

Yours Truly

FY23 Snow Program Update

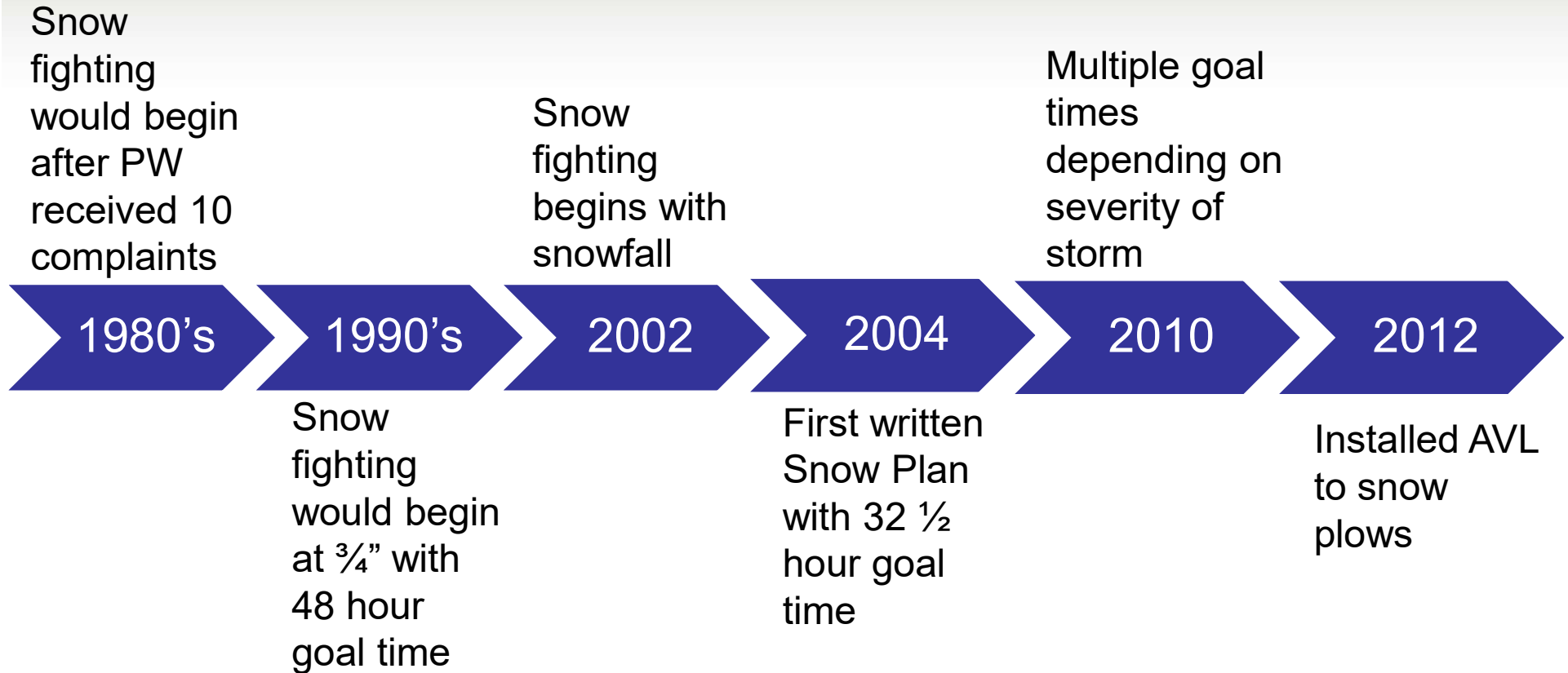
Public Works Committee

October 10, 2022

Outline

- Snow Plan History
- Snow Plan Goal
- Available Resources
- Equipment Upgrades
- Helpful Tips
- How City Council Can Help
- Questions

History



History

Implemented public facing website for snow operations and proposed equipment upgrades

2014

2015

First trucks ordered with wing plows and conveyor system was completed

Brine system completed

2016

Combination dump/spreader beds on dump trucks

2020

LOS change on residential streets to treat only <2" and final truck with wing plow ordered. Upgraded AVL

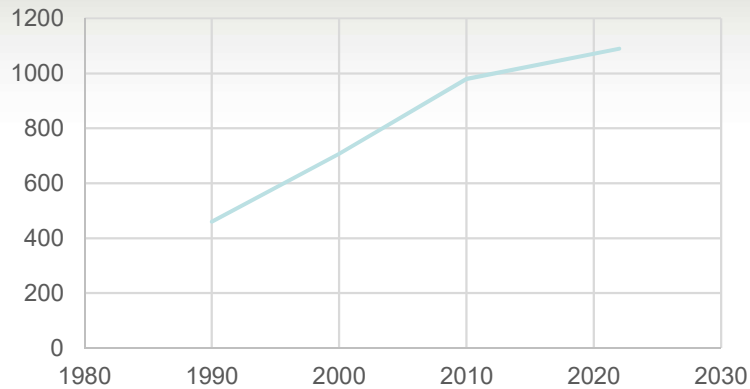
2021

Implemented turn by turn routing system

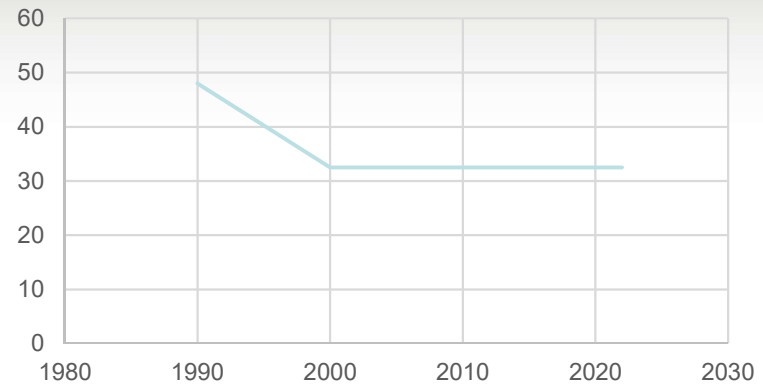
2022

Efficiency Gains

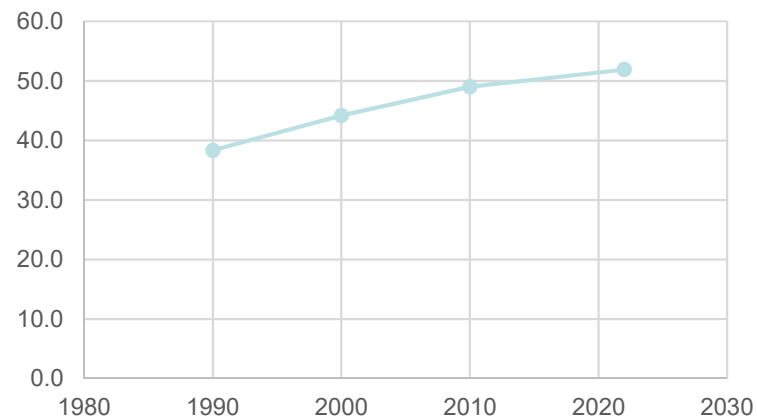
Lane Miles



Goal Time (Hours)

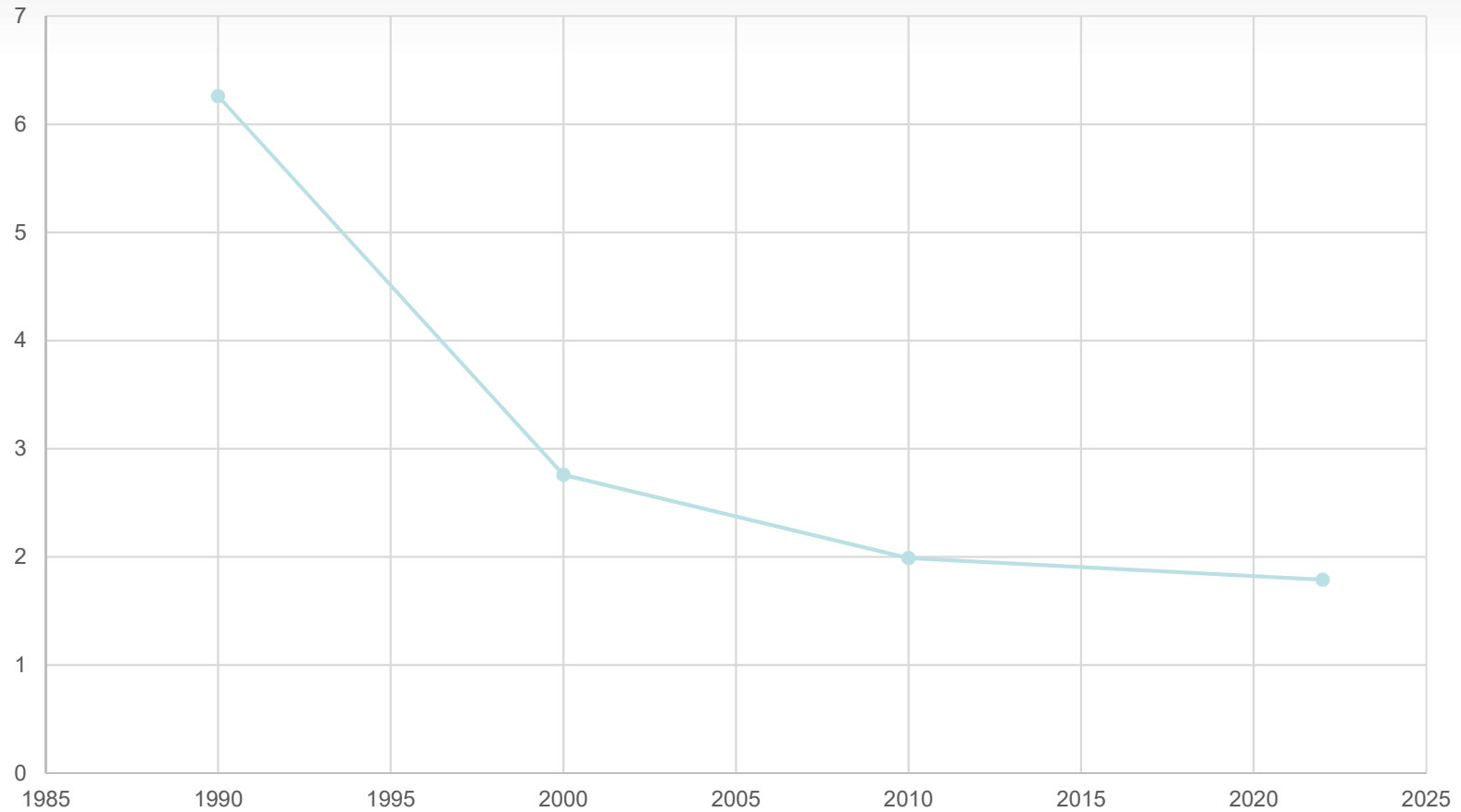


Lane Miles per Truck



Efficiency Gains

Minutes per Lane Mile by Year



Snow Plan Goal

- The goal of the City of Lee's Summit (City) is to provide adequate mobility and safety for properly equipped and prudently operated vehicles within a reasonable time after the end of the storm.
 - Provide a high level of customer service to our citizens
 - Defined Level of Service and completion time
 - Operate within available financial resources
 - Budget using three to five year average of actual expenses
 - Ensure operational balance for the City and employees
 - Continuous 24/7 response as needed

Snow Plan Goal

- The City's Snow Plan outlines steps for the completion of storm response within **24 - 48 hours after precipitation has ended** provided that required levels of equipment/ people are available.
- **Level 1 (pre-treat)**
- **Level 2 (<1" of snow) 24 hrs.**
- **Level 3 (>1" – 6") 32.5 hrs.**
 - **Residential routes treated only when <2" of snow accumulation.**
- **Level 4 (>6" – 10") 40 hrs.**
- **Level 5 (>10") or sustained winds >30 mph) 48 hrs.**

Available Resources

- **Staff**
 - 2 Managers
 - 4 Supervisors
 - 2 Snow Desk
 - 26 PW Operators (at full staffing levels)
 - Multiple volunteers from WU, PW Engr, DS, Admin, PD, Fire, P&R, etc...
- **Infrastructure**
 - 2 Salt domes (6,000 Ton capacity)
 - Conveyor system
 - Brine System (40,000 Gallon capacity)
 - Calcium Chloride Storage Tank (12,000 Gallons)
 - Radio communications
 - AVL
 - Turn by turn routing

Salt Dome/Conveyor



Salt Brine System



Available Resources

- **Plows**
 - 10 Dump trucks
 - 11 One ton trucks
 - 7 $\frac{3}{4}$ Ton PU trucks (limited use)
- **Support Equipment**
 - 2 Backhoes (Level 5 event)
 - 1 Front end loader (Used to load spreaders)
 - 2 Skid Steers (Level 5 event)

Equipment Upgrades

- FY15 Public Works began outfitting dump trucks with brine applicators and wing plows.
- Trucks were upgraded as they were replaced.
- Upgraded trucks
 - Increased salt capacity
 - Allows the application of liquids
 - Longer life materials
 - Increased efficiency without adding additional equipment or staff

Equipment Upgrades

New Trucks have:

- Heavier plow and frame mount
- Larger salt capacity
- Wing plow
- Liquid distribution



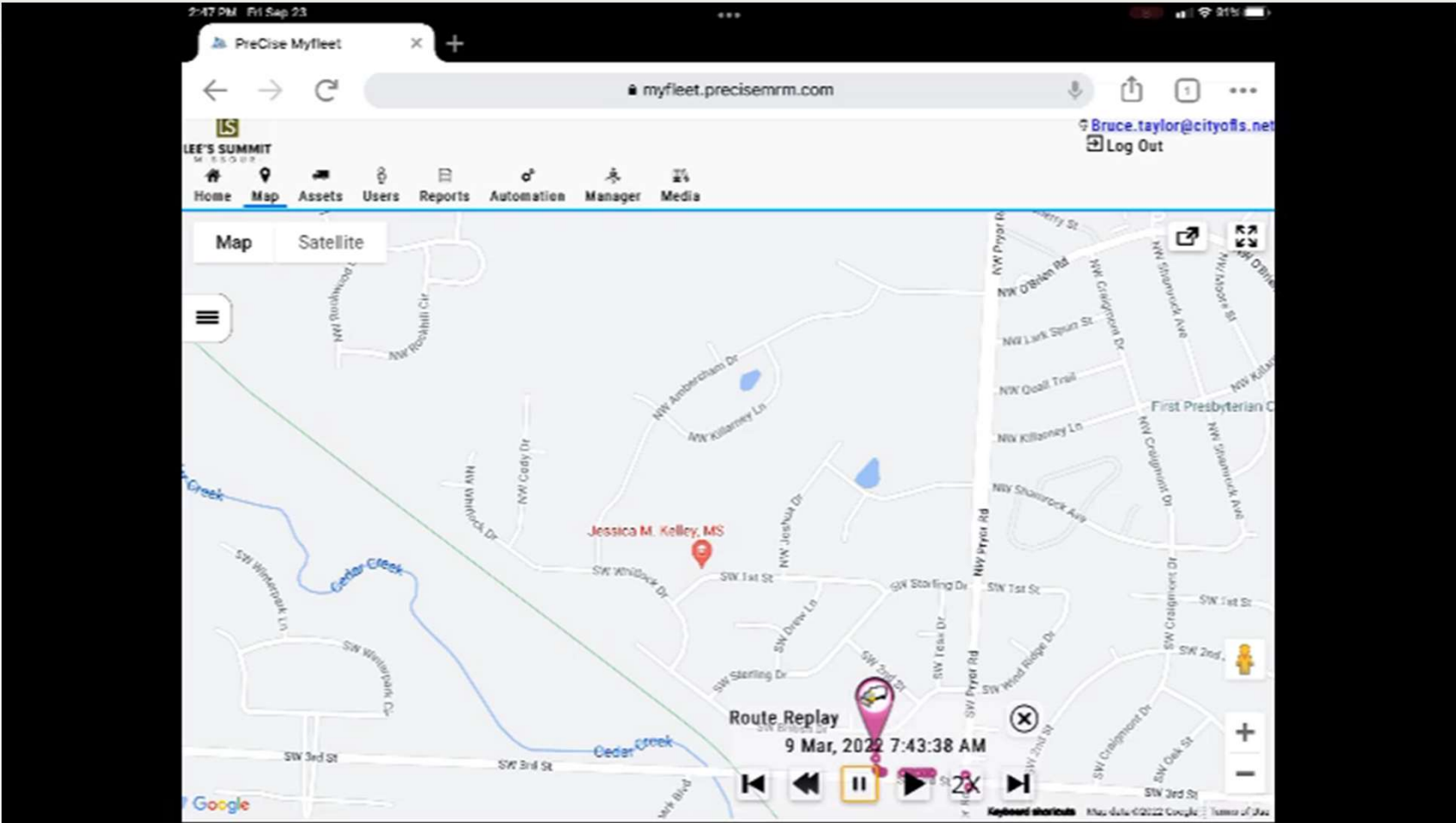
Equipment



AVL

- Automatic Vehicle Locating
 - New vendor last winter
 - Enhanced features
 - Better QC
 - Customizable
 - More Reliable
- Thank you to Fleet for completing installations

AVL



AVL

738

Name:	738
Fleet:	Lee's Summit
Distance From Home:	3.4 Miles
GPS Location:	2/2/2022 5:00:28 AM
Heading:	East
Speed:	2.2 MPH
Ignition:	On
Front Plow:	Up
Wing Plow:	Up
Odometer:	2994.9 miles
Engine Hours:	316.1
Notes:	6100 Gen 5
Address:	2000 SW Walden Dr, Lee's Summit, MO 64081, USA
Coordinates:	[38.90453,-94.41488]
Spreading Status:	S
Granular Material:	SALT
Granular Setting:	300 lb/mi
Granular Spread Rate Index:	3
Granular Mode:	C
Prewet Material:	PWT1
Prewet Setting:	8 gal/ton
Prewet Spread Rate Index:	6
Prewet Mode:	C
Direct Setting:	0 gal/mi
Direct Spread Rate Index:	0
Direct Mode:	C
Road Temperature:	30 °F
Air Temperature:	31 °F
Vehicle ID:	TRUCK 1
Spinner Dial Setting:	0

2 Feb, 2022 5:00:00 AM

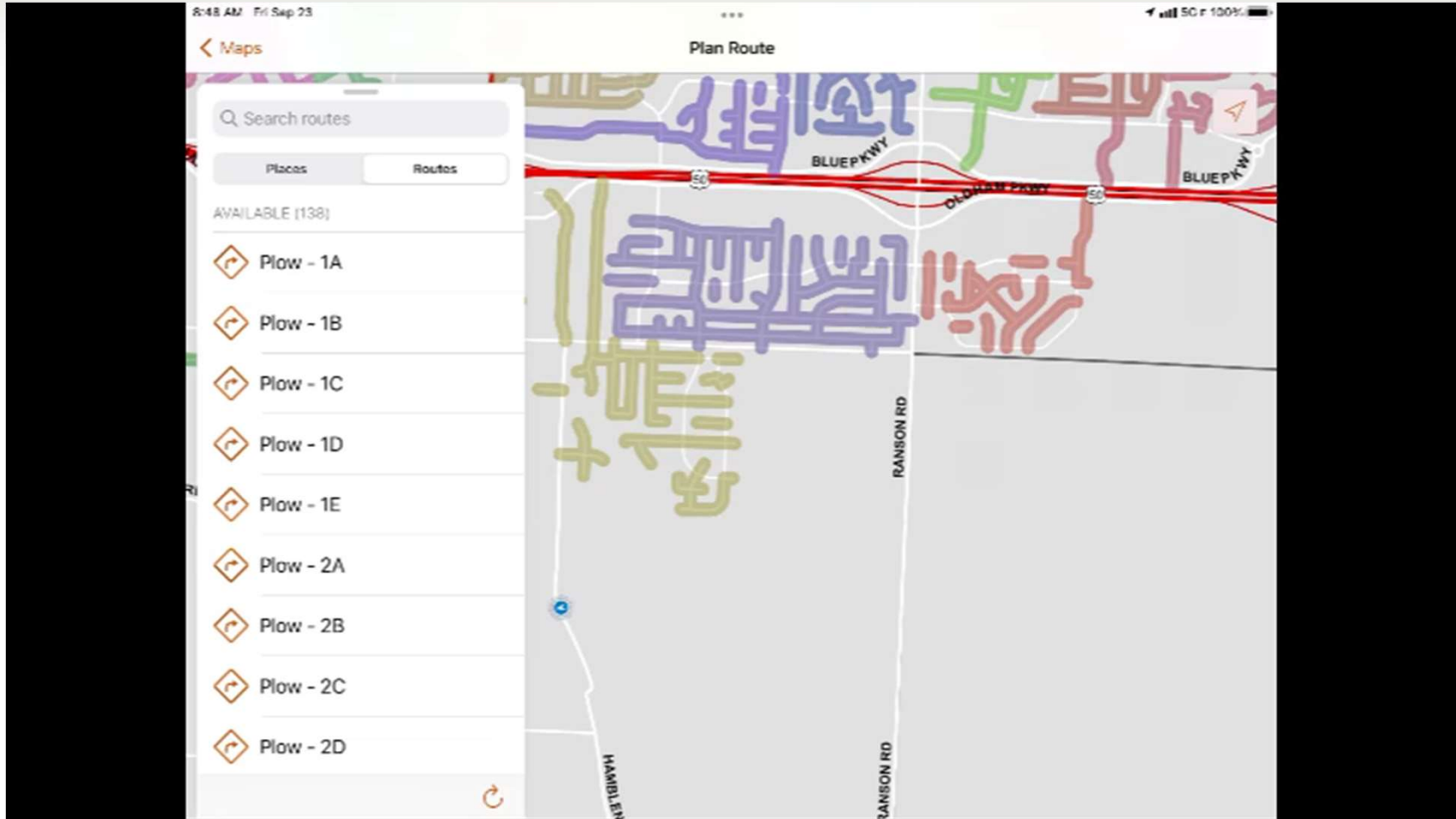
Salt Brine



Salt Brine



Turn by Turn Routing



Helpful Tips

- Remove cars from the street
- Keep trashcans and basketball goal out of the street
- Do not build snow forts in the piles of snow in the street
- Do not shovel snow from your driveway into the street
- Shovel downstream of snow plowing to lessen the amount of snow left at your driveway entrance

Snow Rodeo

- Thank you to all that participated
- Congratulations to our champion drivers
 - Dump Truck
 1. Tyler Sonne
 2. Bob Kanies
 3. Brice Lawson
 - One Ton
 1. Kent Monter
 2. Steve Proudfit
 3. Jonathan Abbott



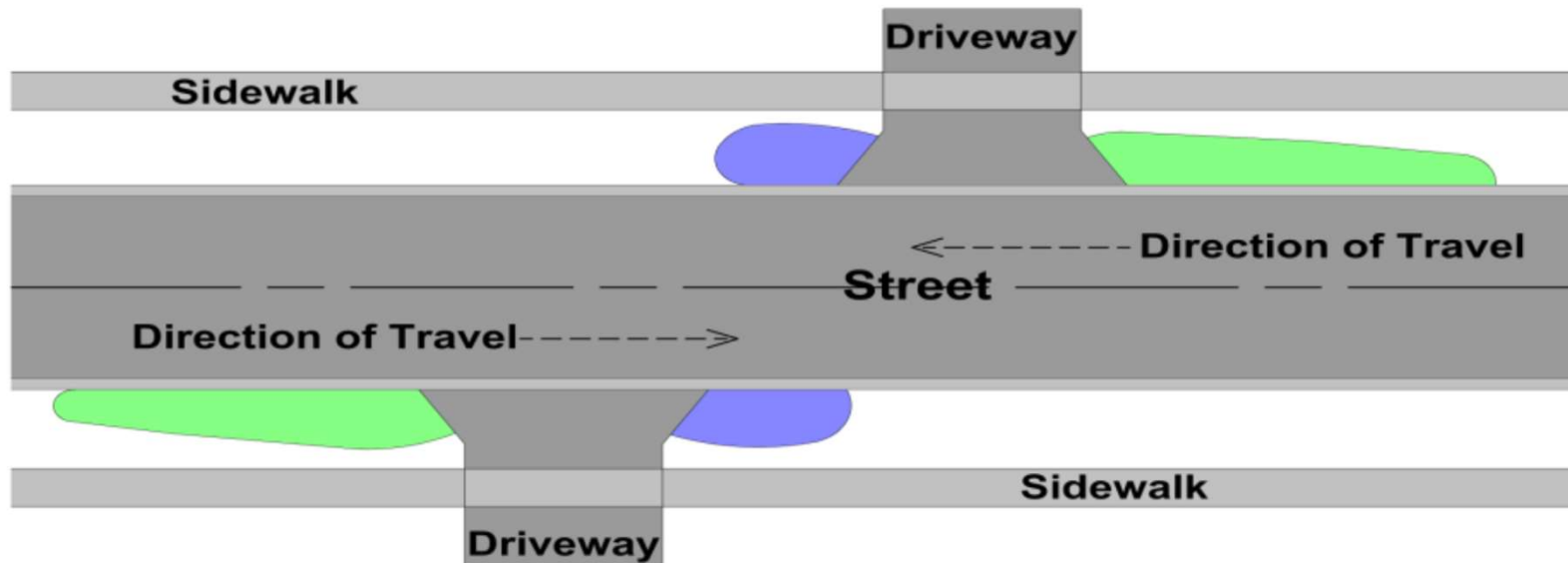
How City Council Can Help

- Help managing expectations
- Help rally our troops
- Help educate the public (share our snow goal)
 - Our goal is to provide adequate mobility and safety for properly equipped and prudently operated vehicles within a reasonable time after the end of the storm.
- Help keep the public informed during snow events





Questions

Helpful Tips



LEGEND

-  Pile Snow Downstream of Plowing Operation
-  Clear this Area (Make a pocket for plow to drop snow)

Snow Predictions

- Farmers Almanac

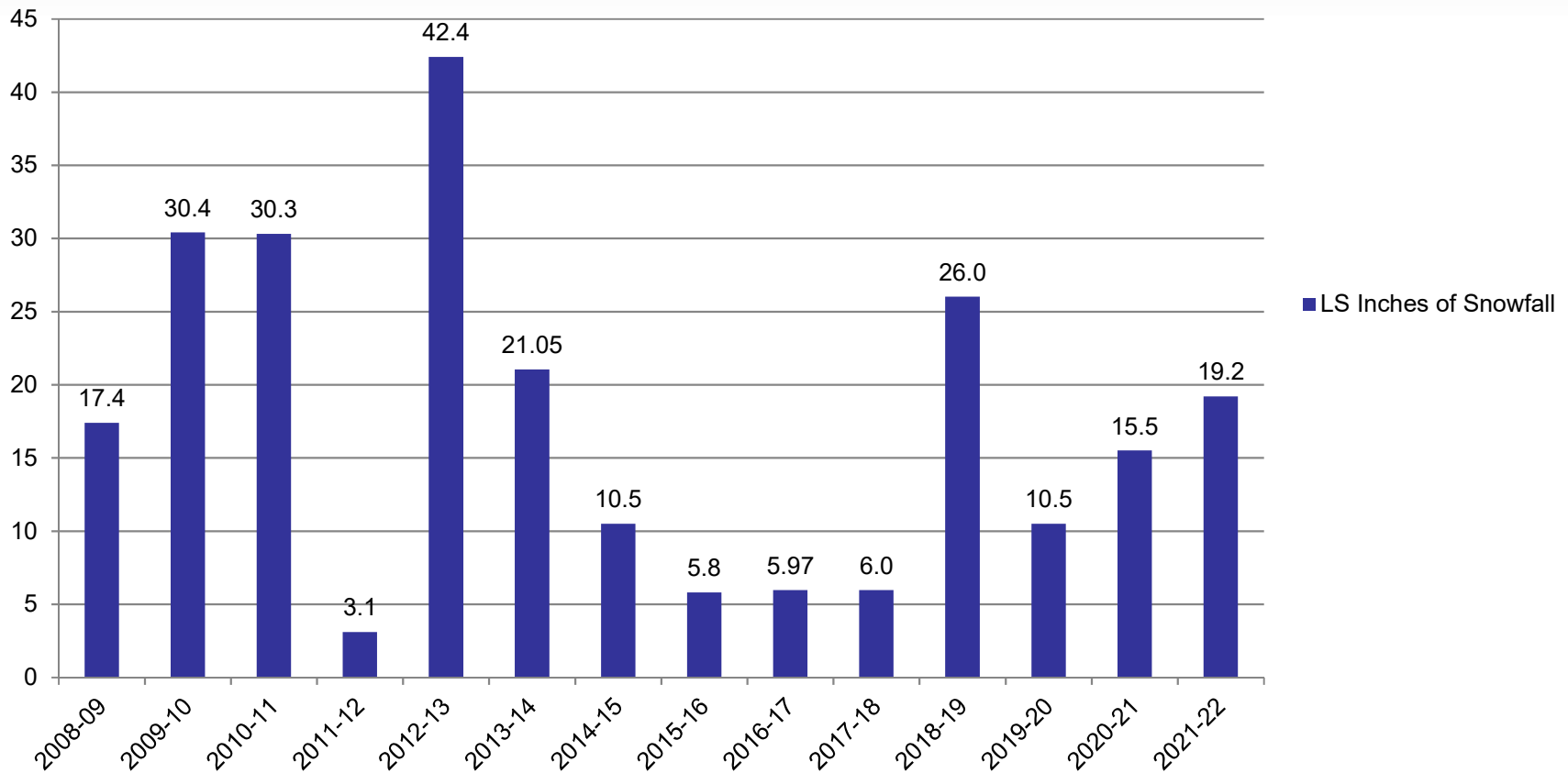


Lane Miles

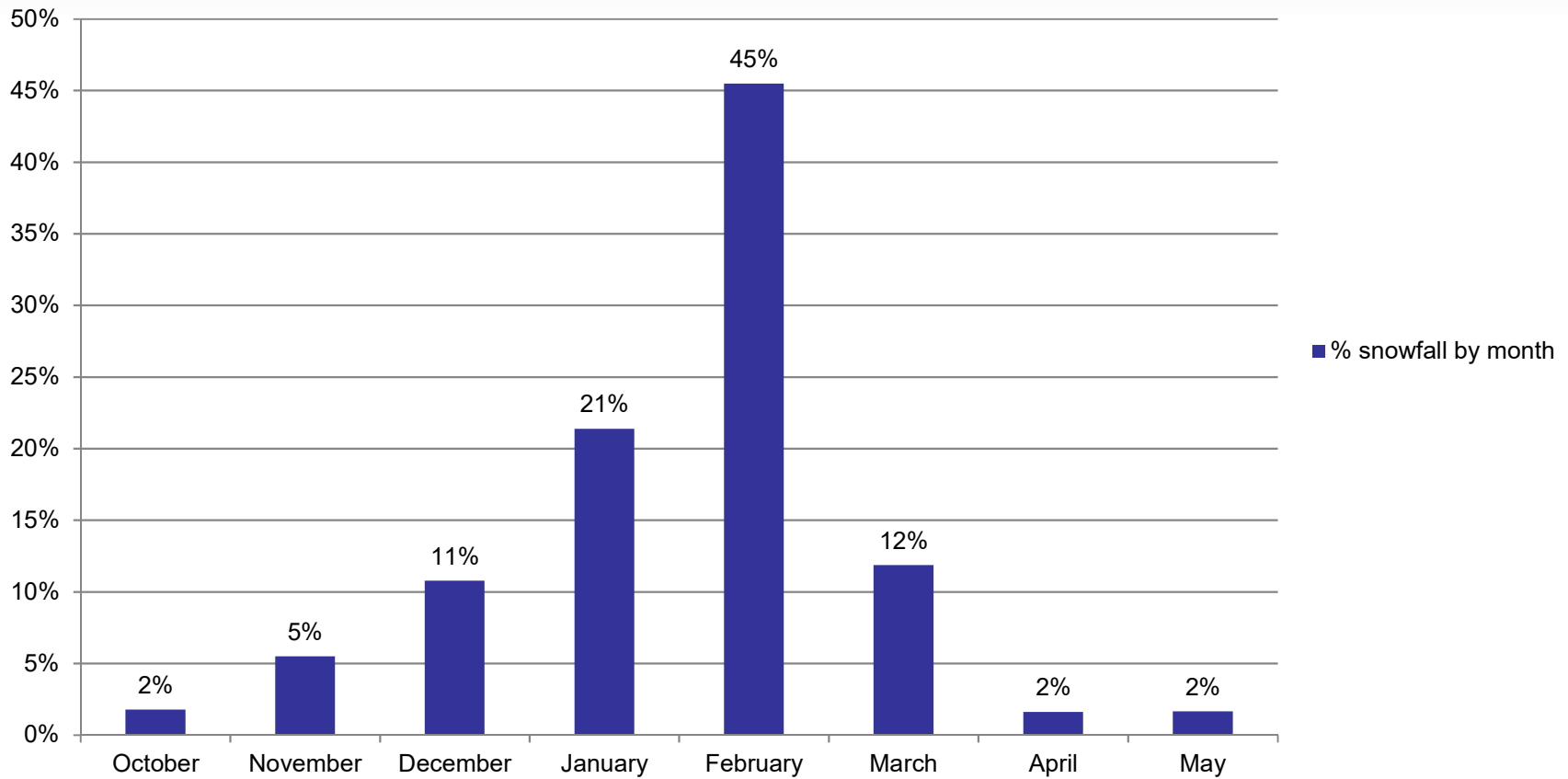
1989	449.7	2006	917.0
1990	459.7	2007	929.2
1991	476.3	2008	964.3
1992	496.1	2009	967.2
1993	534.1	2010	980.4
1994	564.8	2011	990.8
1995	586.8	2012	1,005.2
1996	617.5	2013	1,008.9
1997	638.6	2014	1,019.0
1998	663.5	2015	1,025.3
1999	688.9	2016	1,037.1
2000	707.8	2017	1,046.9
2001	734.5	2018	1,052.8
2002	769.8	2019	1,063.8
2003	812.1	2020	1,070.0
2004	840.8	2021	1,085.1
2005	868.9	2022	1,090.4

Historical Snowfall Totals

LS Inches of Snowfall



% snowfall by month



Common Complaints

- Here is what we were hearing
 - The city never plows my street
 - The driver did not do a good job/bare pavement
 - The plow covered my driveway/sidewalk/hydrant
 - The city is wasting money pre-treating
 - More expensive neighborhoods get plowed first
 - My street has more houses – make it a secondary route
 - Insert a city here _____ does a better job

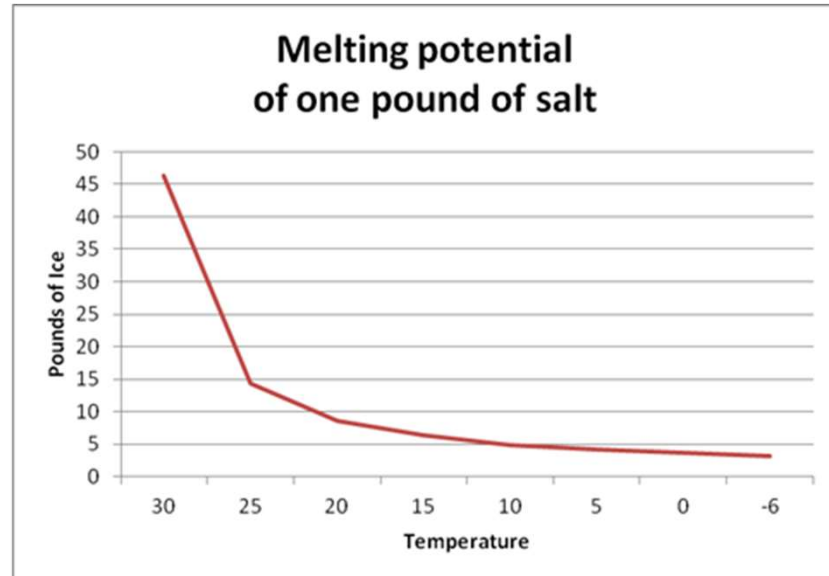
Misc. Stats.

- FY23 Budget \$969,585
- 28 Snow Plows
 - 10 Dump Trucks
 - 11 One Ton Trucks
 - 7 ³/₄ Ton Pickups
- Minimum Staff Needed to Operate Level 3
 - 58 operators
 - 2 Supervisors
 - 2 Snow Desk Operators
 - 2 Mechanics

Salt Performance

Pounds of Ice Melted Per Pound of Salt*

Temperature Degrees F	One Pound of Sodium Chloride (Salt)
30	46.3 lb of ice
25	14.4 lb of ice
20	8.6 lb of ice
15	6.3 lb of ice
10	4.9 lb of ice
5	4.1 lb of ice
0	3.7 lb of ice
-6	3.2 lb of ice



* Information was taken from the Snow Fighters Handbook by the Salt Institute



LS **LEE'S SUMMIT**
MISSOURI

Overland Park, Kansas

The screenshot shows the Overland Park, Kansas website. The header includes the city logo with the tagline "ABOVE AND BEYOND. BY DESIGN." and a navigation menu with links for Careers, About, Events, Newsroom, Contact, and a Search box. Below the header is a secondary navigation bar with categories: THINGS TO SEE & DO, RESIDENT RESOURCES, DOING BUSINESS, CITY GOVERNMENT, and MAPS & MORE. The breadcrumb trail reads: Home > Resident Resources > Snow and Ice Removal.

The main content area is titled "Snow Removal Priorities". It begins with a paragraph: "During a typical snow operation, the city's streets can be completed in a continuous 24-hour period by having two crews working 12-hour shifts. Crews follow routes based on street priority."

The content is organized into three priority levels:

- Priority 1: Thoroughfares & Bridges**
High traffic volume multi-lane roads such as Metcalf Avenue, College Boulevard and Antioch Road, and plowed continuously during snow operations.
- Priority 2: Collectors**
Two-lane streets bordering a neighborhood or commercial area that move traffic to a thoroughfare street such as Lamar Avenue, 71st and 133rd streets. These are plowed from the start of snow operations until completed. Typically completed in the first 12-hour shift.
- Priority 3: Residential Streets**
Plowed after snowfall stops and after Priority 2 streets are treated and cleared. Plowing is not required for ice or snowfalls of less than two inches; however, crews will apply materials to improve vehicle traction. Plows will make a single pass around the perimeter of cul-de-sacs. When a large storm results in the buildup of snow and ice, crews will completely plow cul-de-sacs after all streets have been completed.

On the right side of the page, there is a "CARES" (Overland Park Cares) section with the text: "Do you have questions about Overland Park but can't find answers? Let us assist you with any questions or concerns that you have about Overland Park." Below this text is a green "Submit Ticket" button.

The left sidebar contains a list of navigation links: Snow and Ice Removal, Report Snow Issues, How to Help the Plows, Snow Removal Priorities (highlighted), Storm Operations Map, Winter Weather Tips, Environment, Fire Department, Maintenance of City Property, Neighborhood Resources, Permits, Pet Regulations, Police Department, and Residential Property.

Columbia, Missouri

▲ Winter Weather Policies and Procedures

It is the City's goal that all streets in Columbia be passable by a front-wheel drive vehicle as soon as possible when a winter weather event occurs. Approximately 520 lane miles of priority routes are plowed and treated 24 hours per day as needed during a winter weather event. Other streets are plowed and treated to a [passable condition](#) during business hours. When snow accumulates to 4 inches, though, all City streets are plowed and treated to a passable condition 24/7, once priority routes are near normal.

The City of Columbia has more than 1,350 lane miles of streets including 1,100 cul-de-sacs maintained by City of Columbia Public Works. The high number of cul-de-sacs and lane miles makes it necessary to prioritize roads during ice and snow events. Streets are prioritized by volume of traffic and to create a network of streets that connect neighborhoods to/from major roads, hospitals, schools, fire stations and commercial areas. These designated snow routes must be plowed/treated to a near normal condition. Winter weather events in Missouri can vary dramatically from one snow to the next, but generally speaking a typical response occurs in phases:

- Treat/Pretreat bridges, curves, hills and intersections on priority routes.
- Continuous operations on priority routes until near normal conditions are reached.
- Once priority routes are near normal, ensure all streets are passable by a front-wheel-drive vehicle to facilitate access to the priority routes. (When snow is less than 4 inches, this is done during business hours. When snow is more than 4 inches, this is done continuously in shifts.)

Topeka, Kansas

[City of Topeka Official Website](#) > [Street Maintenance](#) > Snow Removal

Snow Removal

The City of Topeka Public Works Department is responsible for clearing snow and ice from over 1600 lane miles of streets in the City.

With the exception of emergency requests from police dispatchers, individual requests for snow removal cannot be taken.

Standard Snow & Ice Control Priorities

In order to make the most efficient use of available resources, priorities have been established using the assumption that the severity of a storm is not beyond the normal capabilities of the City's snow and ice control resources. Depending on the nature of the snowstorm, deviations could occur. The established priorities are as follows:

Priority 1:

- Primary Streets: Arterial Streets and Emergency Snow routes
- Service Level – Plowing will typically begin with 2" of snow accumulation. Complete snow and ice control within 24 hours of snowfall ending.

Priority 2:

- Secondary Streets: Collector Streets
- Service Level – Plowing will typically begin with 4" of snow accumulation. Complete snow and ice control within 24 hours after Priority 1 completion.

Priority 3:

- Residential Streets: Local Streets
- Service Level – Plowing will typically begin with 6" of snow accumulation to ensure that they are passable to emergency services and general public as necessary upon completion of Priorities 1 through 2.

The top priorities will be constantly monitored and if snow persists we will return to those areas for plowing and/or treating.

The snow depths for plowing are guidelines and may not be adhered to for each storm event. The Public Works Director will have discretion based upon current and forecasted weather and pavement conditions.

Blue Springs, Missouri

WORKING TO KEEP STREETS CLEAN

Blue Springs employs many of the best operators in the Midwest. The personnel who work within the Street Department are the first responders for snow emergencies. They are backed up by skilled personnel from the Utilities, Engineering, and Park Maintenance Departments who operate residential plows if more than two inches of snow accumulate on the roads.

All winter storms are different, and can be difficult to predict. The department consults and reviews weather reports from several different sources: NOAA, the local forecasters, Weather or Not, and other internet sites. Using the information available for each storm, a response plan is developed.



PRE-TREATING ROADS

Crews will occasionally pre-treat roads depending upon the storm predictions. Salt distribution typically begins as soon as the crews hit the streets and continues until all priority roads are completed or until it is no longer effective to salt. Traffic enhances the efficacy of the salt, so roads with more traffic clear more quickly than low volume roads. As a result some streets with lesser amounts of traffic may appear to have not been salted. When plowing begins, salting is limited to grades, intersections, and sharp curves until plowing is complete. After plowing is completed, salting operations begin again as needed. All roads are monitored for icy spots.

THE PLOWING PROCESS

Crews begin to plow when there is about three-quarters to one inch of snow accumulated on the roadway. The priority streets are cleared by ranking. If the snow accumulation has exceeded two inches, crews begin work on the residential streets. If the snow fall continues for many hours, the main roads may need a reapplication of deicing chemicals. This extends the amount of time it takes to reach the residential streets. Cui-de-sacs will be plowed at the same time as other residential streets. Due to the circular design of these streets, it is often difficult to equally distribute the snow along the curb line.

Crews plow from curb to curb to clean the city streets anytime the snow depth is 4 inches or deeper, or if the forecast warrants clearing to the curb due to impending subsequent storms. Curb to curb plowing may take several return trips to your neighborhood depending upon the magnitude of the snow event and because of obstructions along the curb. If cars are parked on the street, our crews will try to remove as much snow as possible.

Keep in mind that it is almost impossible to keep snow from being deposited into your driveway during plowing, as the plow cannot be lifted or swiveled at each driveway it passes. Our crews work to keep the roads safe in the most efficient manner for each storm event.

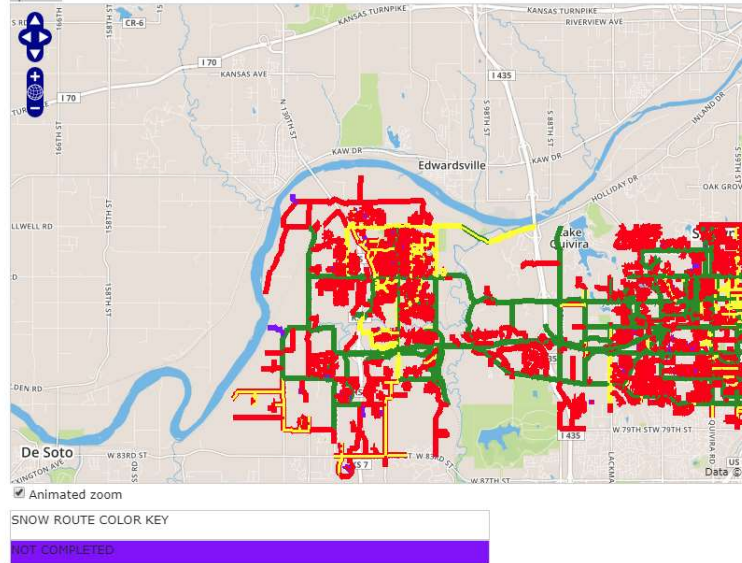
Shawnee, Kansas

The City of Shawnee's snow removal mission is to provide a safe transportation network throughout the City of Shawnee that offers sufficient mobility. It is our objective to clear primary streets and to keep local streets passable. Minimizing costs is a primary concern.

We appreciate your patience while we complete the plowing process. If after snow removal operations are complete you feel your street has been missed, please let us know through our [Citizen Service Request](#) system.

City of Shawnee KS Snow and Ice Control Progress Map

Displays Snow and Ice Control Progress on streets maintained by the City of Shawnee. Please refresh your browser for updates.



[Priority Routes Map](#)

[Citizen Service Request](#)

Levels of Service Guidelines

As a general policy, the following procedures are followed for snow accumulations. These guidelines will be adjusted by the Snow Manager as necessary for specific responses to a storm.

Primary streets receive different service levels than residential streets. Primary streets often carry higher traffic volumes and should be cleared first so that residential traffic can safely move about once out of their neighborhood.

1" to 2" of snow

Plow primary streets edge of pavement to edge of pavement. Residential street are not plowed, but will be treated for ice.

2" to 4" of snow

Plow primary streets edge of pavement to edge of pavement. Residential street will receive one plow pass in each direction.

Independence, Missouri

City of Independence Pre-Treatment Plan

When a winter storm is forecast, Public Works staff monitors weather conditions throughout the city. Equipment is loaded and crews are placed on standby to respond when called. Streets will be pre-treated as necessary with a salt brine mixture.

City of Independence Snow Removal Plan

To make the snow removal process as efficient as possible, city streets are classified in four levels:

- **Level 1** - Roadways that carry the highest volume of traffic. They generally have 3 or 4 lanes.
- **Level 2** - Streets that connect Level 1 roadways to residential streets
- **Level 3** - Dangerous hills and intersections throughout the city
- **Level 4** - Residential streets, cul-de-sacs and dead-ends

Public Works crews are dispatched to Level 1 roadways once freezing rain, sleet or snow begins to fall. As long as snow is accumulating crews will remain on Level 1 roads until all driving and turn lanes are cleared. Public Works crews then move to Level 2 streets. These streets are plowed until passable, which means some snow will remain on the road surface.

Level 3 intersections and hills are next to be plowed or treated. With a typical winter storm, it generally takes between 12 and 16 hours to clear Level 1, 2 and 3 streets after the snow stops. High winds, extremely cold temperatures and additional rain or snowfall will lengthen this time.

Level 4 residential streets will then be opened with one pass. Residents are asked to not park vehicles on the street when snow is forecast. If parking on the street is unavoidable, vehicles should be parked along the north side of east-west streets and along the west side of north-south streets.

Snow removal shifts are staffed 24 hours a day during winter storm events. Crews work on 12-hour alternating shifts during the week, weekends and holidays to provide continuous operations until roads are cleared.

Snow Removal Vehicles

In order to allow snow removal crews to properly treat the streets, please avoid parking on the streets. This will allow the snow removal vehicles along with emergency response vehicles to navigate the streets safely and efficiently.

Grandview, Missouri

SNOW REMOVAL PROCEDURES

The Public Works Department is responsible for snow removal on all public streets within the City. For questions or concerns, please call the Public Works Director at (816) 316-4855 during regular business hours.

Our priority is first and foremost designated Snow Routes. Crews do not begin plowing operations on neighborhood streets until at least 4-inches of snow has accumulated on streets. If it becomes necessary to plow the neighborhoods, clearing will begin after snowfall has stopped and the Designated Snow Routes have been cleared.

Our first priority is designated snow routes which allows emergency vehicles to be able to get around the City.

We strive to make it safe as possible for drivers who must get out. If you do not need to go out please stay home. Generally we will confine our work to Snow Routes and selected "hot-spots".

Crews do not plow or treat neighborhoods and side streets until there has been an accumulation of 4 or more inches of snow at which point plowing will begin AFTER THE SNOWFALL HAS STOPPED.

The goal is to clear all city streets within 24 hours after snow has stopped falling. When we get 4-inches of snow or greater, and we plow into the neighborhoods and side streets, last on the list to be treated are cul-de-sacs and Dead Ends.

It is always a drivers' responsibility to slow down and drive with extra care when there is any precipitation this time of year.

All drivers need to make sure they do not exceed posted speed limits, and during precipitation they need to slow down accordingly. Drivers also need to test their brakes, and remember to allow greater distances and spacing between vehicles when on public streets.

The City does not treat or plow private property or private streets, and does not remove snow deposited in drive approaches by street plowing.

Snow removal on parking lots and sidewalks are the responsibility of the resident or property owner.

History

- 1980's – Snowfighting didn't begin until PW received 10 phone calls about snow on street
- 1990's – Goal was 48 hours to plow and treat all streets after precipitation stopped
 - Trigger for starting was $\frac{3}{4}$ " of snow on roads
- Early 2000's – Goal was 48 hours to plow and treat all streets after precipitation stopped
 - Trigger for starting was when snow began to fall
- 2000's – First comprehensive (written) Snow and Emergency Plan
- Late 2000's – Proactive approach to snow and ice control
 - Pretreatments
 - Staff on the streets when precipitation starts