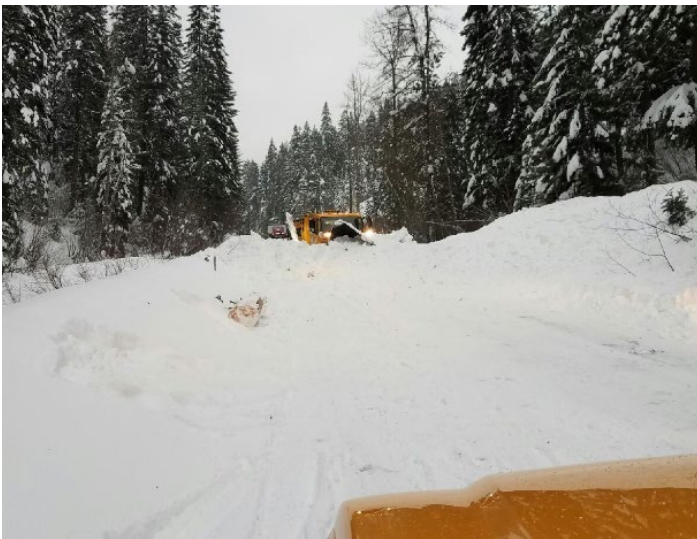


I-84 closed in eastern Oregon due to pileup crashes involving nearly 100 vehicles

Updated: Feb. 22, 2022, 9:20 a.m. | Published: Feb. 21, 2022, 3:19 p.m.

DIFFICULTY HIRING, TRAINING, AND STAFFING

HIGH RISK ACTIVITY



HEAVY FREIGHT COORIDOR



Cost of Unexpected Delays on I-84 in Eastern Oregon

Hourly Cost of Unexpected Delay								
Location				Value of One Hour of Travel Time for all Vehicles				Peak Hour as % of Average
ATR	Highway	Route	Mile Point	Average	Low	High	Peak Hour	
25-008	006	I-84	168.55	\$ 19,900	\$ 12,900	\$ 23,800	\$ 54,300	273%
30-027	006	I-84	191.4	\$ 19,600	\$ 12,500	\$ 23,400	\$ 50,000	255%
30-004	006	I-84	203.34	\$ 19,900	\$ 12,700	\$ 23,600	\$ 50,600	254%
30-026	006	I-84	216.81	\$ 13,400	\$ 7,500	\$ 16,400	\$ 39,000	291%
31-007	006	I-84	260.12	\$ 12,500	\$ 7,300	\$ 15,900	\$ 37,000	296%
31-008	006	I-84	272.19	\$ 13,300	\$ 8,900	\$ 16,600	\$ 37,600	283%
01-011	006	I-84	286.65	\$ 12,600	\$ 7,500	\$ 15,500	\$ 36,100	287%
01-013	006	I-84	309.02	\$ 12,300	\$ 7,200	\$ 15,200	\$ 33,800	275%
01-014	006	I-84	336.29	\$ 12,300	\$ 7,100	\$ 15,300	\$ 33,900	276%
23-016	006	I-84	353.47	\$ 13,100	\$ 7,800	\$ 15,200	\$ 34,500	263%
23-014	006	I-84	376.98	\$ 23,800	\$ 15,800	\$ 27,100	\$ 53,500	225%

<https://www.oregon.gov/ODOT/Data/Pages/Economic-Reports.aspx>





Eastern Oregon I-84 Improvements

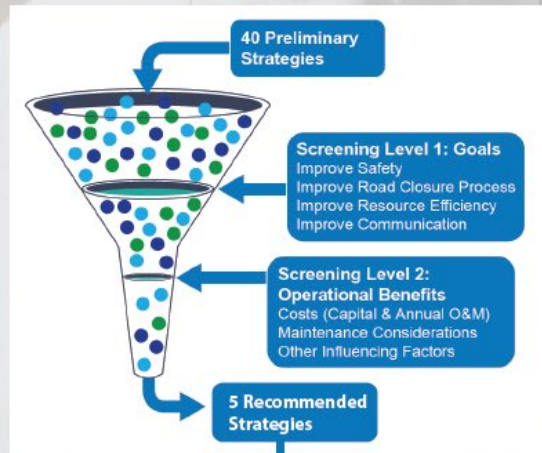


Consultant Performed – Region 5 Freeway Corridor Planning Study

REGION 5: FREEWAY CORRIDOR SAFETY

PLANNING

CORRIDOR MANAGEMENT PLAN evaluated over 200 miles of I-82 and I-84 in eastern Oregon to improve safety and operations with input from maintenance, emergency services, trucking industry and others.



Goals and Strategies Drive Projects and Maintenance Operations

PROJECT DEVELOPMENT



Corridor Plan Area and Upcoming Key Projects

SNOW ZONE IMPROVEMENT PROJECT extends from Pendleton to La Grande and incorporates many of the strategies identified in the Corridor Plan.

LADD CANYON IMPROVEMENT PROJECT adds a third lane for I-84 eastbound truck ascending the steep grade east of La Grande.

MEACHAM MAINTENANCE STATION replaces 50-year-old facility that is critical for winter safety in the Blue Mountains.

MAINTENANCE & OPERATIONS

PILOT SALT USE PROGRAM expanded to I-84 and I-82. Salt storage sheds installed along freeways.

TRAFFIC MANAGEMENT PLAN sorts local traffic and manages truck parking during extended closures.

REFLECTIVE MARKERS installed at curves with high crash frequency.

WORKFORCE EFFICIENCIES improve staff/equipment sharing and 24/7 winter coverage.

NEW EQUIPMENT added, such as tow and dual wing plows that clear two freeway lanes with one pass.



Five New Tow Plows



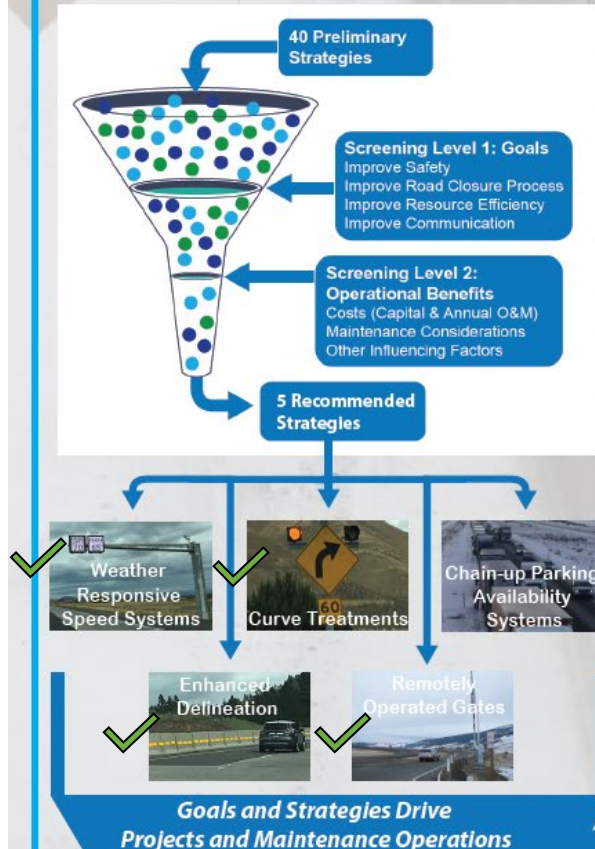
Five New Dual Wing Plows

Consultant Performed – Region 5 Freeway Corridor Planning Study

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PROJECT DEVELOPMENT



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**Use operational solutions to help solve
the issues at hand**

Maintenance and Operations:

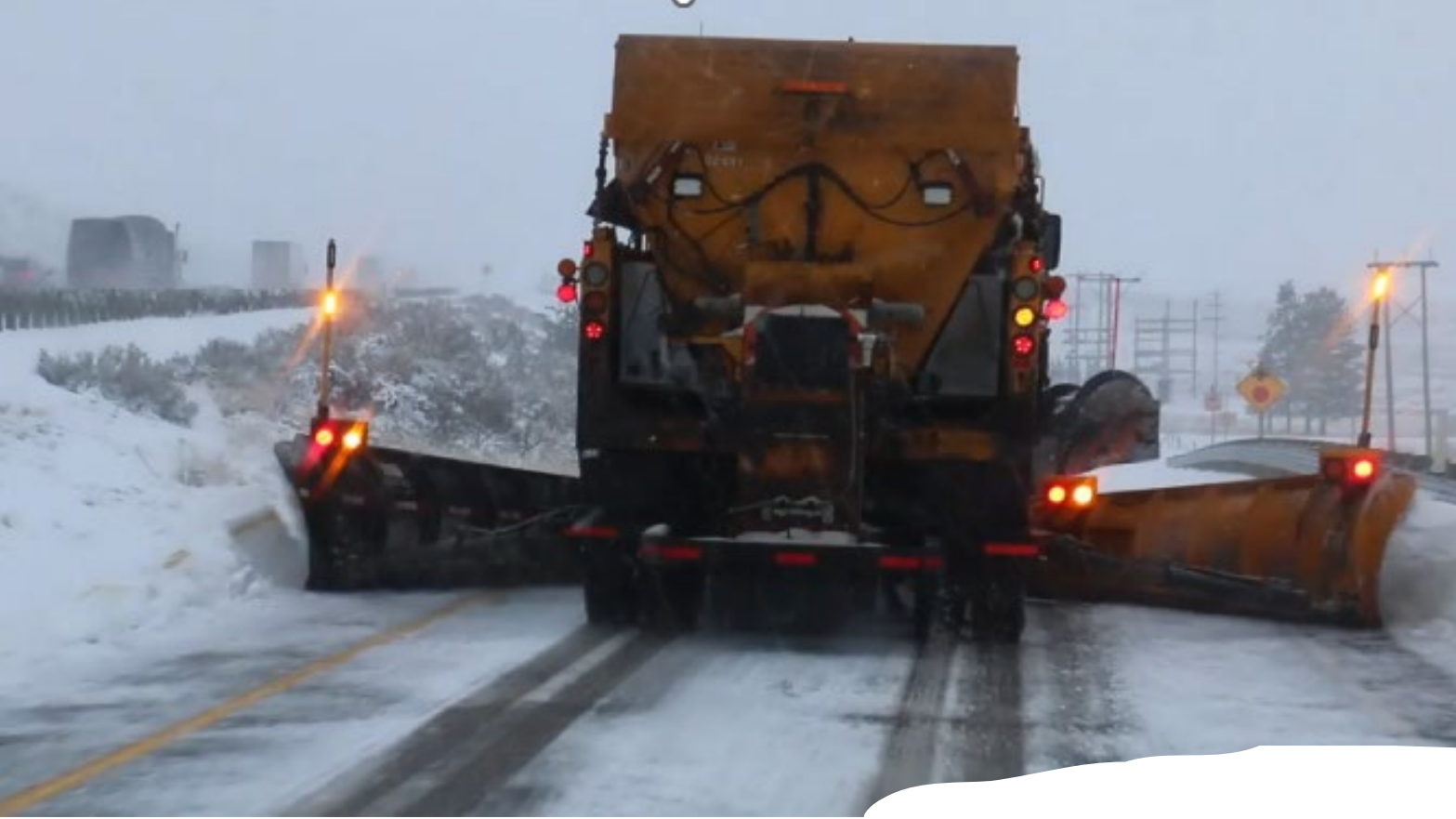
1. **Purchased 5 tow plow truck/trailers** - capable of carrying nearly twice the amount of sand or salt as well as plow 2 lanes at once in order to be more efficient with the limited employees we have to keep roads plowed.
2. **Purchased 6 double wing plows** - that were installed on trucks now capable of plowing both lanes on the freeway in one pass to be more efficient with limited employee resources.
3. **Implemented the salt usage program** - on the freeway in Eastern Oregon with the intent of reducing crashes and closures by providing better road conditions for drivers and better winter tools for employees to use to fight winter conditions.
4. **Began sorting local traffic at freeway closure points** - As we have staff available but we can't take plow drivers off of the highways during storms to sort traffic. Sorting local traffic is important for life safety routes for medical emergencies and appointments, lodging reservations and tourism, local freight, and economics for commerce.
5. **Installed reflective markers on the barriers in curvy sections and durable pavement markings** - on sections of the freeway to help reduce crashes and closures by improved visibility.
6. **Added 12 seasonal employees** - This allowed us on the freeway corridor to implement a new work schedule that includes 24/7 coverage on the freeway throughout the winter.

Maintenance and Operations Continued...

7. **Worked with ODOT Construction and Oregon Department of Forestry** - to share positions to maximize peak demands for winter and summer work.
8. **Fully redeploy our specialty crews such as Striping and Bridge Crews** - and assign them to a maintenance crew and a winter schedule.
9. **Implemented Corridor Operations Meetings and Communication Group** – Implemented strong communication across the 200+ mile freeway corridor.
10. **Improved Snowplow Visibility to Drivers** – Installed standardized conspicuity markings, increased warning lights, and air foils to help keep markings visible.
11. **I-84 Extended Closure Plan** – Developed an extended closure plan that includes discussion and tools specifically intended to improve communication, efficiency, and safety during extended-duration closures of the Interstate in Region 5. The goal of the plan is to assist Region 5 districts and section crews with implementing extended closures and minimizing the impacts to motorists and the trucking industry. The plan provides guidance and resources that should be used prior to and during an extended road closure.

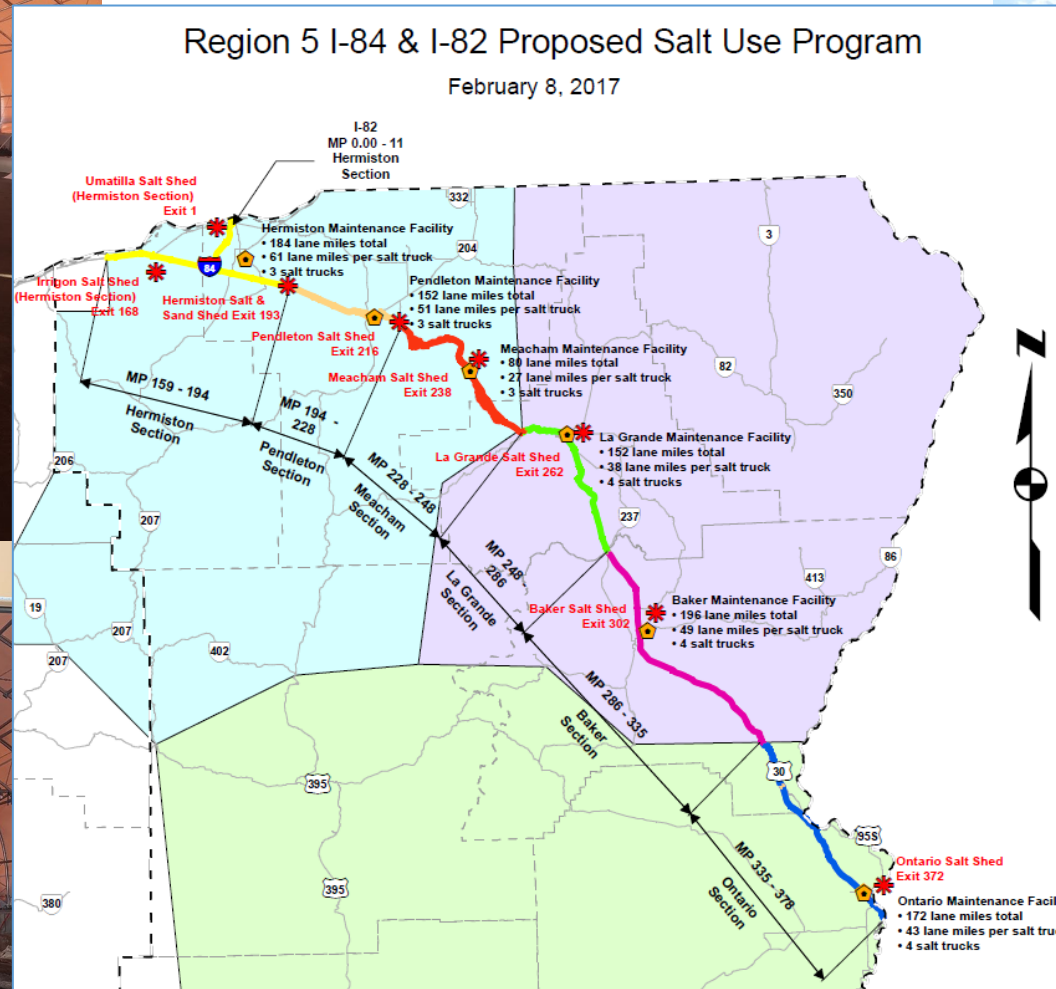


2017 - 5 Tow Plows



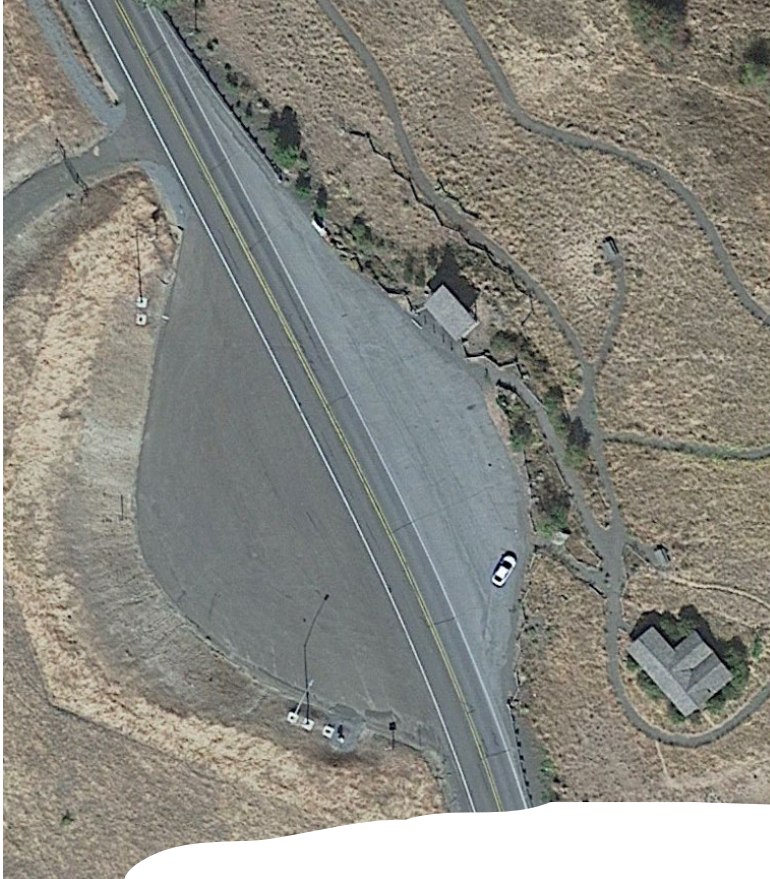
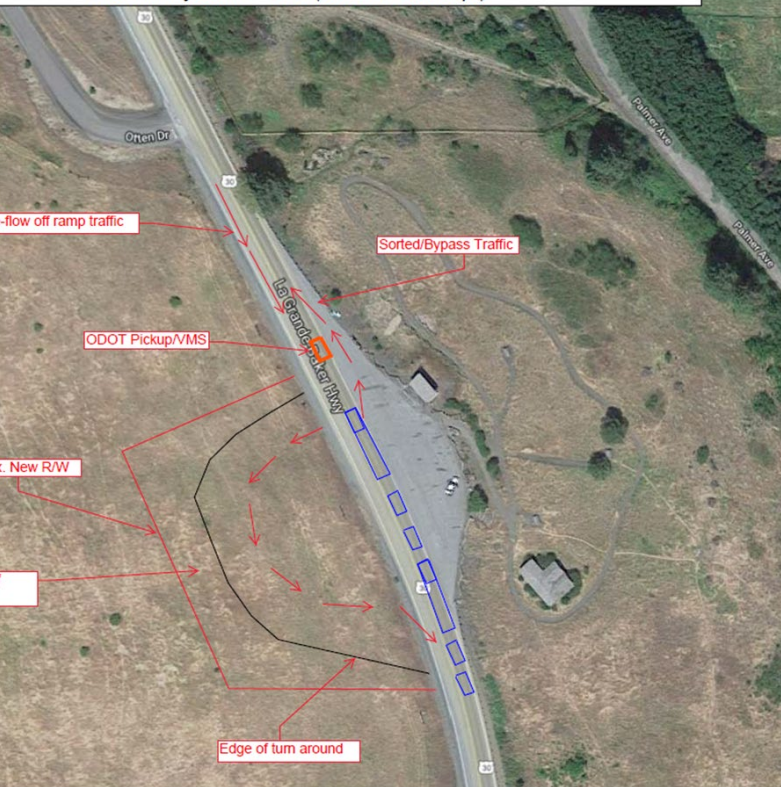
2017 – 6 Dual Wing Plows

Implemented Salt Use on I-84



E I-84 FREEWAY CLOSURE - TRAFFIC CIRCULATION AND SORTING

US30 Hwy 66 MP 0.75 (General Concept)

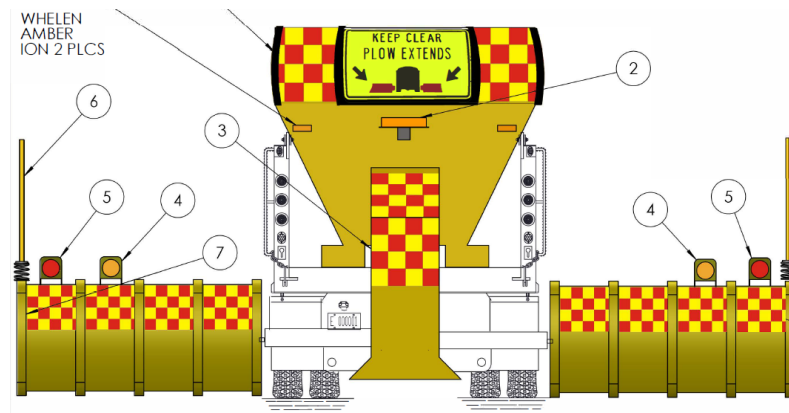
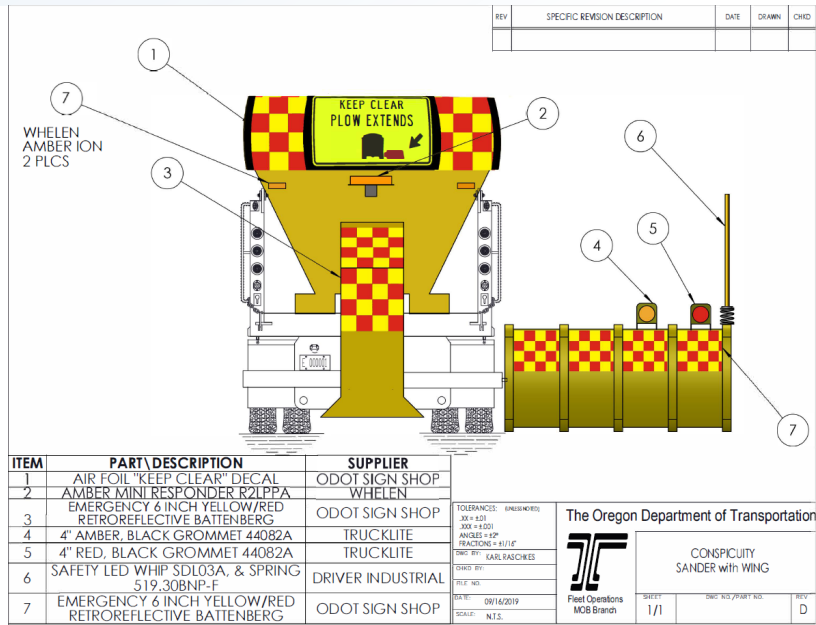


Traffic Sorting During Freeway Closures



Maintenance Constructed –
Emergency Truck Parking

SNOW PLOW SAFETY – Conspicuity Markings



**Choosing the right project solution to
solve the issues at hand**

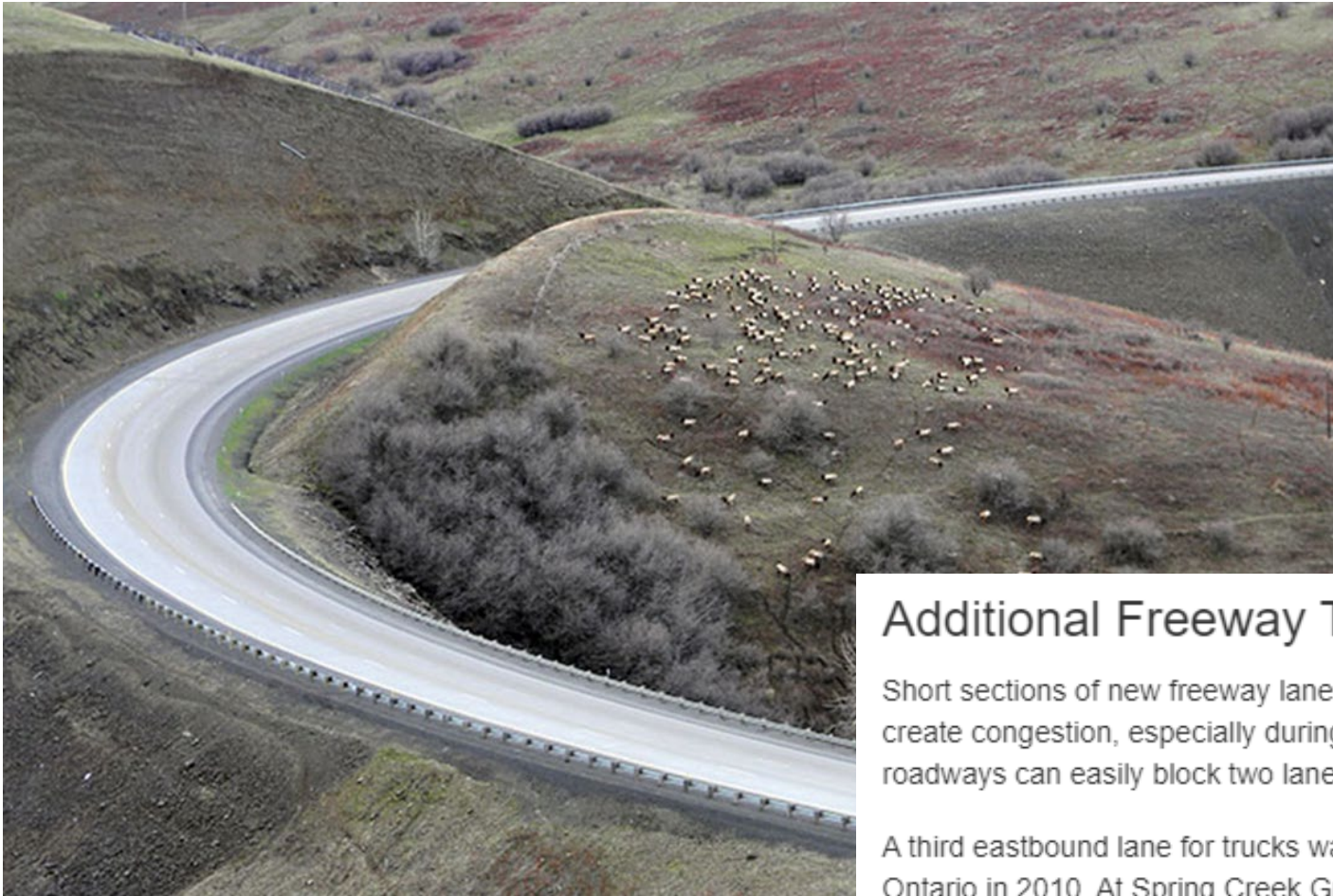
Project Examples





Regulatory VSL Project

OTHER CAPITAL IMPROVEMENT PROJECTS



Additional Freeway Truck Climbing Lanes

Short sections of new freeway lanes are being added along steep grades where slow moving trucks can create congestion, especially during winter conditions. Jackknifed trucks that lose control on slick roadways can easily block two lanes, shutting down the eastbound or westbound freeways.

A third eastbound lane for trucks was constructed at Three-Mile-Hill near mile post 358, 20 miles west of Ontario in 2010. At Spring Creek Grade, 15 miles west of La Grande, a third lane for westbound trucks was constructed in 2015. In 2019 work will begin on the new third lane for EB trucks at Ladd Canyon seven miles east of La Grande between MP 271-273

OTHER CAPITAL IMPROVEMENT PROJECTS

Truck Chain-Up Areas

Over a half-dozen truck chain-up or chain-off areas along I-84 snow zones have been added or enhanced in the past several years between Pendleton and Ontario. Specific chain sites for commercial trucks include the following locations.

- Mission Interchange EB (MP 216.4 to MP 216.9)
- Cabbage Hill WB (MP 217.3 to MP 217.9)
- Poverty Flats WB (MP 224.6 To MP 225.7)
- Poverty Flats EB (MP 226.3 To MP 237.4)
- Meacham EB (MP 237.2 To MP 237.7)
- Mount Emily WB (MP 245.2 to MP 245.7)
- Spring Cr. WB & EB (MP 249.2 to MP 249.7)
- 5 Point Cr. WB & EB (MP 253.5 To MP 253.8)
- West La Grande WB (MP 259.9 to MP 260.3)
- Ladd Marsh EB (MP 265.7 To MP 266.7)
- Clover Cr. Interchange WB (MP 279.1 To MP 280.4)
- Baker City WB & EB (MP301.0 To MP 302.0)



OTHER CAPITAL IMPROVEMENT PROJECTS

Roadway Realignments and Curve Warning Systems

Some sections of I-84 follow alongside winding rivers that cut natural pathways through eastern Oregon mountain ranges. The Burnt River Canyon south of Baker City is one such site where the curvy alignment of the freeway has contributed to crashes when vehicles are driving too fast for conditions. In 2006 ODOT realigned two 50 mph curves and added three new curve and speed related reader boards that have helped reduce crashes in this corridor. The upgrades include radar signs to warn motorists of their travel speeds, curve warning signs with flashing lights, and variable message signs that can display current conditions in the area.



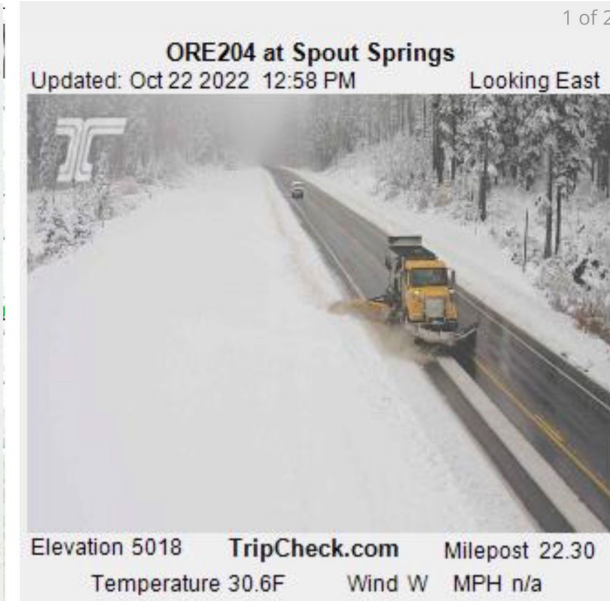
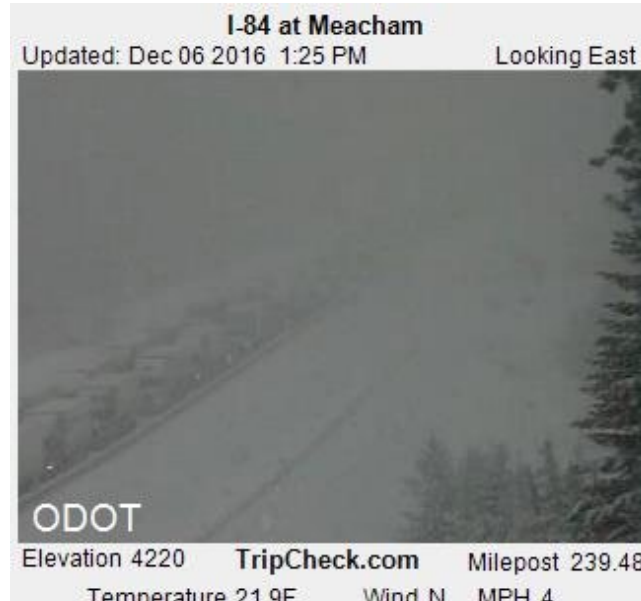
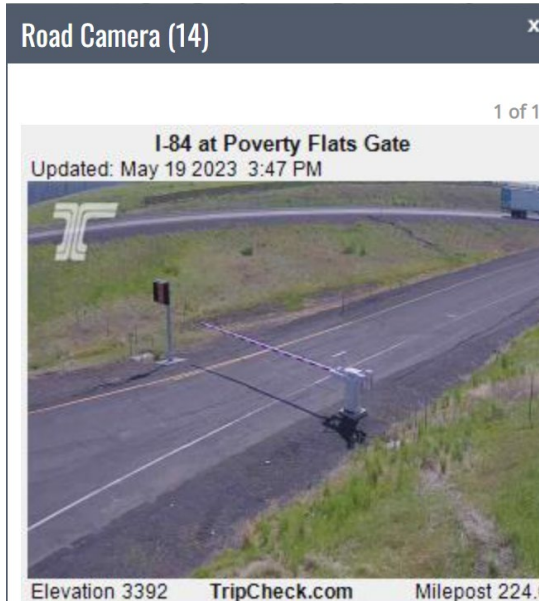
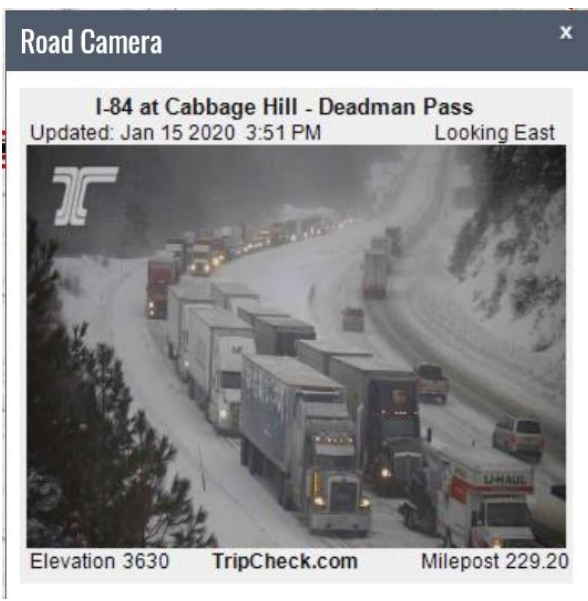
New Snow Fencing to Reduce Drifts/White-Outs

ODOT has been investigating and testing different types of snow fencing to improve winter driving conditions along the interstate and other highways where drifting snow can create winter driving hazards. Over the past two decades new snow fencing has been installed along several sections of I-84 between La Grande and Baker City, including log style fencing in Ladd Canyon and a vinyl slat style in the Baker Valley.



OTHER CAPITAL IMPROVEMENT PROJECTS

Road and Weather Information Systems



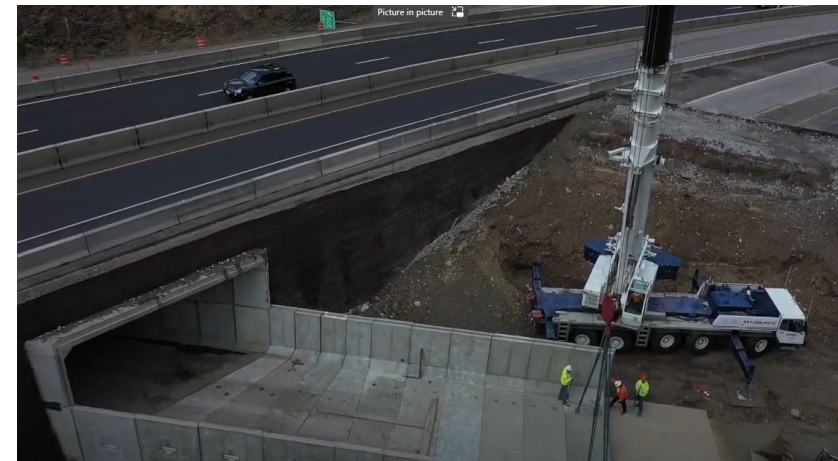
MAJOR CAPITAL PROJECTS:

- 1. LADD CANYON FREIGHT IMPROVEMENTS:** Constructing a 30 million dollar construction project that will add a 3rd climbing lane to Ladd Canyon and replace an existing bridge with a box culvert among other improvements. The 3rd lane will reduce the number of spun out trucks that block the highway causing freeway closures. The new box culvert will allow fill material under the roadway and prevent bridge icing issues. This project is similar to the 3rd lane that was added on I-84 “cabbage hill”, “spring creek hill”, and “3 mile hill” on I-84 in Eastern Oregon to reduce closures due to spun out trucks during the winter months.
- 2. I-84 Snow Zone Improvements:** Oregon Department of Transportation developed a \$15.6 million automated system that allows the real-time weather, traffic flow, and surface condition readings to flow into Oregon DOT’s Active Traffic Management system. This system provides traffic advisory messages to the public via new weather stations, variable message signs, and live cameras accessible online.
- 3. Meacham Maintenance Station:** ODOT’s Meacham Maintenance Station facility is the Agency’s home base for highway maintenance on Interstate 84 through the Blue Mountains between La Grande and Pendleton. Facility functions include maintenance vehicles, equipment servicing, minor repairs, material and tool storage, fueling, de-icing, stockpiling of road sand and salt, and crew areas.

LADD CANYON FREIGHT IMPROVEMENTS



ODOT is adding a third eastbound climbing lane through the Ladd Canyon area (about five miles east of La Grande), as well as repaving and replacing a bridge with a box culvert that will reduce the likelihood of icy roadway conditions.



Project Elements

Over a dozen new **electronic message signs** to provide information about:



Weather and roadway conditions,



Chain-up conditions,



Curve warning information, and



General information that impacts the interstate such as crashes ahead, closures, or construction information.



Ten new **weather stations** with sensors to detect pavement conditions and cameras to provide visual information to operators and travelers.



A dozen **curve warning signs** with flashing beacons in the Grande Ronde River Canyon (west of La Grande).



Nine miles of **cable barrier** between eastbound and westbound lanes at two locations to prevent cross over crashes (MP 229 - 238, and 249-250).



Two miles of **prep work for future LED roadway lighting** along Cabbage Hill westbound curves (MP 221-223); 20 lights will be installed initially with additional illumination as funding allows. The LED illumination will help delineate the westbound lanes through the curves as you are driving down the hill.



An **automated ramp gate** at the westbound on-ramp from Exit 224, allowing for faster closure during inclement conditions. This reduces the number of vehicles entering hazardous conditions, reduces the likelihood of a crash, and frees up staff resources to clear the roadway faster.



Over a dozen miles of **yellow reflective markers** attached to guardrail in Cabbage Hill area.



Over 10 miles of **buried power line** (to support these enhancements and future upgrades).

I-84 Snow Zone Improvements



Meacham Maintenance Station



ODOT is replacing the Meacham Maintenance Station with a new facility that will support improved maintenance response times on I-84, improve crew efficiency, reduce wear and tear on agency equipment, and save on energy costs.

Continued Challenges:

1. **HIGH SPEEDS** – Higher speeds coupled with less enforcement
2. **EMPLOYEE RETENTION AND ATTRACTION** – Difficult and expensive to train and recruit seasonal employees
3. **CHAIN COMPLIANCE AND ENFORCEMENT** – Raised fines for non-compliance, planning a chain sorting infrastructure project, seeking assistance from ODOT Commerce and Compliance Division
4. **DRIVER ABILITIES** – Commercial vehicles are easier to drive and require less experienced operators
5. **DRIVER EXPECTATIONS** – Today's drivers have a higher expectation of their vehicle performance and road conditions
6. **DRIVER PATIENCE** – We seem to experience drivers with less patience and more agitated



QUESTIONS?



Region 5 Winter Maintenance & Operations Improvements

Here is the description you submitted:

This session will discuss a multi-year planning and implementation project addressing operational issues such as large and serious truck crashes on a 200+ mile section through mountainous Eastern Oregon. Over the course of a decade or more, Oregon Department of Transportation conducted a corridor planning study and improvements that incorporated stakeholder feedback and implemented recommendation for operational and safety improvements. Improvements include a regulatory Variable Speed Limit (VSL), climbing lane additions, salt use program, workforce efficiencies, improved road closure protocols, and new equipment efficiencies such as tow plows and dual wing plows.