



# NORTHERN VIRGINIA WINTER WEATHER BRIEFING

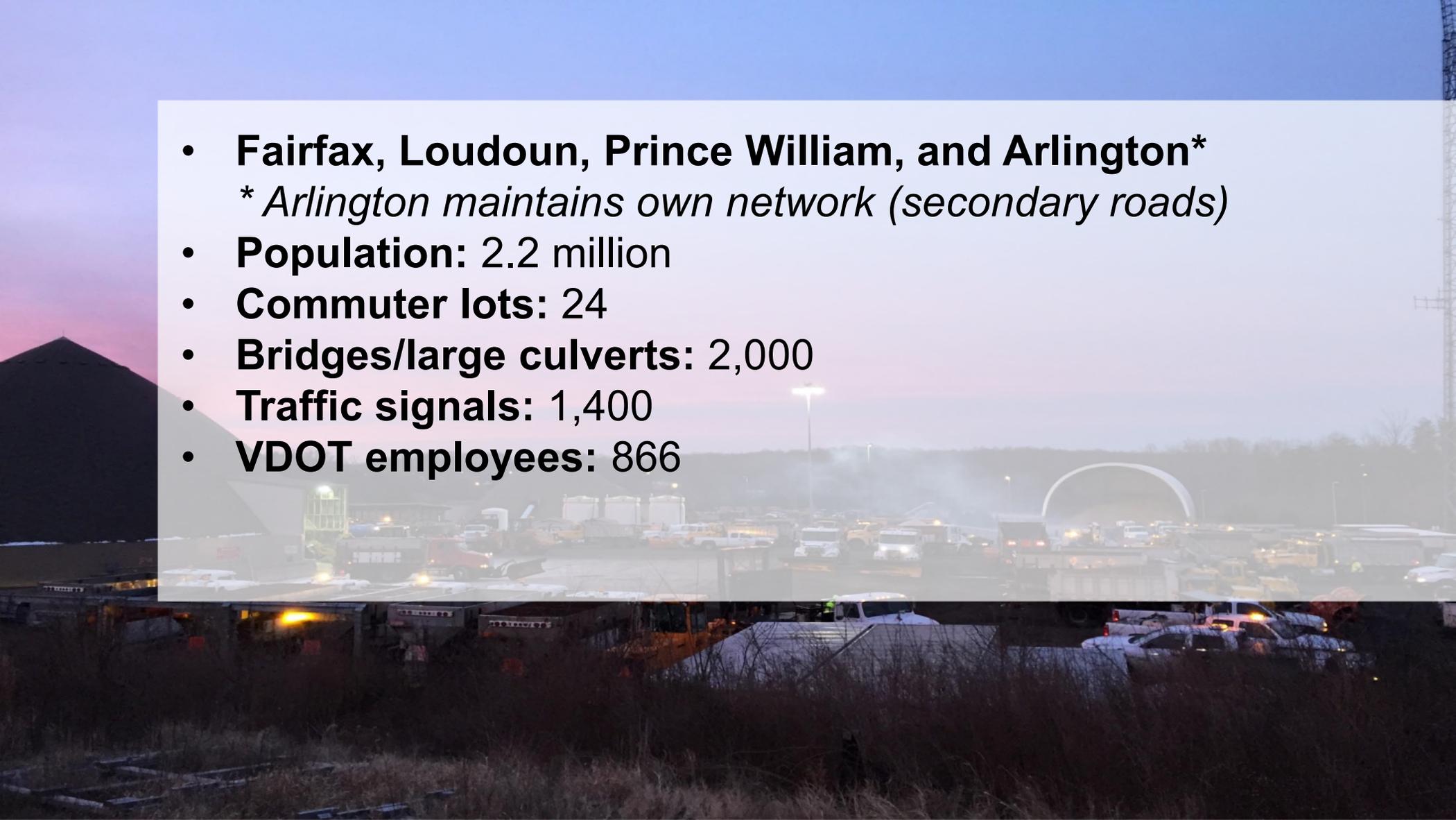
**May 24, 2018**

**Lauren Mollerup, P.E., CCM**  
**District Maintenance Engineer**



**Northern Virginia District Background**

- **Fairfax, Loudoun, Prince William, and Arlington\***  
*\* Arlington maintains own network (secondary roads)*
- **Population: 2.2 million**
- **Commuter lots: 24**
- **Bridges/large culverts: 2,000**
- **Traffic signals: 1,400**
- **VDOT employees: 866**





**Total lanes miles: 13,585**

- **Interstate: 727 • Primary: 1,736 Secondary: 11,046**
- **Gravel: 318 • Frontage: 78**
- **Subdivision streets: 16,000**



## **18 maintenance headquarters**

Arlington: 1 • Fairfax: 9 • Loudoun: 4 • Prince William: 4



**2017-2018 Snow removal budget \$84.8 million**



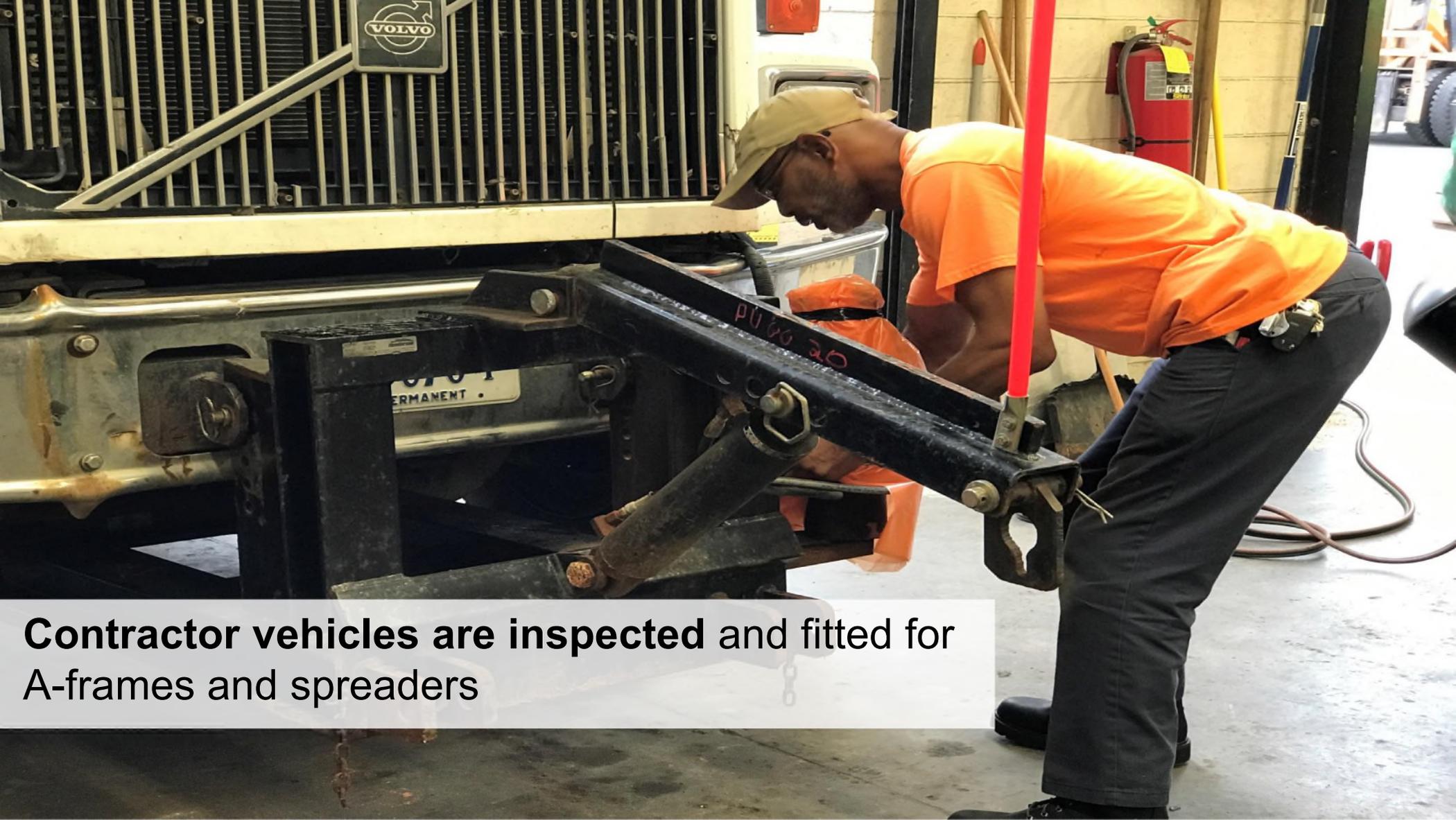
**Pieces of equipment: 4,500**  
*(mostly contracted)*

## **Materials at start of season**

Salt: 120,000 tons • Sand: 25,000 tons

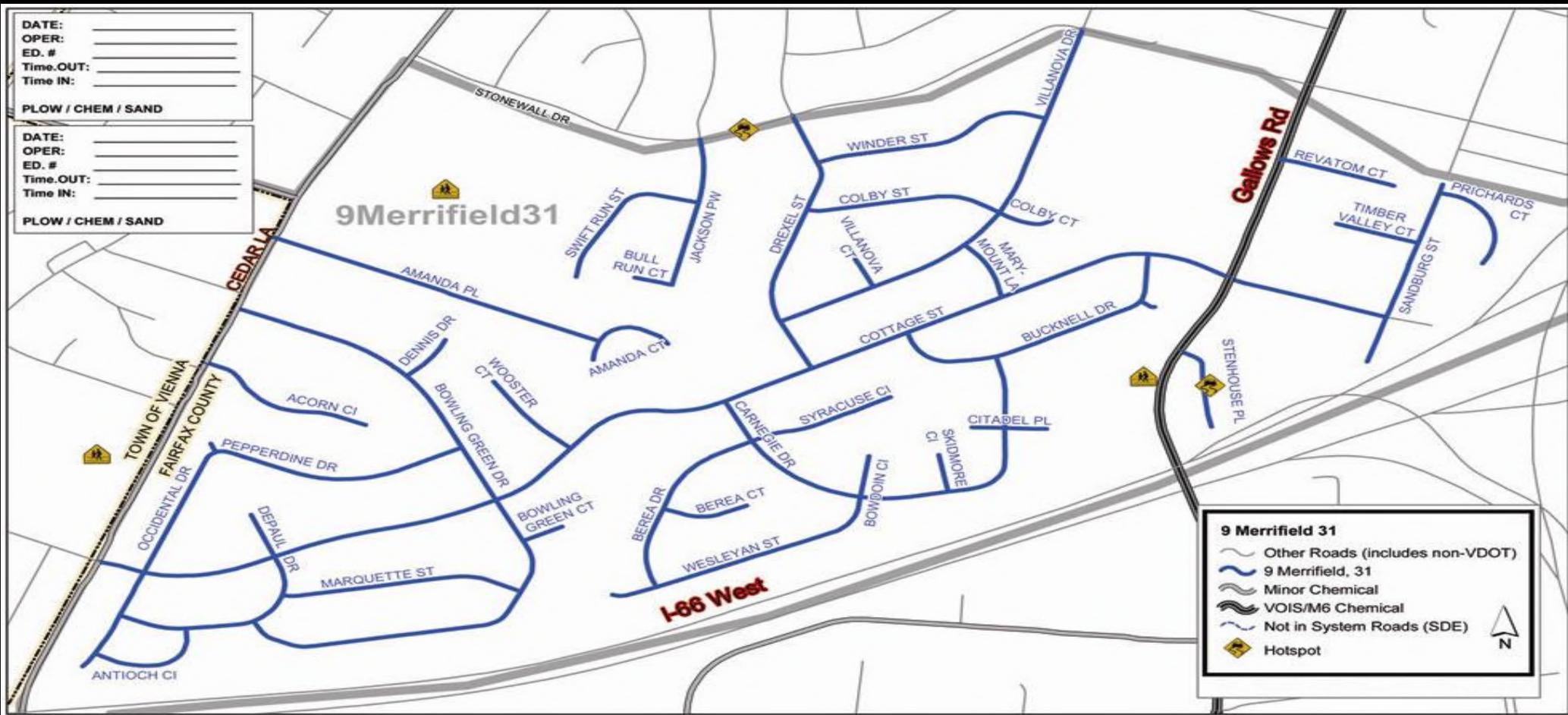
Brine: 250,000 gallons





**Contractor vehicles are inspected and fitted for A-frames and spreaders**

# The district is divided up into 626 snow maps



# Planning for winter weather



- **Forecast reviews** with National Weather Service ([weather.gov/washington/winter](https://www.weather.gov/washington/winter)) and Iteris
- **Mobilization plan** determined, including if incident command will be activated



A few days  
before a storm

**SALT BRINE**  
←

240-000083-N  
CHLORIDE, MAGNESIUM, LIQUID  
UOM-GAL →

**USE CAUTION**  
DRIVERS MUST EXERCISE DUE  
DILIGENCE DURING THE LOADING  
AND UNLOADING OF MATERIAL  
REMAIN WITH THE VEHICLE AND  
STAY ATTENTIVE WATCHING FOR LEAKS

**DANGER**  
CONFINED SPACE  
ENTER BY  
PERMIT ONLY

VIRGINIA DEPARTMENT OF TRANSPORTATION  
Sodium Chloride Deicing (23%) Solution

|  |  |
|--|--|
| <b>Health</b><br>Irritant to sensitive skin and eyes.<br>Ingestion may cause vomiting<br>and stomach irritation. Extensive<br>ingestion may cause vomiting, diarrhea<br>and/or elevated blood urea nitrogen. | <b>Flammability</b><br>Nonflammable.<br>Product can be used to sanitize tires. |
|--|--|

A worker wearing a white hard hat and a high-visibility yellow safety vest with 'VDOT' on the back is seen from behind, standing in front of a large white truck. The truck has a large red sign that reads 'PRE-STORM TREATMENT'. The background shows a cloudy sky and a building.

# PRE-STORM TREATMENT

- Applied when pavement temps are above 20 degrees, and event does not begin as rain
- Anti-icing treatment most effective during first hour of weather event

- **2,150 lane miles of interstates and major roads** including bridges, ramps, and overpasses are treated with brine and/or liquid magnesium chloride.





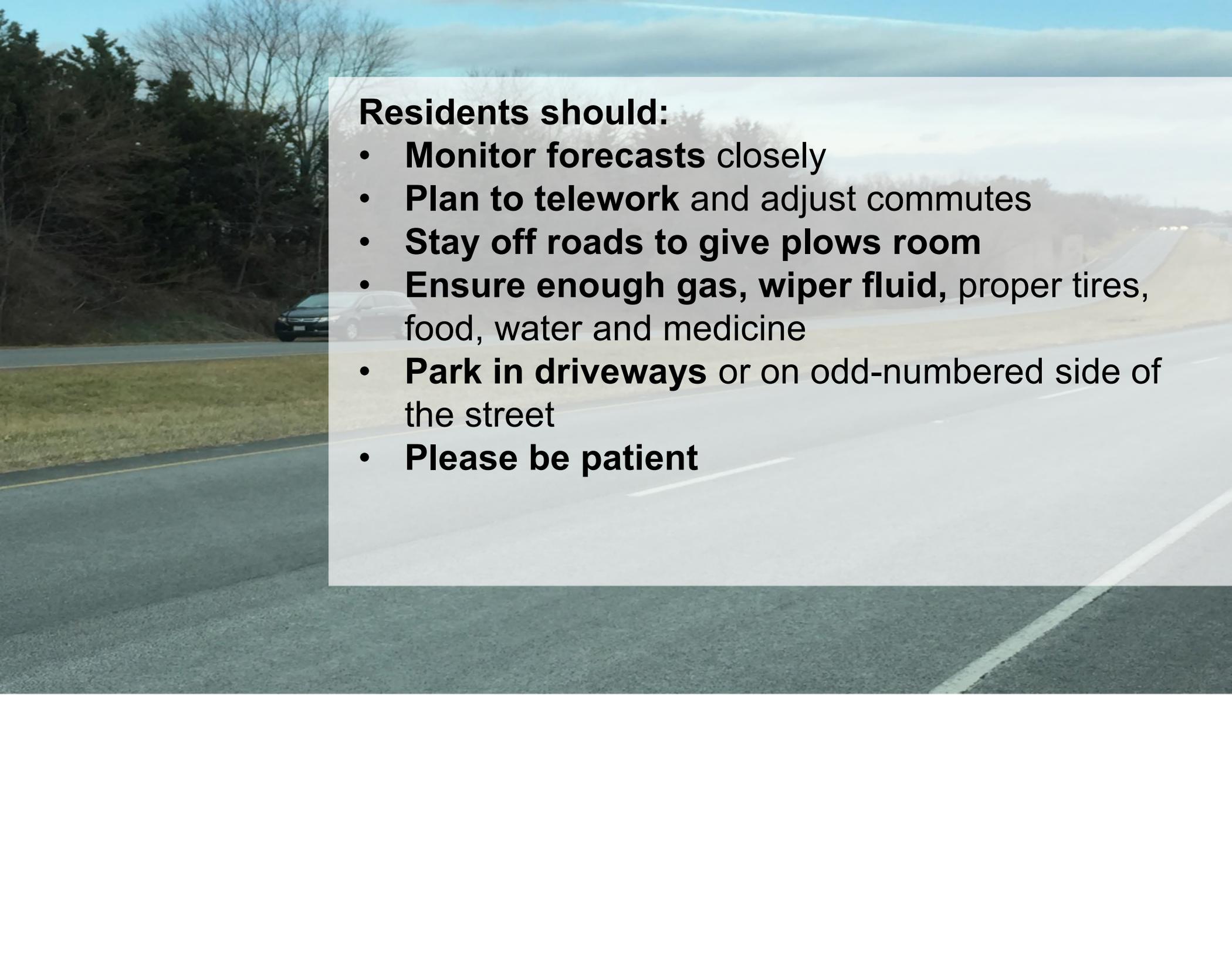
**Mobilization begins**

- **Contractors report, load, and stage trucks in the assigned areas before predicted storm arrival**
- **If 2”+ are forecasted, residents may see trucks begin to stage in neighborhoods.**



- **Small events:** 12-18 hours before forecasted start
- **Large events:** 18-24 hours before forecasted start



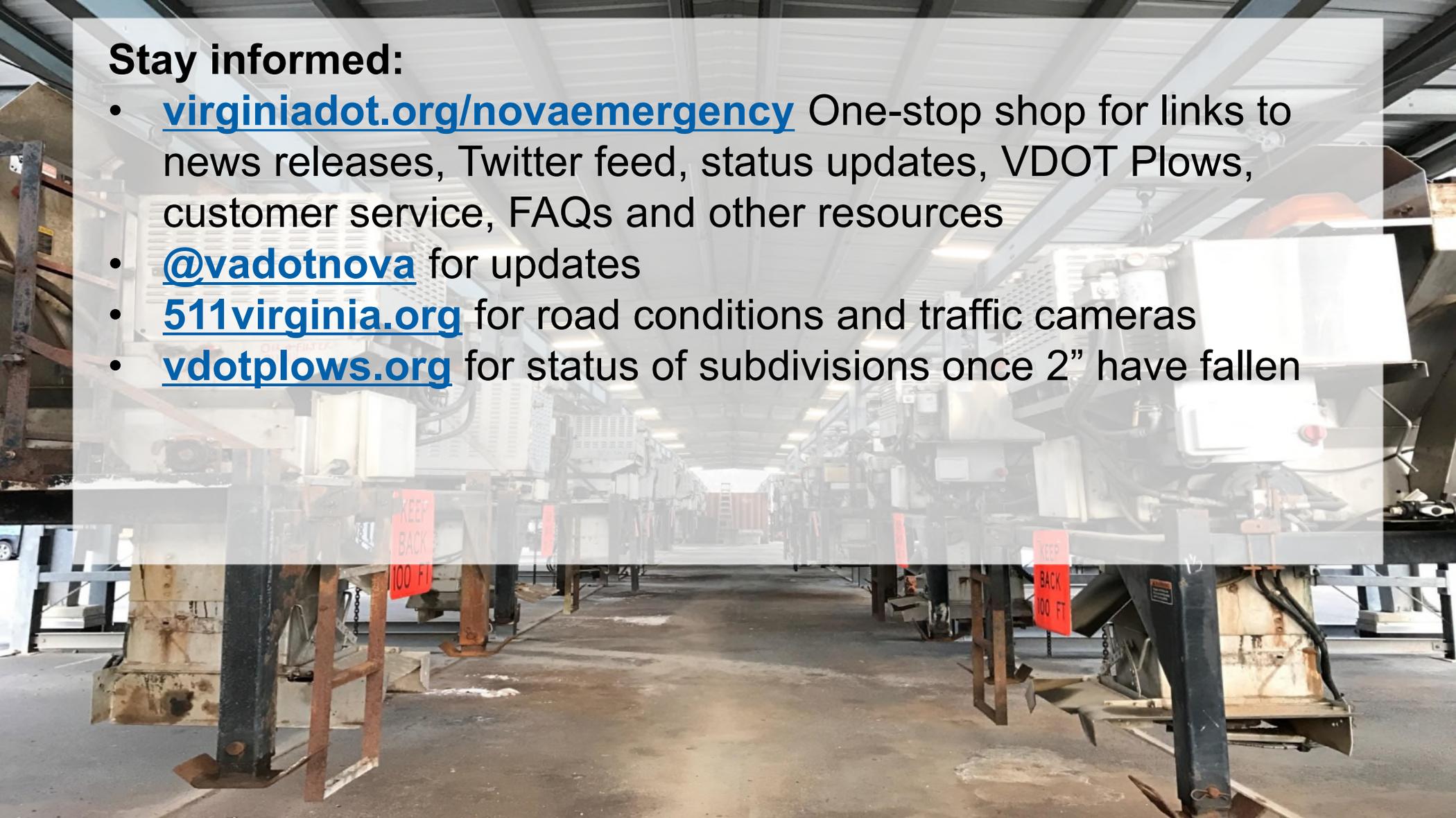
The background image shows a paved road with a white lane line, a grassy shoulder, and a line of trees under a cloudy sky. A semi-transparent white box with a light gray border is positioned in the upper right quadrant, containing text. The text is in a bold, black, sans-serif font. The first line is a section header, and the following lines are a bulleted list of six items, each starting with a black dot.

## Residents should:

- **Monitor forecasts** closely
- **Plan to telework** and adjust commutes
- **Stay off roads to give plows room**
- **Ensure enough gas, wiper fluid**, proper tires, food, water and medicine
- **Park in driveways** or on odd-numbered side of the street
- **Please be patient**

## Stay informed:

- [virginiadot.org/novaemergency](https://virginiadot.org/novaemergency) One-stop shop for links to news releases, Twitter feed, status updates, VDOT Plows, customer service, FAQs and other resources
- [@vadotnova](https://twitter.com/vadotnova) for updates
- [511virginia.org](https://511virginia.org) for road conditions and traffic cameras
- [vdotplows.org](https://vdotplows.org) for status of subdivisions once 2" have fallen



**The storm begins**





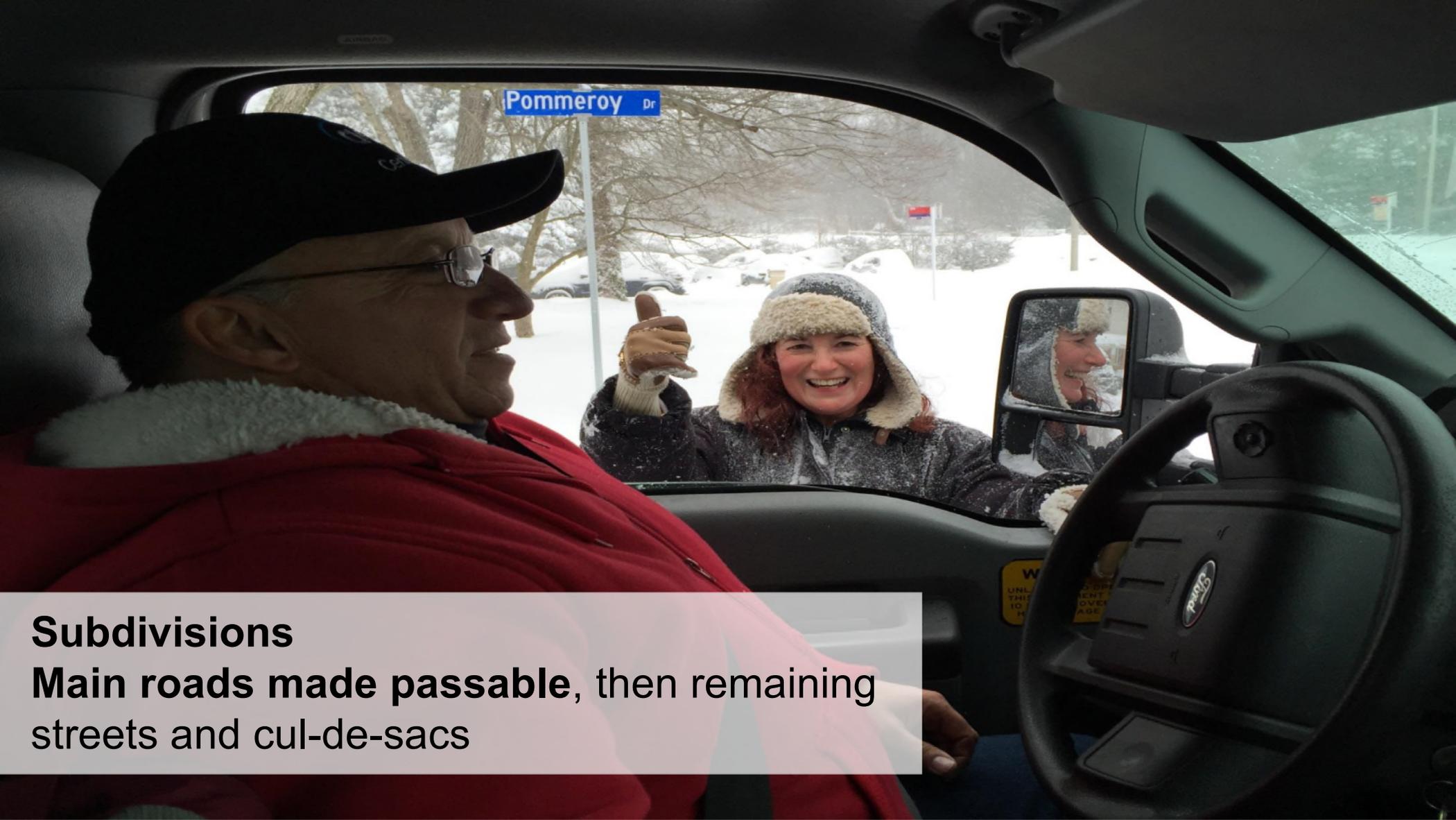
**Crews work interstates, major roads and main subdivision roads in priority order.**

**Interstates (66/95/395/495)**

**High-volume routes (Routes 1, 7, 28, 50, etc.)**

**Made passable, then bare pavement where possible**





## Subdivisions

Main roads made passable, then remaining streets and cul-de-sacs



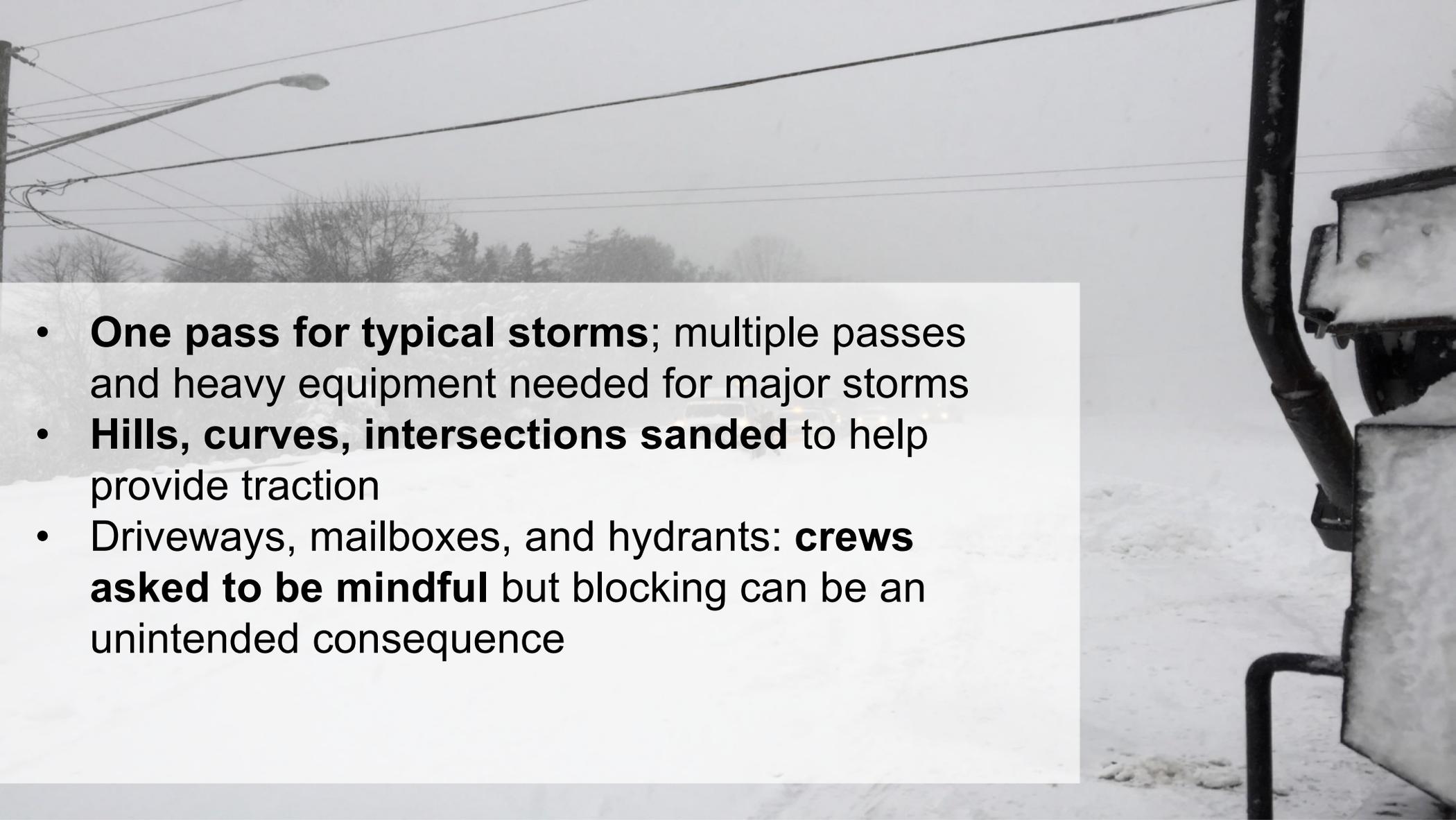
## What does “passable” mean?

- **An 8- to 10-foot path** cleared for emergency vehicle access
- **Drivable with extreme caution**
- Road remains **snow-packed**, will **not be curb-to-curb or bare pavement**

## **Passable lane goals:**

- **2-4" of snow: 24 hours**
- **4-6" of snow: 48 hours**
- **6"+ of snow: 72+ hours**



- 
- **One pass for typical storms**; multiple passes and heavy equipment needed for major storms
  - **Hills, curves, intersections sanded** to help provide traction
  - Driveways, mailboxes, and hydrants: **crews asked to be mindful** but blocking can be an unintended consequence



### **Additional priorities:**

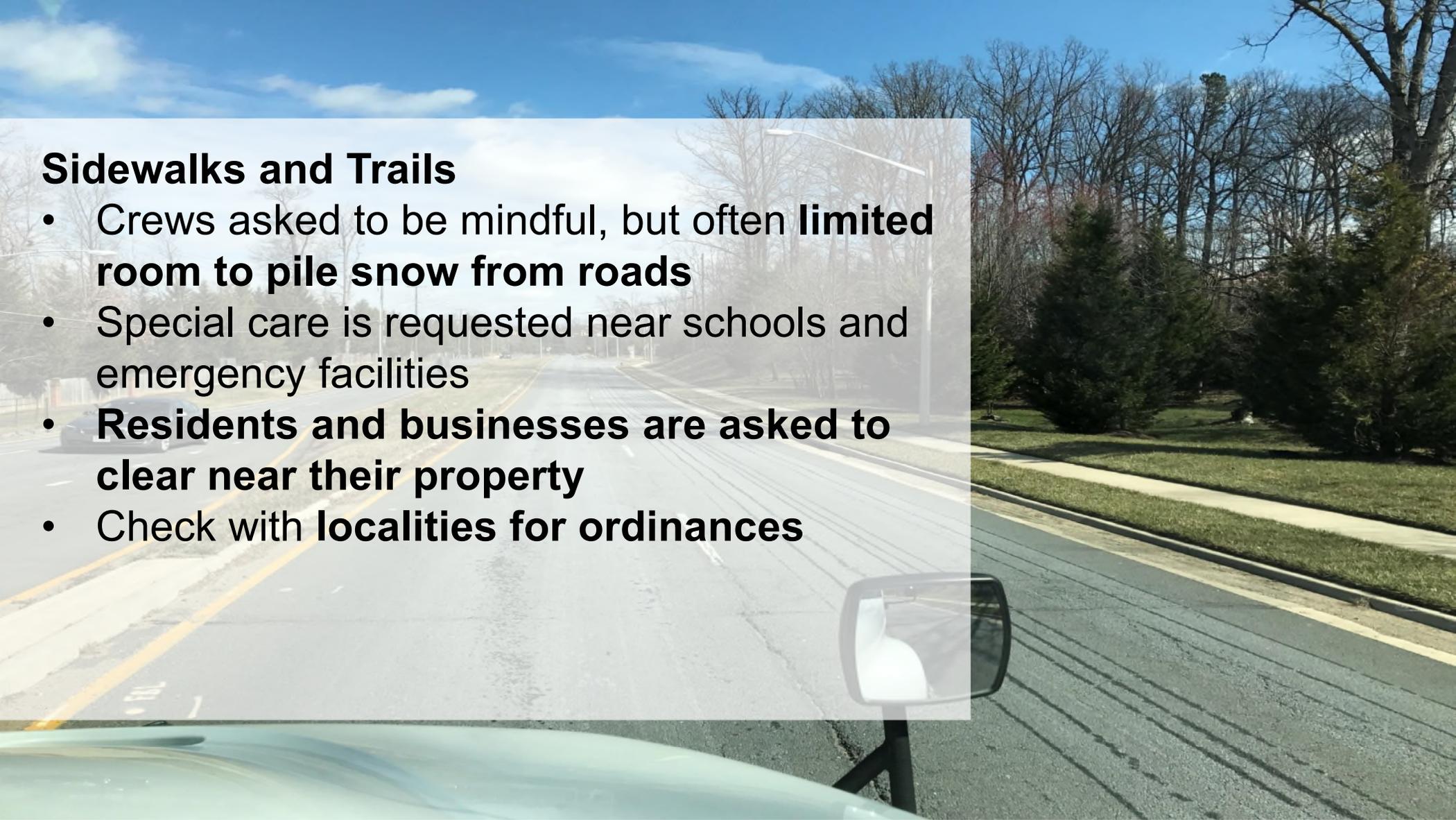
- Getting the roadways **as safe as possible**
- **Shoulders, ramps, turn lanes, intersections**
- **12,000** park-and-ride spaces



- **Monitors:** Staff inspect routes for quality control and customer calls
- Maps marked complete when a **driver reports back and monitors have spot-checked**
- **Once roads are made passable,** call center logs inquiries to investigate
- **AVL plow-tracking can help verify,** provide data for inquiries

## Sidewalks and Trails

- Crews asked to be mindful, but often **limited room to pile snow from roads**
- Special care is requested near schools and emergency facilities
- **Residents and businesses are asked to clear near their property**
- Check with **localities for ordinances**



After the storm

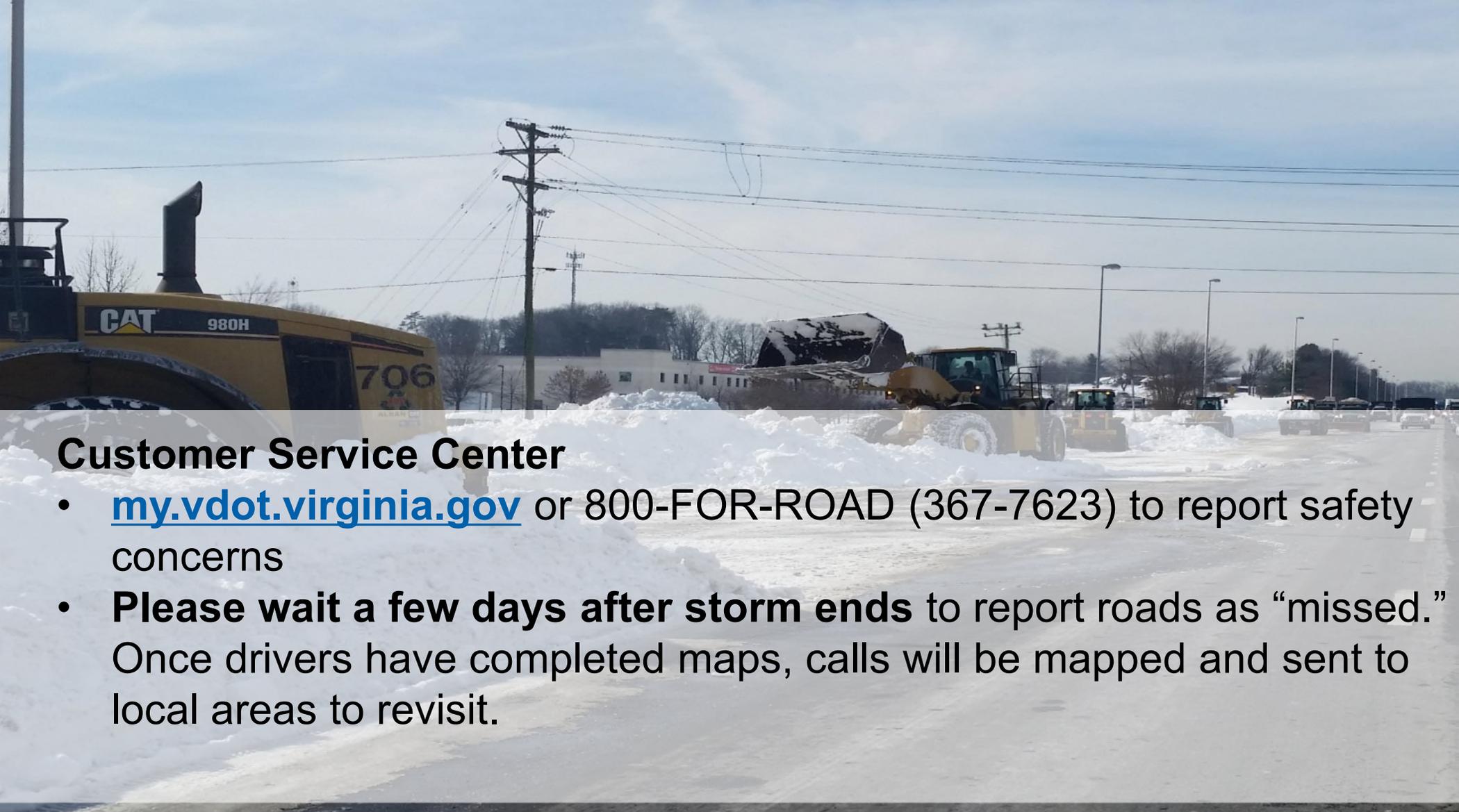




- **Demobilization takes hours**
- Trucks must be **offloaded of materials and spreaders removed**
- Residents may see **trucks queued around area headquarters**

**Area headquarters crews  
restock materials continuously**





## Customer Service Center

- [my.vdot.virginia.gov](https://my.vdot.virginia.gov) or 800-FOR-ROAD (367-7623) to report safety concerns
- **Please wait a few days after storm ends** to report roads as “missed.” Once drivers have completed maps, calls will be mapped and sent to local areas to revisit.

Questions?



# BEST MANAGEMENT PRACTICES

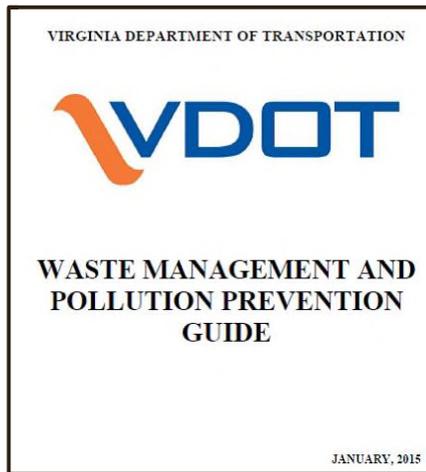
Pollution Prevention and Salt Management

 Marian Carroll, NOVA District NPDES Coordinator

May 24, 2018

# Salt Management – Pollution Prevention

- **Municipal Separate Storm Sewer System (MS4) Program**
  - Stormwater Pollution Prevention Plan (SWPPP) at VDOT Facilities
  - Illicit Discharge Detection and Elimination (IDDE)



Guide 3.19  
Revision 2  
February 2013

Salt Infrastructure and Waste Management

VDOT is legally required to manage stormwater that comes into contact with salt on our mixing pads. This water is primarily managed to three stormwater retention ponds: "salt ponds", underground storage tanks (USTs), stormwater storage (POTTS), or direct discharges to the sanitary sewer. (also known as a Public-Contact Treatment Pond or PCTP).

**Operational Procedures**

The following operational procedures are intended as a guide to minimize waste disposal costs, prevent pollution and ensure environmental protection.

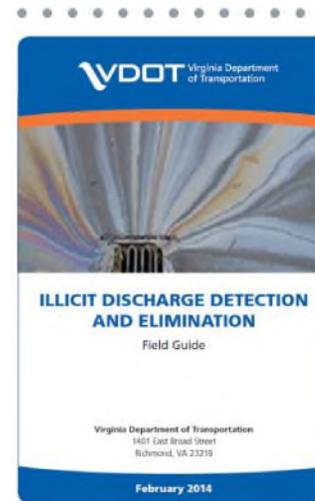
**Before the winter season begins:**

- Pumping capacity to provide sufficient water capacity
- Position diverter valves to direct runoff to the salt pond/tank.

**During the winter season:**

- Watch computers on the mixing pad and keep the pond pumped regularly to maintain a minimum 1-foot headroom. Check the pond levels on a regular basis and prior to forecasted or significant precipitation events.
- Sweep residual salt from the mixing pad into the salt storage building.
- Load and unload apparatus on the mixing pad.
- At the completion of each storm response, clean up recoverable salt spilled on the lot, as well as salt placed on health indicators or pushed beyond the mixing pad or other control barrier, return these materials to the salt shed.
- If the anticipated frequency of storming events is low, consider only diverting salty water during such events to the ponds/tanks or POTTS. This active approach requires sweeping, raking, drying, and salt back into the shed, closing the shed doors, and sealing down the pad and shutting the lines prior to turning the diverter valve.
- For discharges to the POTTS, only discharge salty water and not clean stormwater.

Dispose / use options for salt water:



## EXAMPLES OF WHAT IS AN ILLICIT DISCHARGE



Cleaning Chemicals



Paints



Mismanaged / Excess Road Salt



# Best Management Practices – Salt Storage



Salt is stored and contained in buildings.



Liquid products, like brine, are stored with secondary containment.



# Best Management Practices – Controlling Salt Runoff



Runoff is directed into underground storage tanks or above ground salt ponds



Equipment washwater is controlled.



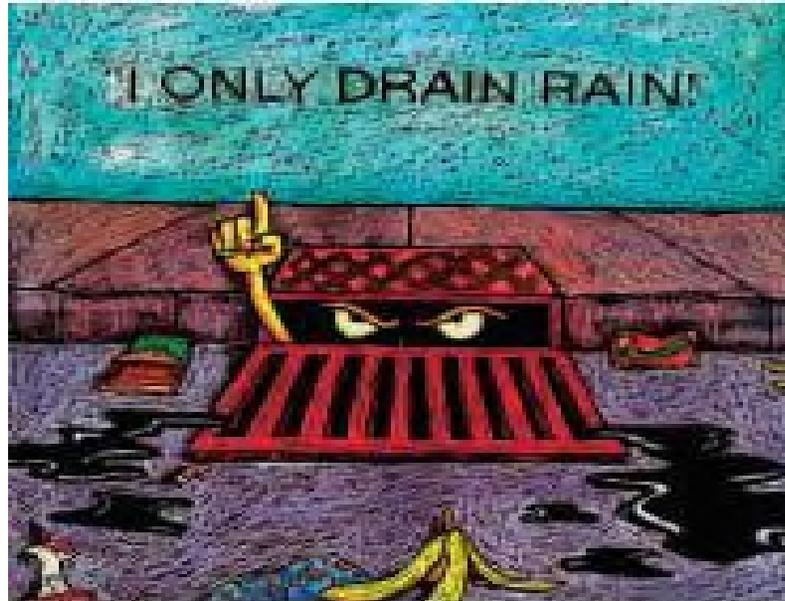


Photo from New Zealand Ministry for the Environment

## Questions?

# WINTER MAINTENANCE RESEARCH CONDUCTED BY VDOT

**Michael Fitch, Ph.D.**

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**Virginia Transportation Research Council**

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# Winter Maintenance Research Conducted by VDOT

- **Exploring Ways to Prevent Bonding of Ice to Pavement**  
(VTRC, 1998) [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/98-r18.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/98-r18.pdf)
  - Study performed back in 1998
  - VDOT's first attempt to determine what other states and other countries were doing with respect to anti-icing
  - Recommended using liquid chemicals for anti-icing purposes
- **Environmental Implication of the Use of Ice Ban as a Pre-wetting Agent for Sodium Chloride**  
(Transportation Research Record, 2000) [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/00-r12%20.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/00-r12%20.pdf)
  - Examined the use of an agricultural by-product patented for use as deicing agent
  - Evaluated its effectiveness in removing snow and compared its impacts on the environment and highway infrastructure
  - It was recommended that VDOT not use Ice Ban as a pre-wetting agent as it showed no appreciable benefits
- **Characterization and Environmental Management of Stormwater Runoff from Road-salt Storage Facilities**  
(Transportation Research Record, 2005) [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/05-r15.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/05-r15.pdf)
  - Performed a complete chemical characterization of salt-laden stormwater captured at VDOT's maintenance locations
  - Developed a thorough understanding of how this runoff is captured, stored, managed, and disposed
  - Methods of reducing the amount of runoff generated were recommended as well as potential treatment methods that required additional study

# Winter Maintenance Research Published by VDOT (cont.)

- **Potential Use of Reverse Osmosis in Managing Saltwater Waste Collected at Road-salt Storage Facilities**  
(VTRC, 2006) [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/06-r26.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/06-r26.pdf)
  - A pilot study using RO was conducted to determine its feasibility for use by VDOT (in lieu of stormwater disposal)
  - Primarily due to the extremely large volume of water VDOT collects, RO was not recommended as a treatment method
  - The potential for using the stormwater for the purpose of brine generation was identified as a potential reuse option
- **Recycling of Salt-contaminated Stormwater Runoff for Brine Production at VDOT Road-salt Storage Facilities**  
(Transportation Research Record, 2008) [http://www.virginiadot.org/vtrc/main/online\\_reports/pdf/08-r17.pdf](http://www.virginiadot.org/vtrc/main/online_reports/pdf/08-r17.pdf)
  - Examined the use of stormwater captured at VDOT's maintenance facilities to generate NaCl brine for the purpose of anti-icing
  - Ensure that this source of water did not affect the quality of the brine, compromise brine generation equipment, and was economically feasible
  - It was concluded that (1) the sediment levels in the stormwater were not so high as to negatively affect the brine quality or equipment; (2) a high percentage of the water that was requiring disposal (60 million gallons) could be reused; and (3) by avoiding disposal of this water, significant savings could be realized
- **Environmental Life-Cycle Assessment of Winter Maintenance Treatments for Roadways**  
(Journal of Transportation Engineering, 2013) <https://ascelibrary.org/doi/pdf/10.1061/%28ASCE%29TE.1943-5436.0000453>
  - Researchers performed an LCA for three winter maintenance treatments (granular NaCl, NaCl brine, and calcium magnesium acetate)
  - CMA – long considered one of the most environmentally promising treatment chemicals – had higher total impacts than either salt alternative
  - Brine was determined to be the best option available when considering all environmental burdens

# Advantages of Using Brine for Anti-icing

- **Significantly reduces the amount of NaCl needed to achieve equivalent level of service by preventing the formation of a bond between ice/snow and pavement**
- **This allows more complete mechanical removal (e.g., plowing) of ice/snow from the roadway**
- **Depending on a number of variables, including storm duration, temperature, and precipitation intensity, this practice can reduce total NaCl application volumes needed for a given storm by 30 to 65%**

**References:** National Cooperative Highway Research Program Report 577, 2007 (<http://www.trb.org/Publications/Blurbs/158876.aspx>)  
National Cooperative Highway Research Program Synthesis Report 449, 2013 (<http://www.trb.org/Publications/Blurbs/169520.aspx>)