

CITY OF

Grand Island

NEBRASKA

PUBLIC WORKS

Grand Island Street Division

Snow Removal:

Who, What, When, Where, Why and How

WHO

Grand Island Street Division
Snow and Ice and Removal

The Grand Island Street Division in conjunction with the Grand Island Police Department determine when snow and ice removal will begin.

The Street Division is responsible for clearing snow and ice from city maintained roadways.

WHAT

Grand Island Street Division
Snow and Ice and Removal

- Approx. 890 miles of roadway in Grand Island may need to be cleared.
- The city is divided into four priority areas
 1. Emergency Snow Routes
 2. School Areas
 3. Residential Areas and Cul-de-sacs
 4. Downtown (Hauling).
- Operators = 20 within Street Division

WHAT

Grand Island Street Division
Snow and Ice and Removal

- Equipment = 22 Pieces (only 18 clear snow)



4 Motor Graders



1 $\frac{3}{4}$ Ton Pick-up
with a Plow



10 Truck Plows

WHAT

Grand Island Street Division
Snow and Ice and Removal

- Equipment = 22 Pieces (only 18 clear snow)



3 Loaders

4 Salt Trucks



WHEN

**Grand Island Street Division
Snow and Ice and Removal**

- After 2” of snow accumulation –
Emergency Snow Routes
- After 3” of snow accumulation –
School Areas
Residential Areas
Cul-de-sacs
Downtown (Hauling)

These amounts of snow are a “rule of thumb”. Each snow event is different and it is important to stay flexible with the snow removal plan.

For example, if there are several successive snowfalls of less than 2”, snow removal may be required to prevent snow from being packed down and becoming very slick.

WHERE

Grand Island Street Division
Snow and Ice and Removal

Emergency Snow Routes

- Tandem plowing is done to clear all lanes of the roadway.
- The goal is to plow to pavement to keep ice from forming.
- Emergency Snow Routes are typically the major arterials within the city and are marked with signs.
- Completed before plowing of school and residential areas begin.

WHERE

Grand Island Street Division
Snow and Ice and Removal

School Areas, Residential Areas, Cul-de-sacs

- Grand Island is split into 36 residential geographical areas.
- School zones in each area are cleared first, ideally, to allow the salt operation to happen after plowing.
- Cul-de-sacs are separated into a different category because of their design. It is difficult to maneuver motor graders and truck plows in the cul-de-sacs. Typically, loaders are sent to these areas to move snow to the middle of the circle.

WHERE

Grand Island Street Division
Snow and Ice and Removal

Downtown

- Plowing is done in conjunction with residential areas.
- If not on an Emergency Snow Route, the snow is cleared to the middle of the street.
- Snow is hauled from Downtown after all areas of the city have been plowed.
- Hauling is accomplished using snow blowers and dump trucks.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why are some streets cleared better than others?

Different equipment clears snow and ice differently than others. Motor graders have cutting edges that can get under the packed snow and ice to clear the streets to pavement. Truck plows push snow off the roadway, but run across packed snow and ice.

Why doesn't Grand Island have a fleet of motor graders to remove snow?

Motor graders are very good at clearing snow and ice but they have set-backs too. These large pieces of equipment are slow, hard to maneuver (especially in traffic), and the cutting edges are expensive. Another important factor is versatility. While motor graders are also used for grading gravel roads and some dirt work, the Street Division does not do large enough amounts of this type of work that would call for more motor graders than what is currently owned. The couple of times a year it snows would be the only time they would be used and having equipment sit idle for long periods of time can be detrimental to its condition.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why do some areas always get the motor graders?

There are spots within Grand Island that are prone to drifting and icy conditions because of their geographical locations and surroundings. Motor graders are placed in areas near these spots so they can respond quickly if any issues arise.

How is it determined what equipment does which areas?

Each residential area has quirks so it is beneficial to residents to have operators that are familiar with their area. This familiarity lends itself to items like, where the edge of the roadway is, where the ideal spots to turn around are, and the location of any other obstacles. With this in mind, the equipment is typically dispersed based on the operator and their knowledge of certain areas.

Also, the Street Division makes an effort to keep the equipment divided evenly between north, south, east, and west Grand Island. This is done to complete areas in about the same amount of time and prevent one section of town receiving better service than others. This division also minimizes response times for emergencies.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why does it take so long to clear the streets?

Grand Island has approximately 890 lane miles of roadway to clear (if more than 3" accumulates). With only 18 pieces of equipment that clear snow, it takes time to get to each street.

Other factors that add to snow removal times are:

- **Equipment Speed** - equipment is driven at low speeds
- **Amount of Snow Accumulated** – larger snow accumulation means longer clearing times
- **Availability of Operators and Equipment** - Clearing snow 24-hours a day requires the Street Division go to a two-shift schedule. At that time, operators from other departments are called upon to help with snow removal. Depending on the availability of these outside operators it takes time to fill each piece of equipment.
- **Emergency Snow Routes** - If enough snow accumulates, emergency snow routes may need to be cleared more than once. When this happens equipment is moved from residential areas to the Emergency Snow Routes. Emergency Snow Routes will always take precedence over residential areas.
- **Weather Conditions** - Certain weather conditions can lead to longer clearing times. For example, if it is windy and snow starts drifting it takes the operators longer to clear snow from certain locations.
- **Traffic** - It is ideal for snow removal to take place at night when traffic volumes are low. Unfortunately this can not always happen depending on when the snow starts and stops. High traffic volumes make it difficult for operators to maneuver and travel times become longer.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why do the plows push snow into cleared driveways?

Operators are instructed to push snow “curb-to-curb”. This means the snow should be cleared from the total width of the road. This procedure helps eliminate ice buildup and standing water in the roadway. If Grand Island were to receive consecutive snow storms and the roads were not cleared “curb-to-curb”, the snow and ice could build up into the roadway making it unsafe for motorists and even more difficult to clear.

Unfortunately when plowing “curb-to-curb”, snow is pushed into driveways (clean or not). The physical break in the curb and gutter to a drive way apron allows snow to accumulate in the opening. The equipment operators do not intentionally place snow in driveways, but rather it is an inconvenient side effect of snow removal.

Timing also has a lot to do with it. If the plows go by before driveways are cleared there is a chance less snow will fall in in the driveway opening compared to the areas around it. Depending on when the residential areas are started, some driveways may require clearing more than once.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why should cars not be parked on the street?

This City Code is in place for beneficial reasons to both the snow removal operation and property owners. If cars are parked on the street it is difficult for the operators to push snow “curb-to-curb”, which is especially important on the Emergency Snow Routes. Also, if there is enough snow and a car is covered it is difficult for the operators to see and the car may be damaged. Damage can also be incurred if the snow removal equipment slides or if high volumes of snow are coming off the plow. Lastly, if a car is parked on the street and a snow plow comes by, the owner will have to uncover the car (which is inconvenient) and then the street will have a large windrow for other motorists to maneuver around.

In short, vehicles should not be parked on the street during snow removal to prevent damage to equipment and vehicles, alleviate vehicles from becoming buried, and to allow the street to be completely cleared.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

Why doesn't the Street Division salt the roads every time the snow begins?

Salt can be very useful in fighting slick and icy roads, but if placed too soon, it can be a waste of resources. When salt is placed on the roadway and then shortly after the snow is cleared, it is like plowing money off the street. Ideally salt is placed after the roads are cleared to prevent snow pack and ice from accumulating.

Based on the forecast, a decision of whether to salt before the plows go out has to be made and with the weather being somewhat unpredictable, this decision is not always easy. Salt can also do a lot of damage to the pavement, so it is wise to be selective on how and when this product is used.

Salt is a hot commodity this time of year so it has to be used with some discretion. There is a limit on how much salt can be stored and once those supplies run out, it may be difficult to get more depending on the severity of the winter throughout the country.

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

How much snow is cleared?

If snow accumulation is more than 3”:

890 lane miles x 10’ average lane width x depth of snow = Approx. Amount of Snow Cleared

Example:

The first snowfall of the 2011 Winter was around 3.9” so,

890 lane miles x 10’ x 3.9” = 565,644 Cubic Yards of snow cleared.

565,644 Cubic Yards of snow is enough to fill one of the Street Division’s dump trucks over 47,000 times!

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

How much does snow removal cost?

There are four large costs (excluding equipment costs) for snow removal

1. Labor

Approx. regular hours per 3" snow event = 300

Approx. overtime hours per 3" snow event = 230

Labor costs for the first two snowfalls of 2011-2012 winter was \$26,674.42.

2. Fuel

Fuel costs during the first two snow events ranged from \$3.08-\$3.11 per gallon for ethanol and \$3.65-\$3.79 per gallon for diesel.

Approximate fuel cost to clear all areas once:

- 830 gallons of ethanol x \$3.08 = \$2,556.40
- 1340 gallons of diesel x \$ 3.65 = \$4,891.00
- Total fuel cost = \$7,447.40

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

How much does snow removal cost?

There are four large costs (excluding equipment costs) for snow removal

3. Salt for De-icing

Average cost per ton = \$49.50

Salt usage for the first two snowfalls of the 2011-2012 winter was approximately 150 tons

150 tons of salt x \$49.50 = \$7,425.00

4. Motor Grader Cutting Edges

Average cost per cutting edge = \$97.92

Cutting edges used for the first two snowfalls of the 2011-2012 winter was approximately 60.

60 Cutting Edges x \$98.00 = \$5,875.20

WHY AND HOW

Grand Island Street Division
Snow and Ice and Removal

How much does snow removal cost?

The picture below shows the total accrued costs for 2011-2012 snow removal as of December 19, 2011.

**Snow and Ice Removal
2011-2012 Budget Year-To-Date**

