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Morning Speaker August 2

Snow Storage: A Salt Reduction Strategy

SALT SYMPOSIUM

Snow Storage:
A Salt Reduction Strategy

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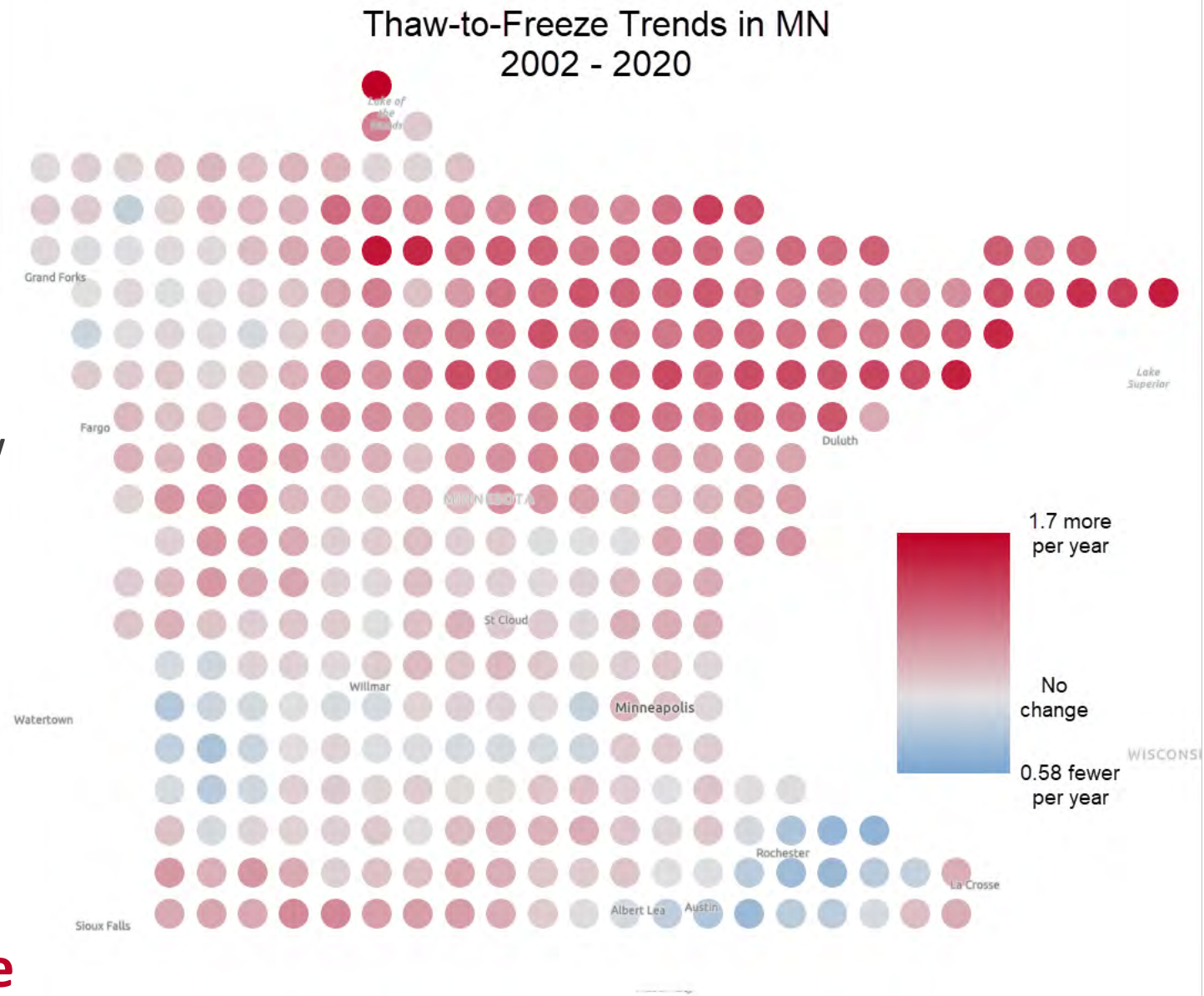
Things to remember.

- Chloride remediation is very difficult:
  - ✓ Source reduction is our best strategy.
- We manage the same snow continuously:
  - ✓ Not just once and not just when it snows.
- We have 2 seasons, rain and snow:
  - ✓ Traditional infrastructure design is for rain only.

Thaw/Freeze Cycles

- Each thaw then freeze cycles can result in extra maintenance calls.
- Meltwater will refreeze creating new salting events even when not snowing.
- ~40 to 50 Thaw/Freeze cycles in Twin Cities each winter.
- Climate adaptation strategy.



Average ~20 years of data show one extra thaw/freeze event every 3.5 years.

Why would snow storage be a salt issue?

Snow movement and placement is critical to winter management.

Meltwater Footprint → **Ice Footprint** → **Salt Footprint**

Managing Salt Footprint Through Snow Storage Design

- We can either “consider” snow storage **OR** actually design for it!
- WE CAN:
  - ✓ Define plowshed and understand how much snow we have to move.
  - ✓ Define areas on site or corridor that are big enough for a snow pile/berm.
  - ✓ Reduce or eliminate opportunity for meltwater to spread back onto pavement through winter design choices.
  - ✓ Use less salt AND improve safety.

Optimal Snow Storage Design

- We want to achieve **zero** reentry of meltwater back onto pavement.
- REMEMBER: 1/8” or 8” thick – will be salted.

Bad Example – HIGH Salt

Good Example – LOW Salt

Designing for Snow Storage

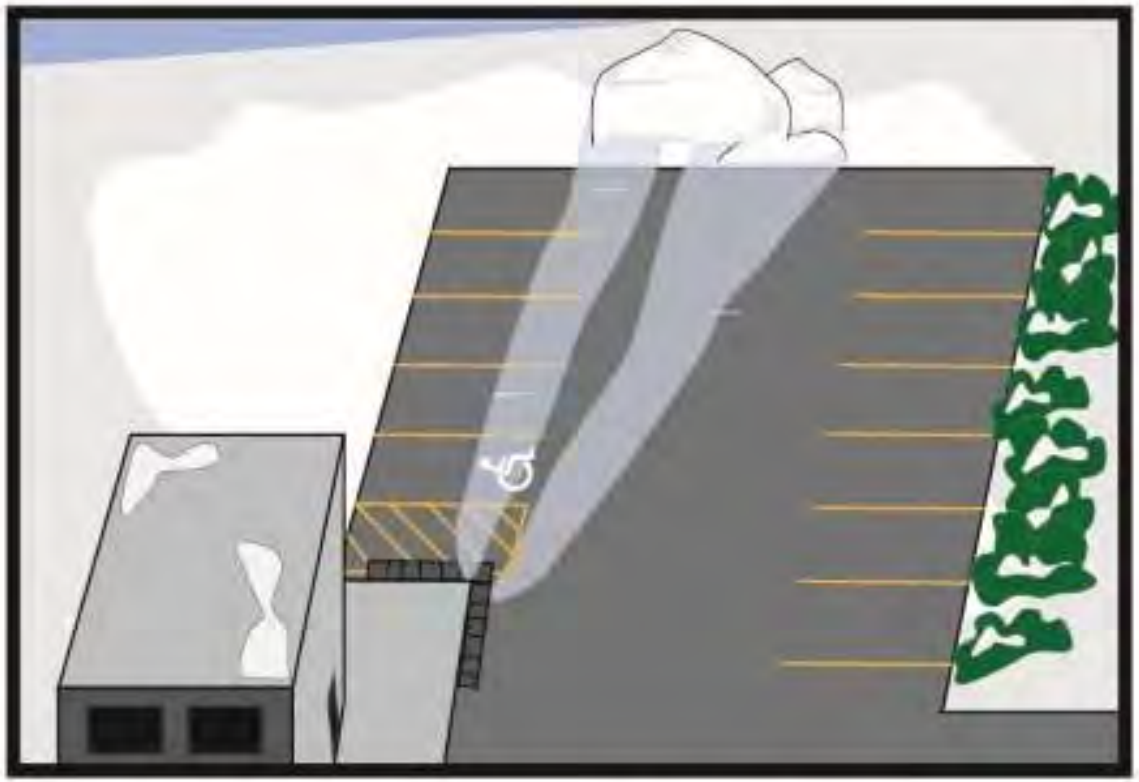
Snow storage design is not straightforward.

- Criteria for snow storage has many competing variables.

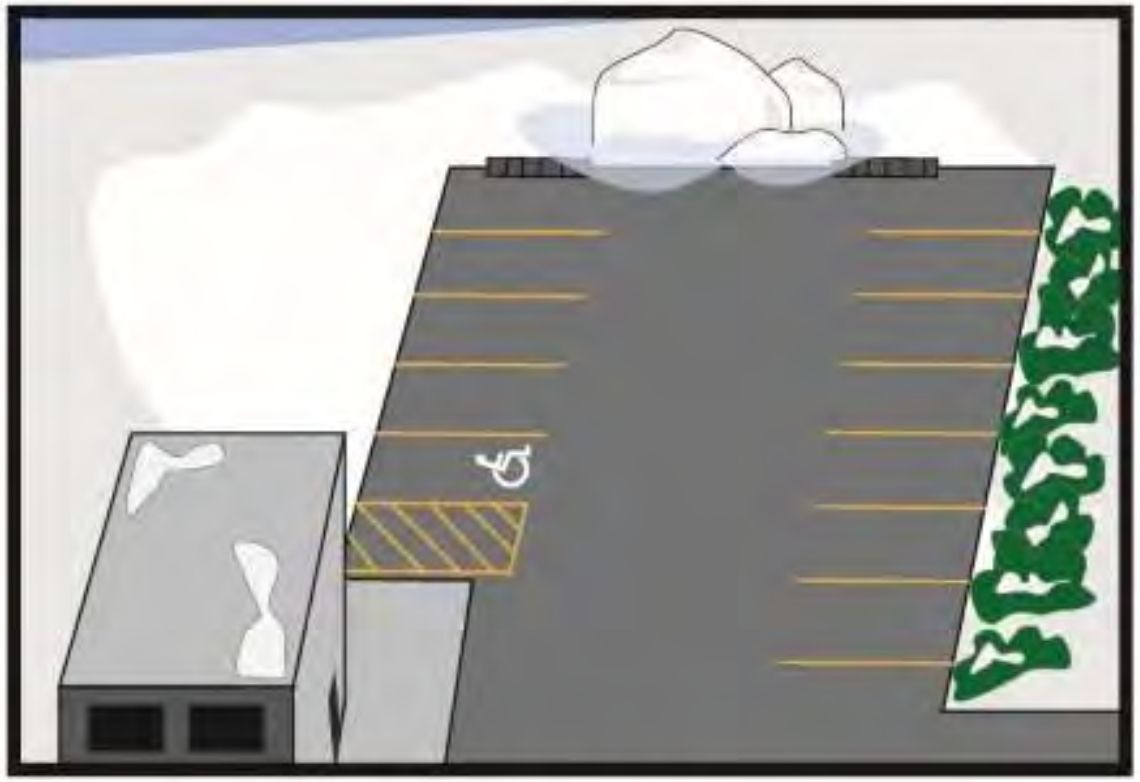
1. **Elevation:**
   - **Store snow on the low side near**
2. **Site perimeter controls:**
   - **Damage vegetation/soil.**
   - **Pedestrian facilities.**
   - **Curb types.**
3. **Store snow in stormwater facility:**
   - **No. But…**
4. **Space needs:**
   - **How much?**
   - **Where?**
   - **Haul out or melt on site.**

Snow Storage Design 101

Snow storage should be at a lower elevation than "saltable" surfaces



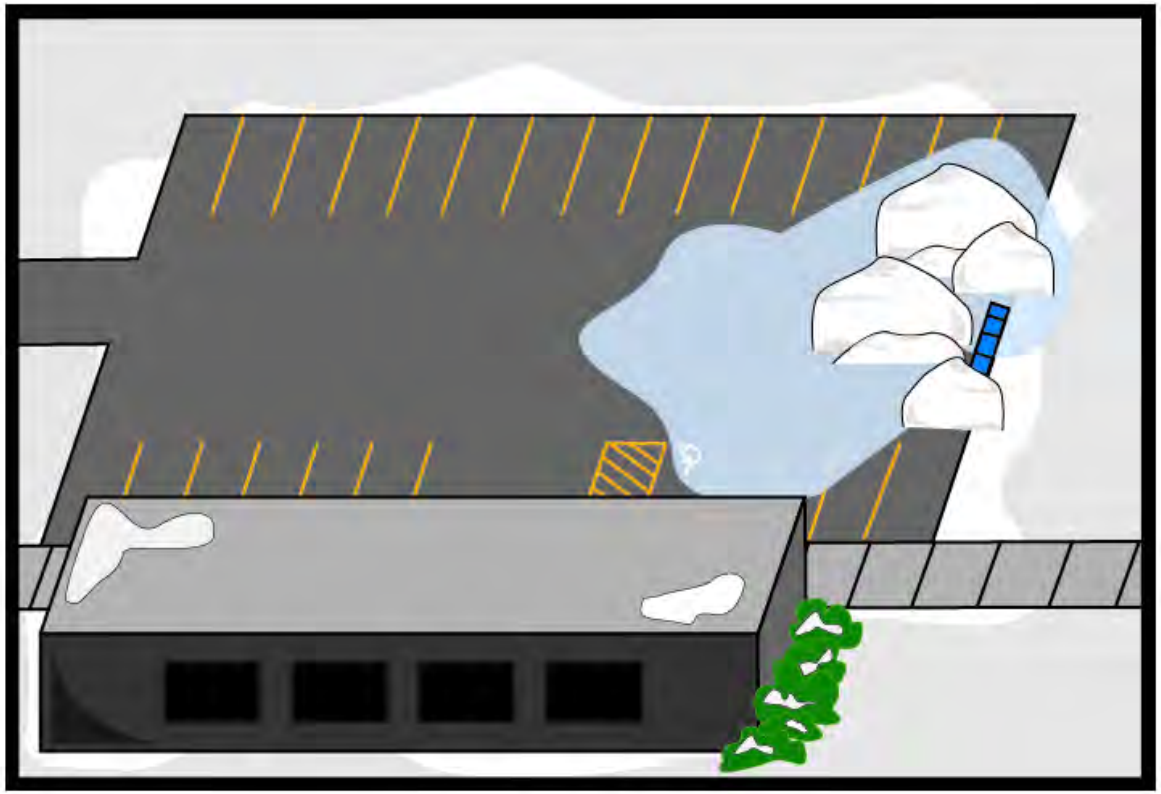
HIGH SALT



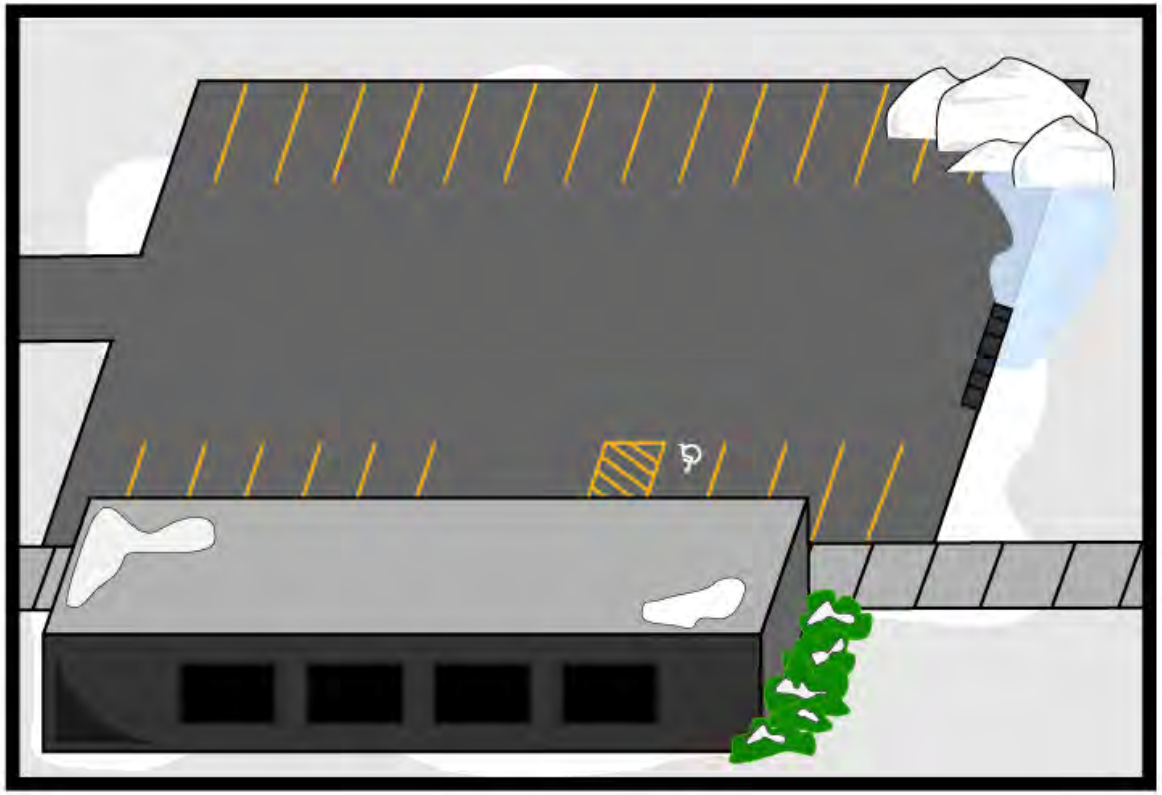
LOW SALT

Snow Storage Design 101

Avoid damming at drainage infrastructure during winter months.



HIGH SALT



LOW SALT

Snow Storage Design 101

Snow storage should not create sightline problems (and no meltwater footprint).

Snow Storage Design 101

Trees, shrubs, and snow storage do not mix.

Snow Storage Design 101

Trees, shrubs, and snow storage do not mix.

Snow Storage Design 101

Minimize obstacles for both snow storage and snow removal.

- Design street-side boulevards with less stuff in the way.
- Shift utilities/signs during reconstruction projects.

Snow Storage Design 101

Can’t push snow into lakes, rivers, & wetlands (Water of the State).

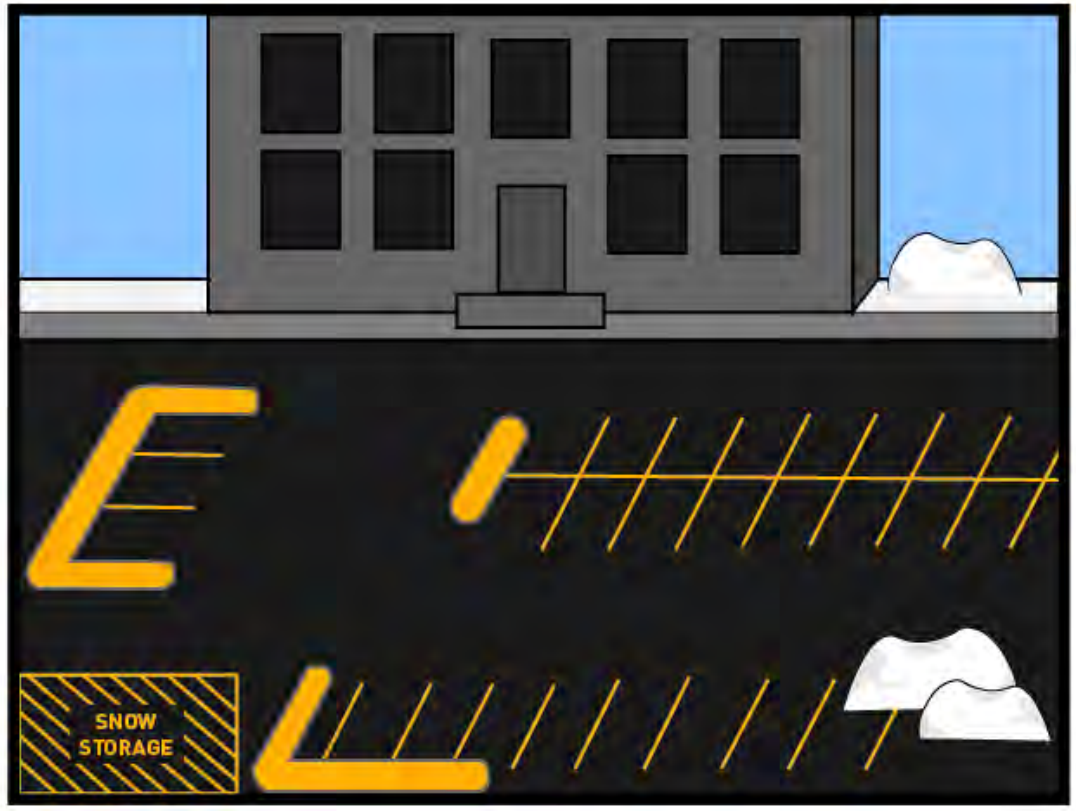
Snow Storage Design 101

Can push into rain garden or stormwater pond.

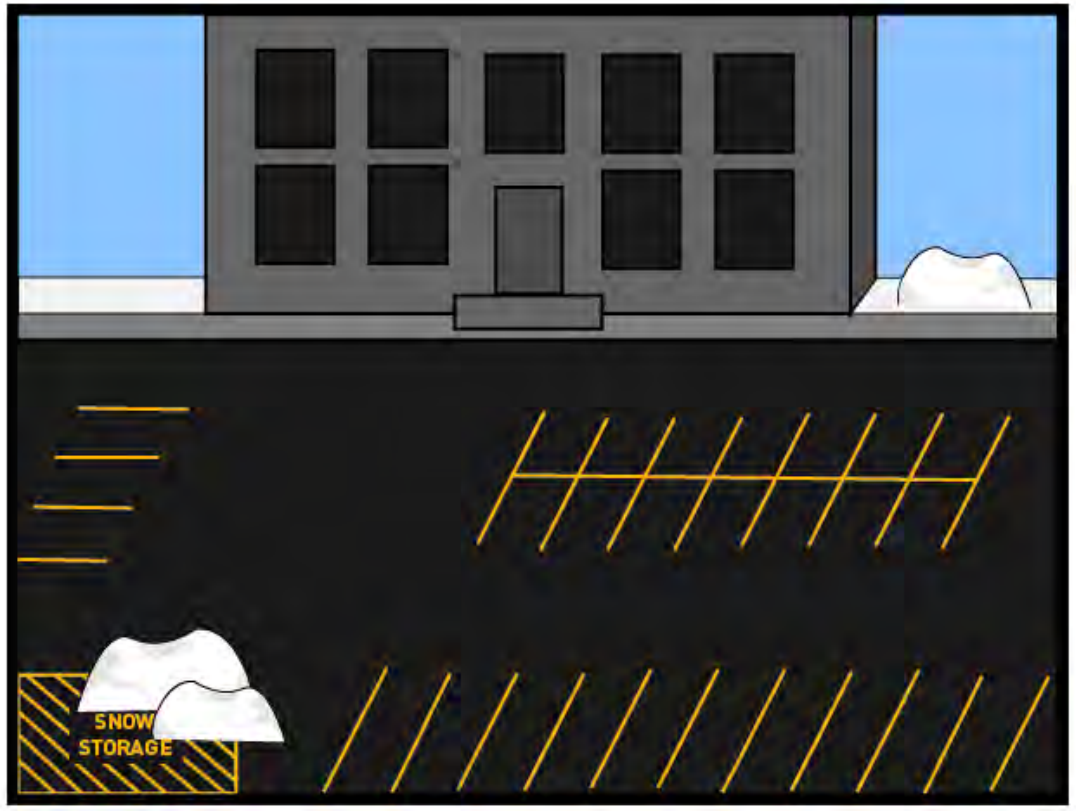
- BUT: Will pay the price in maintenance.
  - Salt damages soil & plants.
  - Snow piles are filled with debris.

Snow Storage Design 101

Make sure snow can actually be plowed to your designated storage area.



HIGH SALT

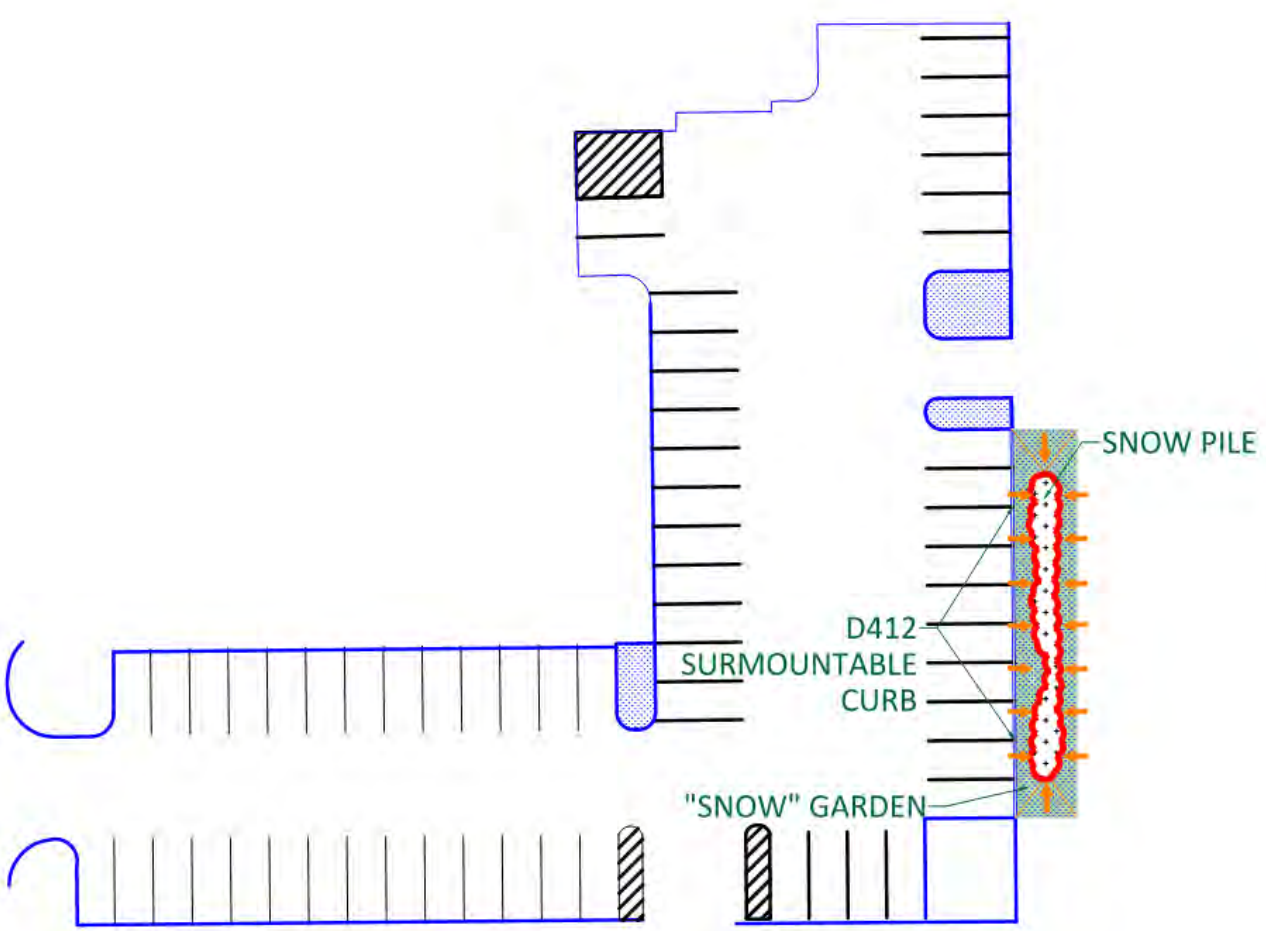


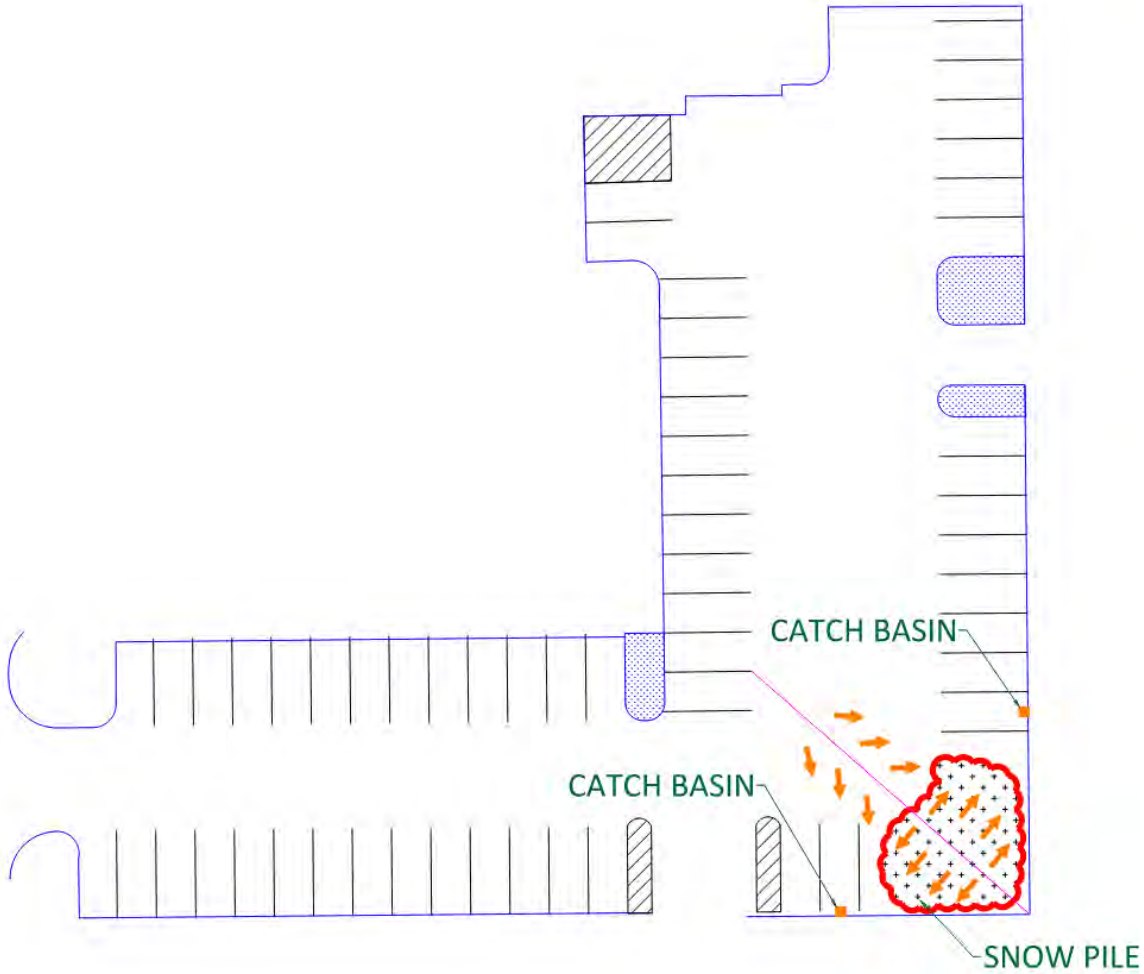
LOW SALT

Snow Storage Calculations

- Research suggests stored snow volume ~ 20-40% of initial snow volume.
  - Moisture content, compaction, temperature, volume, thaw/freeze
  - Calculate (snowfall × plowshed area) x 0.3 ~ storage volume
- Predicting footprint is tricky due to the unusual shape of snow piles.
- Efforts to predict footprint based on volume have been inconclusive, snowpack is dynamic thought the year.
- Identify approximately how much space to reserve for snow pile based on acceptable pile height and volume.
  - Equipment limitations.
  - Sight lines.

Snow Storage Calculations





Reduce Salt Through Winter Design

All cold climate designs should have designated snow storage.

- Give it as much attention as other areas of design.
- Try to achieve zero meltwater footprint.

We can improve our freshwater future!

Thank you!

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