

2024

# Snow Removal and Ice Control Operations Plan

DANIEL R. ROBERTS, ASSISTANT DIRECTOR OF PUBLIC WORKS OPERATIONS

DOUGLAS COUNTY GOVERNMENT | Department of Public Works



## Operational Overview

### **Snow Season - October 1<sup>st</sup> through May 31<sup>st</sup> of each year.**

The Operations Division is responsible for developing policies and procedures that provides an explanation of services for emergency access to public roads for emergency vehicles, school bus transportation and residents in Douglas County. Snow removal and ice control is considered and adopted as a top priority in Public Works. The purpose of this Plan communicates our level of service during the winter season, to the public and our staff.

## Roles and Responsibilities

**Assistant Director** – responsible for overall budget and assuring resources are available. Communication with Elected Officials, County Manager, and Director of Public Works. Assigning staff to Emergency Operations Center. The specific areas of responsibility are as follows:

- Developing and implementing snow policies and procedures.
- Plan and facilitate emergency response coordination with Director of Operations, Director of Emergency Management and Operations Manager.
- Assign key members to the Emergency Operations Center.
- Requesting, planning, and allocating funds need for snow removal budget.
- Assigning contracted personnel during emergency events, such as natural disasters.
- Working directly with administrative staff on tracking equipment, material purchases and inventory, and material usage.

**Operations Manager** – overall responsibilities include, providing leadership and direction to during emergency snow events, partner with Fleet Department to oversee equipment repair and maintenance, manage for the health and safety of our team members rests with all levels of management. The specific areas of responsibility are as follows:

- Manage, plan, and provide necessary leadership with snow removal district supervisors for snow events communicate and oversee materials that are designated at each deployment facility.
- Update Assistant Director of Operations on specific snow removal operations and report issues.
- Redirect and assign additional personnel during major blizzards to areas within the County for route coverage.
- Communicating and reporting to the Emergency Operations Center, rerouting resources and provided personnel, during the event of an emergency.
- Monitor and track all snow removal districts on AVL system.

**Supervisors** – overall responsibilities include, supervise staff during snow removal maintenance operations in assigned district. Manage and direct equipment operators snow routes. Track material usage within snow removal district and track employees time and resources. Communicate and report during snow events and schedule equipment repairs and breakdown with the Fleet Department.

### **Snow District Supervisors**

- Billie Brewer – Snow District 1
- Steve Dalke – Snow District 2
- John Kadlec – Snow District 3
- Wes Trueblood – Snow District 4
- Steve Patterson – Snow District 5
- Curtis Marshall – Snow District 6

The specific areas of responsibility are as follows:

- Meet or discuss with Operations Manager snow removal plan during snow events. Update Operations Manager on emergencies, route coverage, and if additional staff is needed.
- Ensure that any accident is reported to the Operations Manager and Risk Management within 48 hours of the incident.
- Monitor and track materials in assigned yards. Communicating with administrative staff on material orders and coordination of material delivery. Assigning stockpiling material into sheds to equipment operators.
- Check and report vehicle breakdowns to Fleet and assign equipment to Equipment Operators when needed.
- Reviewing service requests and assigning snow related and ice related complaints to staff. Communicating closed requests with the Customer Service Center.
- Communicate, respond, and meet with residents on issues or concerns, when necessary.
- Meet with Senior GIS Analyst on district snow routes, reassign routes for snow removal coverage, and update maps throughout the year, if needed.
- Monitor and track district snow removal routes on AVL system. As well as monitoring weather updates and responding to inclement weather hazards.

**Equipment Operators** – responsibilities included, operating snowplows and other snow removal equipment and deicers material used throughout assigned snow route, obeying all traffic laws. Performing pre/post trip inspections, monitoring equipment issues and reporting accidents to their direct supervisor. The specific areas of responsibility are as follows:

- All employees must follow the policies and procedures communicated in our adopted Safety Plan.
- Responds to snow shifts in a timely manner when called to assist in snow removal operations. During the event of an emergency operators should

expect to be deployed to other districts to assist in emergency recovery and response. This will be communicated to you by either the Operations Manager or your direct Supervisor. When working in another district you will be working under the direction of the designated District Supervisor.

- Maintaining Class, A or B Commercial Driver's license and following and obey motor vehicle laws and traffic laws.
- Always wearing appropriate personal protective equipment.
- Providing snow removal is done adequately and safely during designated shift and ensure snow route coverage is achieved. Communicating with supervisor and/or equipment operator during the next shift of status of route if shared.
- Performing pre/ post trip inspections daily and complies with safety precautions and equipment standards. Monitoring and reporting any issues to your direct supervisor. Responsibility for keeping equipment clean and in a tidy manner for the next equipment operator.
- Using materials responsibility and reporting usage during snow removal shift.
- Reporting any type of traffic or private property damage immediately to direct supervisor. Filling out accident report on the Origami system within 48 hours of an accident.
- Submitting PubWorks accurate mobile records for supervisor approval daily. Correcting errors flagged from administrative staff is done in a timely manner.
- If approach by a resident responding and a respectful manner and directing repairs and service to the Customer Service Center and questions to your direct supervisor.

**Administrative Staff** – responsibilities included providing administrative support, scheduling material orders, and tracking inventory, monitoring AVL system and reporting financial reports to Assistant Director of Operations. The specific areas of responsibilities are:

- Ordering and scheduling material orders for various material sheds. Tracking inventory usage and monitoring snow removal budget.
- Reporting overall snow removal operations on a biweekly bases and upon request.
- Providing detail reporting during emergency events or natural disasters. If necessary, tracking and reporting: personnel hours, equipment usage, material usage, and other expenses for FEMA reimbursement.
- Providing food, water, and other resources during emergency events.
- Monitoring AVL system and reporting software issues, assigning new user profiles, and reporting equipment that is not tracking to the Fleet Department.
- Providing additional support to the Customer Service Department during emergency events.
- Creating and maintaining library for job hazard assessments.

**Support Specialist** – responsibilities include, providing all personal protective equipment and First Aid supplies, and other support items as directed by the Operations Manager and Supervisors. The support specialist is required to pursue additional safety items outside of daily purchasing practices if safety items cannot be acquired the day of the event. This will include acquiring safety items from local vendors and delivering them to the crews and other team members if needed. Other specific areas of responsibility are:

- Providing additional support to the Customer Service Department during emergency events.
- Taking photographs of damage areas, if directed by management.
- Ordering and maintaining supply throughout the year and during the event of any emergency this may include all other divisions and volunteers if directed by management. Items include but are not limited to:
  - Annual clothing allotment
  - Safety vests, type II and III
  - Safety glasses
  - Safety gloves, lined, double lined, waterproof, etc.
  - Winter jackets, bibs, three in one reflective jackets
  - Rain gear, including pants and jackets (if directed by management)
  - First aid kits, small and large
  - Hard hats and hard hat liners
  - Sunscreen
  - Bug spray
  - Ice cleats
  - Masks and respirators

**Customer Service Department** – overall responsibilities included, monitoring snow and ice removal citizen requests and concerns, tracking types of snow related responses and generating requests, and assigning service requests to the appropriate Supervisor. The specific areas of responsibilities are as follows:

- Supervisors for the Customer Service Department is responsible for attending weekly staff meetings and communicating updates to their staff. Supervisor also provides service request reports for biweekly reporting and other related requests, including emergency responses.
- Staff is responsible for creating tracking and monitoring service requests. In addition to, closing service requests and adding supervisor's comments and the date request was closed.
- Staff also monitors and tracks Citizen Connect requests and emails and responds to citizens with policies and procedures but will direct questions and concerns to the Supervisor responsible for area of concern.
- Monitors and tracks plows on AVL system for citizen inquires and emergency related requests.

**Senior GIS Analyst** – responsibilities include receiving direction from the Assistant Director in preparation for snow removal season and in the event of an emergency. Manages

projects related to Geographic Information System technology, and data programs. Developing and maintaining snow removal maps and route coverage with the Operations Manager and Supervisors. The specific areas of responsibilities are as follows:

- Meet and discuss GIS support during the snow removal season and in the event of an emergency.
- Meeting through the year developing and maintaining snow removal route maps for each snow removal district. Manage and edit data to keep maps up to date.
- Uploading and managing PubHub Dashboard.
- Create new applications/dashboards during emergency events, if necessary.

**Staff Representatives Assigned to Emergency Operations Center (EOC)**—in the event that an emergency has been declared, the EOC will be activated. Currently there are three staff members that are assigned as representatives. Their responsibility is designated by the Assistant Director of Operations. Staff members should report to the Director for the EOC, or other staff members as directed by the Director of the EOC, the Assistant Director, and the Operations Manager. The specific areas of responsibility are:

- Staff members will attend initial training and maintaining training scheduled by Emergency Management.
- Staff members should be familiar with management and supervisor staff, as well as have a general knowledge on PW Ops equipment and facility locations.
- Staff members will not make any pertinent decisions before discussion with the Assistant Director of Operations.
- Staff members should plan on being on a rotation and communicate with other members of the team should the event be more than one day.
- Debriefing with management and discussion of events and decisions should be made in a timely manner.

## Road Network

The Department of Public Works Operations Division is responsible for snow and ice control within Douglas County. There is approximately **2,575** number of lane miles within the County, with **1,994** being paved and **580** being gravel.

Douglas County's Road network is generally comprised of 4 designated maintenance districts. Each year, new roads are accepted into the County and the maintenance districts are updated based on the maintenance area the road falls under. However, during snow removal operations, district boundaries shift changing from 4 to 6 to provide optimum coverage for snow and ice removal activities.

## Snow Routes

Snow routes are currently serviced based on district boundaries and number of available equipment operators based on each district.

**Staffing Levels and Miles Per Operator** - the table below gives a breakdown of each district's lane miles. (District boundary maps are included in the **Resource Section** of this document.)

**Table 1: District 1 Day and Night Snow Routes**

Route ID	Unit #	Lane Miles
Day-101	1-2	32
Day-102	13017	71
Day-103	15006	51
Day-104	15007	61
Day-105	15010	24
Day-106	1608	18
Day-107	19048	61
Day-108	19049	75
Day-109	19050	69
Day-110	20003	45
Day-111	21814	62
Day-112	21815	50
Day-113	21816	57
Night-101	2003	38
Night-102	17043	24
Night-103	15007	54
Night-104	19048	34
Night-105	10949	47
<b>Total</b>		<b>873</b>

## **Snow Operation Procedures**

This section briefly outlines the standard operating procedure during snow removal. The policies and procedures that are described have been practiced and adopted by the Operations Division.

### **Shift Coverage**

During snow removal operations, we generally run two 12 hours shifts. The morning shift is 2:00 a.m. – 2:00 p.m. and the afternoon shift is 2:00 p.m. – 2:00 a.m. Shifts are assigned to the Equipment Operator upon hiring. The majority of our staff is scheduled for the morning shift. At times this can change depending on the type of storm, snow drifts, and/or responding to accidents. Each Supervisor after discussion with the Operations Manager can make these changes for optimal coverage.

### **Snow Removal Priority Levels**

Our primary focus is always on public safety. Because every snowstorm is different – temperature, moisture content, wind velocity, storm duration, etc. – we implement a snow removal plan unique to each storm.

#### **Priority 1 - Arterial Roadways**

**Emergency Facilities: access to fire stations, hospitals, Sheriff stations, and other emergency facilities are plowed first.** Arterial roadways are major roadways with high traffic volumes and high operating speeds that provide critical transportation and emergency access and links within the County. The majority of the County's snow removal equipment is needed to keep arterial roadways safe for travel. Crews will remain on arterial roadways until the snowstorm dissipates to ensure safe access for emergency vehicles, and provide adequate lane width for traffic, and minimize surface re-icing. There are 834 lane miles of arterial roadways considered to be a top priority for snow removal in the County's road network.

#### **Priority 2 - Collector Roadways and School Bus Routes**

When the snowfall has subsided and arterial roadways have been cleared, equipment is deployed to plow collector roadways and school bus routes. Collector roadways distribute traffic between arterial roadways and residential streets and often serve as links between subdivisions. Collector roadways normally do not provide direct access to private property.

#### **Priority 3 - Local Street and Cul-de-sacs**

Local streets and cul-de-sacs provide for low and moderate traffic volumes within subdivisions and provide direct access to residences or private property. The plowing of local streets and cul-de-sacs is typically addressed after arterial and collector roadways have been cleared. All local streets and cul-de-sacs are plowed unless accumulations are minor and are expected to melt the following day. During heavy storms, snow may not be removed until the following day after arterials and collectors are plowed.

## **NEW! Bike Lanes**

Bike lanes are generally located in urban areas of the County. They run adjacent to travel lanes with striping. During a snowstorm, these areas are plowed routinely from travel lane to bike lane and then to the curb line in an echelon formation. However, during heavier snowfalls, bike lanes may become snow packed with ice and are not safe to travel until roads are widened. Expect that every storm is different and allow plows the adequate amount of time to clear snow and ice from these bike lanes.

## **Standard Operational Practices During Snow Removal:**

- Roads may not be plowed or treated at the same time each day or even the same day throughout the winter season. During snow events, snow removal operations commence when snow begins to accumulate on the roads and continue until the storm ends.
- Main roads are cleared curb to curb.
- We clear roadways according to priority until conditions are safe for travel. Cul-de-sacs and some local streets may not be plowed if accumulations are minor, and snow is expected to melt over the following 24-hours. Exceptions to this are made if the streets have hills or curves that may become icy and hazardous to traffic.
- Multiple snowplows often plow together to remove snow from multi-lane streets. This results in more efficient operation and eliminates piles of snow in the roadway that may become obstructions to vehicles. When this process is in action, we direct the traveling public to please give equipment adequate room to operate, however you should always watch for vehicles quickly approaching and be aware of your traveling speed.
- Cleanup and widening operations often take place one to four days after the snowstorm, depending upon the severity of the storm and wind conditions. It is often necessary to widen roads to ensure that ice and snow melt from the pavement surface to keep driving lanes open.
- Subdivision streets cannot be plowed if parked vehicles or other obstructions interfere with the safe and continuous operation of snow removal equipment. Equipment will return to plow after obstructions are moved.
- Depending upon temperatures, wind velocities and the extent of snowmelt, crews may have to widen travel lanes, remove ice, and perform other operations for up to several days after a snow event.
- Mailboxes installed along roadways are usually at the risk of the owner when lack of maintenance is apparent or if vandalism occurs. However, mailboxes damaged due to heavy snow from plowing will be repaired in a timely manner after snow dissipates and when resources are available.
- During the event of an emergency Operations will deploy plows to other districts to assist in emergency recovery and response.

- Residential streets receive one or two passes but are not plowed curb to curb (this minimizes snow thrown back onto residential sidewalks) and are not plowed to bare pavement, you should expect to drive on packed snow.
- During the storm, crews are unable to address ice complaints.
- After routes are complete, which may be a day or two after snow stops, crews will address priority ice complaints. Priority ice complaints are those where icing is built up and covering sidewalks, icing in intersections, and on hills. (A patch of ice in a parking lane of a residential street is not a priority.)
- Cul-de-sacs and roads with no outlet that do not have adequate space to safely turn equipment around will not be plowed.
- Vehicles parked on roads in a manner that restricts or prevents the safe and continuous operation of snow removal equipment may cause the road to be unplowed until vehicles are removed.

#### **Standard Operational Practices During Ice Removal:**

- During the storm, crews are unable to address ice complaints.
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#### **On-Call and Emergency Requests**

On-call and emergency requests related to snow should always be directed to the snow district that the request falls under. If an employee from another district receives a call that is snow related, they should contact the snow district supervisor directly. The person on-call should remain available should other requests are dispatched to them, unless directed otherwise by their supervisor. The Customer Service Center should also follow the same protocol during normal business hours.

#### **Deployment Facilities**

Deployment of snow removal equipment is generally chosen to limit drive time when reloading materials and refueling equipment. Each snow district manages material orders and stockpiles material from their designated deployment facilities. There are currently eight facilities Operations deploys from during a snow event. Multiple snow districts can operate out of the same facility. This is based on the facilities capacity to hold equipment and stockpile material. Some snow districts operate from multiple locations.

**Table 2 (Information on Deployment Facilities and Designated Snow Districts)**

<b>Facility</b>	<b>Address</b>	<b>Designated Snow Districts</b>
<b>Castle Rock Facility</b>	3030 N Industrial Way, Castle Rock	Snow Districts: 2, 3, 5, 6
<b>Larkspur Yard</b>	55 Fox Farm Road, Larkspur	Snow District: 2

<b>Northwest Facility</b>	8117 Midway Drive, Littleton	Snow District: 5
<b>Parker Facility</b>	9040 Tammy Lane, Parker	Snow Districts: 1, 4
<b>Sedalia Shop</b>	5469 Clay Street, Sedalia	Snow District: 3
<b>Southeast Facility</b>	11815 Spring Valley Road, Larkspur	Snow District: 2
<b>Trumbull Yard</b>	7826 Hwy 67, Sedalia	Snow District: 3
<b>Waterton Yard</b>	7201 Waterton Road, Littleton	Snow Districts: 3, 5, 6

## Fleet

District 1	Unit	Description	Located
<b>Light Duty Trucks with Plows</b>			
	15009	2015 Ford F350 with plow	Parker
	15010	2015 Ford F350 with plow	Parker
	16017	2016 Ford F350 with plow	Parker
	17040	2017 Ford F350 with plow	Parker
	20044	2020 Ford F350 with plow	Parker
	21019	2021 Ford F350 with plow	Parker
<b>Tandem Snowplows</b>			
	09017	2009 Western Star 4900 Tandem with mag tank	Parker
	13017	2013 International Tandem 7600 with snowplow, wing plow, combo box with sander and prewet	Parker
	15006	2016 Western Star 4900 Tandem with snowplow, wing plow, combo box with sander and prewet	Parker
	15007	2019 Western Star 4900 with snowplow, combo box with sander and prewet	Parker
	16018	2019 Western Star 4900 Tandem with snowplows with slide in sander and prewet	Parker
	17043	2017 Western Star 4900 Tandem with snowplow with radius dump spreader	Parker
	19048	2019 Western Star 4900 Tandem with snowplow with radius dump spreader	Parker
	19049	2019 Western Star 4900 Tandem with snowplow with radius dump spreader	Parker

	19050	2019 Wester Star 4900 Tandem with snowplow with radius dump spreader	Parker
	20003	2020 Wester Star 4900 Tandem with snowplow with radius dump spreader	Parker
<b>Graders</b>			
<b>Lease Unit</b>	23914	2023 John Deere grader front angle plow and v-plow	Parker
<b>Lease Unit</b>	21815	2015 John Deere grader front angle plow and v-plow	Parker
<b>Lease Unit</b>	21816	2018 John Deere grader front angle plow and v-plow	Parker
<b>Loaders</b>			
	23910	2023 John Deere 644 Loader	Parker
	19031	2019 CAT 950 Loader	Parker
	23905	2023 T770 Bobcat Loader	Parker
<b>District 3</b>	Unit	Description	Located
<b>Single Axle with Plows</b>			
	19061	2019 Freightliner single axle with snowplow	Castle Rock
	09018	2009 Western Star single axle plow and sander	Castle Rock
	07002	2007 Western Star plow with sander	Trumbull
<b>Light Duty Pickup Trucks with Plows</b>			
	19058	2019 F-350 pickup with plow only	Castle Rock
	15017	2015 F-350 pickup with utility box and plow	Castle Rock
	13018	2013 F-350 pickup with plow and sander	Trumbull
	20045	2020 F-550 with pickup plow and sander	Castle Rock
	15020	2015 F-350 pickup plow only	Castle Rock
<b>Tandem Snowplows</b>			
	15018	2015 Western Star Tandem with snowplow, wing plow, comb box with sander and prewet	Castle Rock
	13019	2013 International Tandem with snowplow, wing plow, combo box with sander and prewet	Castle Rock
	16027	2016 Western Star Tandem with snowplow, wing plow, combo box with sander and prewet	Castle Rock
	19062	2019 Freightliner Tandem with snowplow, combo box with sander and prewet	Castle Rock

	19063	2019 Western Star Tandem with snowplow, combo box with sander and prewet	Castle Rock
<b>Graders</b>			
	20639	2020 CAT 140 grader with angle front plow and v-plow	Sedalia
<b>Lease Unit</b>	21813	2021 John Deere grader front angle plow and v-plow	Sedalia
<b>Lease Unit</b>	23917	2023 John Deere grader front angle plow and v-plow	Trumbull
<b>Lease Unit</b>	20811	2020 John Deere grader front angle plow and v-plow	Castle Rock
<b>Loaders</b>			
	17054	2017 CAT 938 Loader	Castle Rock
	31399	2019 CAT 950 Loader	Castle Rock

## Materials Utilized

Douglas County uses a variety of sanding and deicer materials during winter. Materials are utilized depending on surface type and location of snow district being treated. Treatment times vary greatly depending upon type of storm, snow accumulation, temperatures, heavy wind, and resources. The Operations Manager and Snow District Supervisors plan and communicate, (if needed) what type of material to apply.

**Salt sand** – is a 50/50 blend of salt and sand. This application is primarily used in the rural parts of the County. Deicing takes time to start working, however traction from the sand works immediately. This blend is used in other parts of the County; however it is carefully monitored in urban areas due to PM10 regulations and environmental sweeping standards.

**Ice slicer** – is a fast-acting deicing compound with a darker color, this allows drivers to recognize roads that have already been treated. Application is primarily used in urban areas of the County, main arterials, hills, and curves. Ice slicer uniquely works approximately 14 degrees lower than traditional salt, allowing it to melt snow and ice within 30 minutes of application.

**Rock salt** –

**Magnesium Chloride (MgCl)** - MgCl gives the ability to keep roads open in the winter by preventing ice and snow from bonding to the pavement. This increases the safety of the driving public by reducing the likelihood of vehicular accidents. It also allows for a higher traffic speed, reducing traffic congestion on high volume roads.

On an environmental standpoint, the practice of using MgCl, where appropriate, minimizes the need for granular material, in so doing, improving air quality. This

increased level of service saves on vehicle fuel consumption, reducing the number of trips to reapply additional material on snow packed and icy surfaces.

MgCl in tanker loads is used on the roads highlighted in the map below. This includes arterials, major collectors, and minor collectors on hills, intersections, and to pre-wet salt.

### **Pounds Per Lane Mile and Equipment Capacity**

Currently operators load their trucks, 3 to 4 times in a 12 hour shift. This is based on weather and treatment needed, as it can sometimes be greater. A larger tandem truck will refill less than a 4x4 or a dump truck. Tandem cover over twice as many miles as a 3.5 dump before refilling, we use larger trucks where we can.

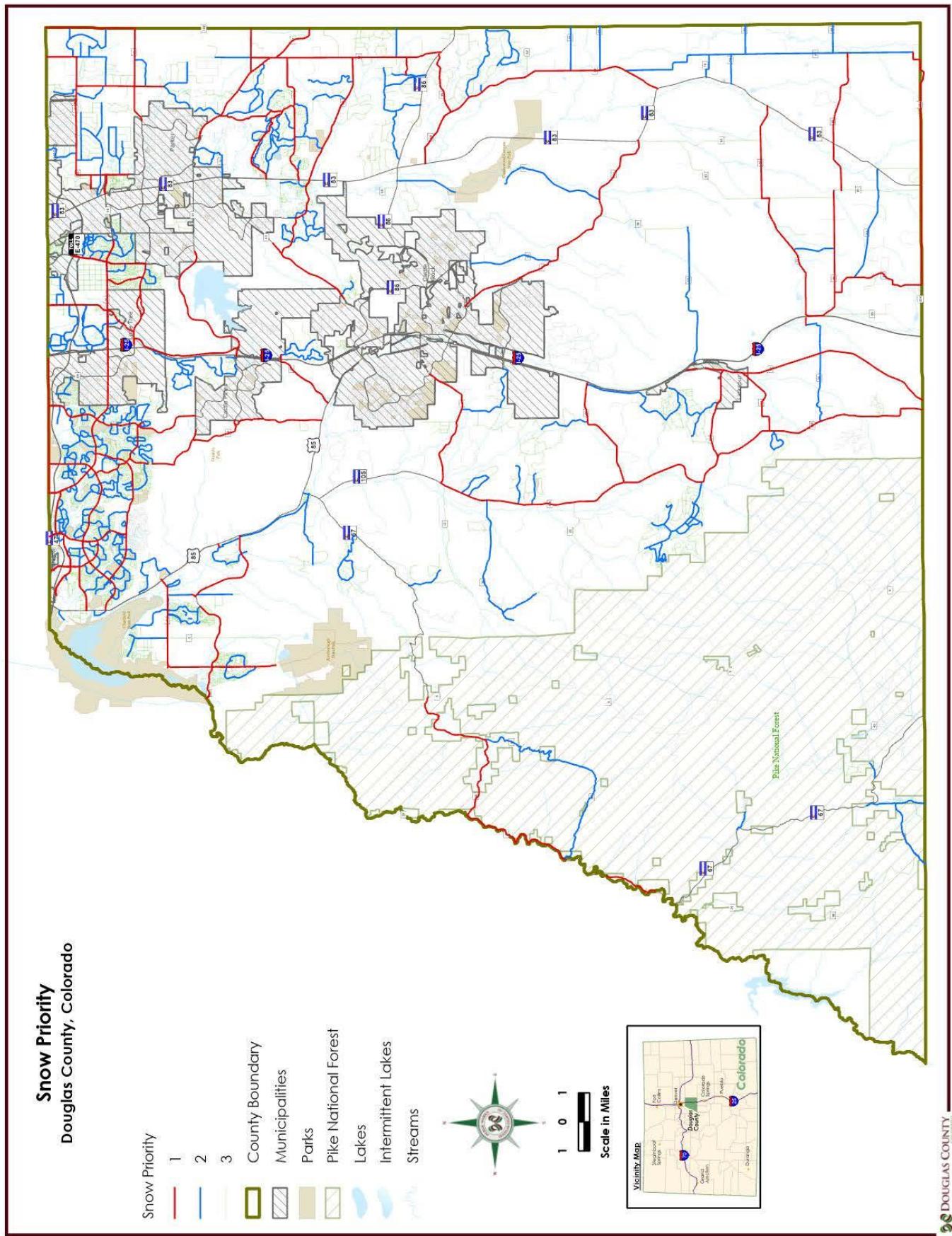
**Table: Distance treated by one ton of material at differing rates and number of lanes.**

Tandem	Lbs/Lane Mile	Max. Treatable Distance 1 lane	Max. Treatable Distance 2 lane	Max. Treatable Distance 3 lane
120	125	62.5	41.67	
150	100	50	33.33	
175	85.71	42.86	28.57	
200	75	37.5	25	
225	66.67	33.33	22.22	
250	60	30	20	

### **Automatic Vehicle Locator System (AVL)**

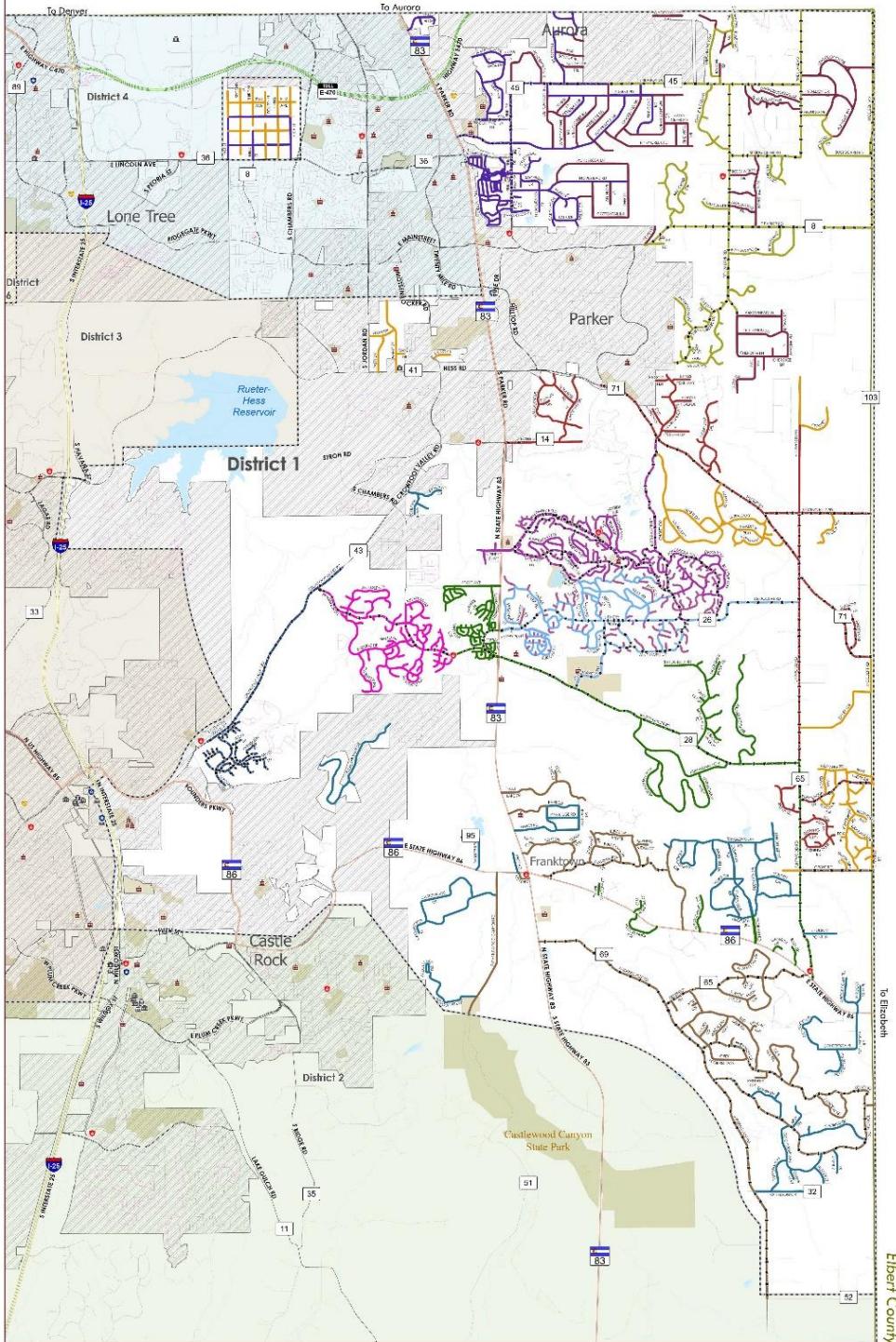
Personnel monitors and tracks the Automatic Vehicle Locator (AVL) system to assist in snow removal operations. The AVL system is used as a management tool to track vehicles to provide operator safety, help with equipment deployment, and storm management. This system allows management staff to view the progress of snow removal operations during storms and can be monitored from Douglas County Emergency Operations Center, the PW Ops Facility, or from supervisor's vehicles. Based upon information from the AVL system, supervisory staff can move resources to accommodate changing weather conditions and move resources from one snow removal district to another to maximize productivity and efficiency. This system also enables the most efficient use of equipment when assisting emergency services (ambulances, fire equipment, and law enforcement) during blizzards.

## Appendix A – Maps



**Public Works Operations  
Snow District 1 Day  
Billie Brewer**

2023/2024  
Douglas County, Colorado



Douglas County Public Works Department GIS Disclaimer

All GIS data and information products provided by the Douglas County Public Works Department are for illustrative purposes only. The data is not complete, accurate, or current. The data is provided "as is" without warranty of any kind. Douglas County does not warrant that they are error free. Douglas County Public Works Department shall not be liable for damages resulting from the use of such products or arising from the use of such products. The recipient and/or user, acknowledges and agrees that the use of such products is at the user's own risk. The user shall not resell the product provided by Douglas County Public Works Department. Including errors, corrections and/or updates should be directed to:

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(303) 660-7480  
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 DOUGLAS COUNTY COLORADO



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Scale in Miles

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