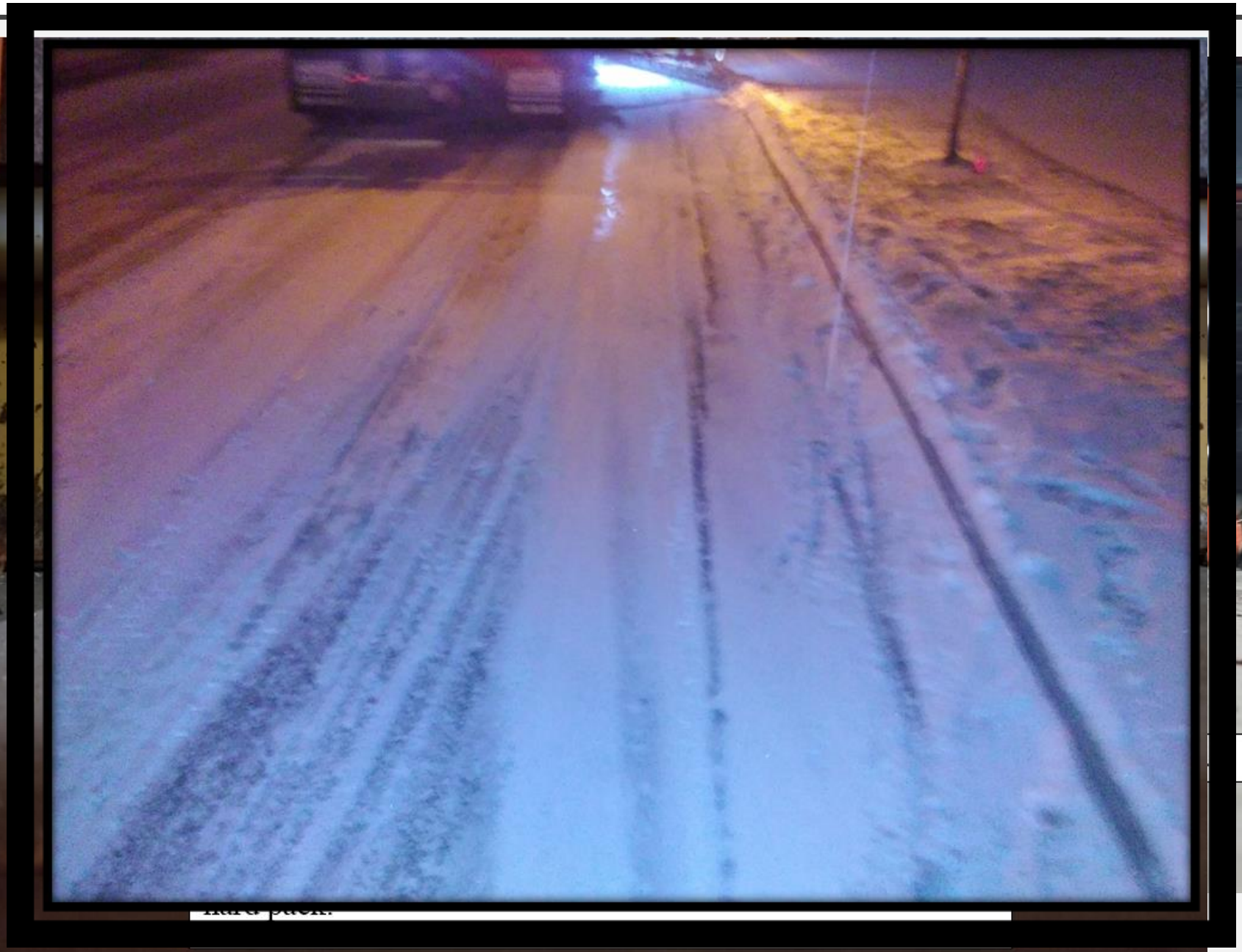
ON-STREET BIKE LANE WINTER MAINTENANCE

Winter 2019

PLOWS

How plows work on the road

HOW PLOWS WORK ON THE ROAD

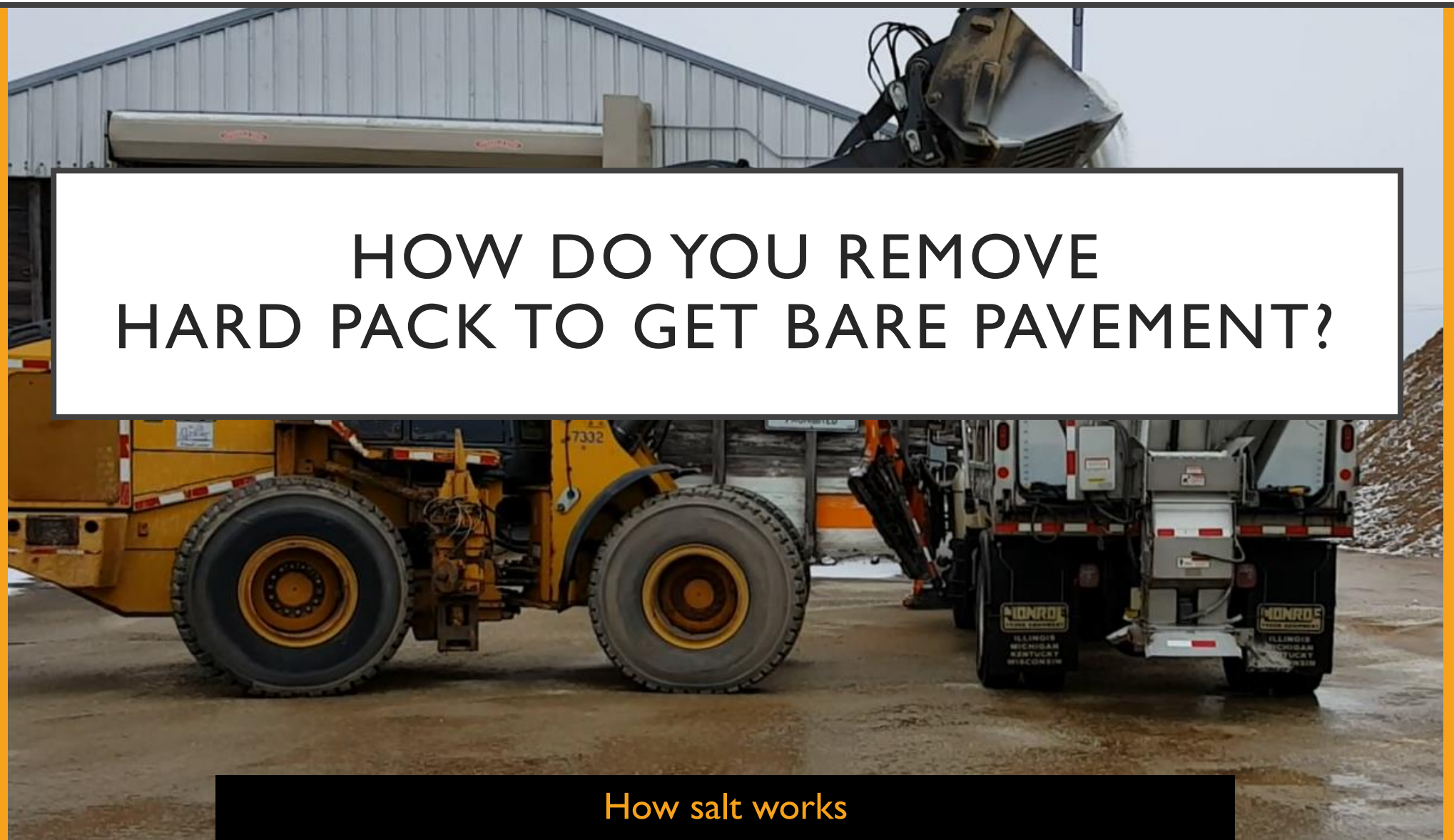


- Plows do not press down to the road surface
  - Plows push the snow forward and to the side
  - Plows "float" over the road surface

HOW PLOWS WORK ON THE ROADS

- Plows are flat. Roads are not. Creates gap between plow & road.
- Floating plow + crowned/bumpy roads = hard pack.
- Hard pack is normal.

SALT



HOW DO YOU REMOVE HARD PACK TO GET BARE PAVEMENT?

How salt works

HOW SALT WORKS IN THE ROADS

- Snow/ice absorbs salt to create the saltwater solution that triggers the melting process
- Vehicle tires crush/disperse salt & the saltwater solution – meaning it becomes spread over more roadway surface.
- Friction from vehicle tires & exhaust from vehicles also warm the traffic lanes to expedite melting.
- Still need time for snow/ice to absorb salt

THE PROBLEM:

HOW CAN WE MAKE THE BIKE LANES SNOW-FREE LIKE THE TRAFFIC LANES ON SALT ROUTES AT ROUGHLY THE SAME TIME?

BIKE LANE PILOT

NOTE:

Weather conditions dictate how paths can be maintained.

Temperature, snow depth, wind, timing of event, and many other factors play a role.

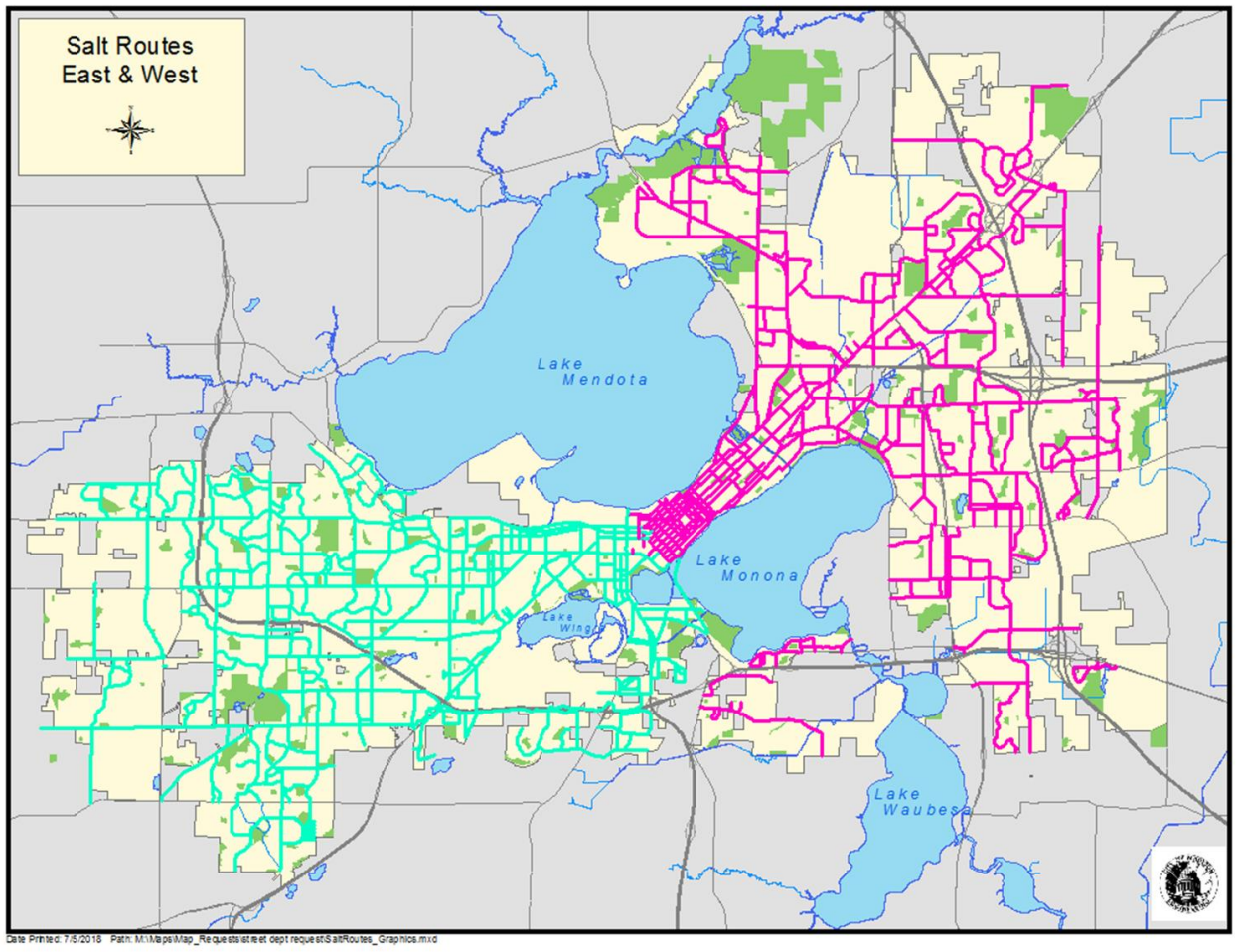
TRIAL ONE: ANTI-ICE BRINING

- On 12/11, prior to the winter event, OUTBOUND (South Park toward John Nolen Drive) bike lane was brined

- Traffic lanes and INBOUND (John Nolen Drive toward S. Park) bike lane received standard salt route operations.

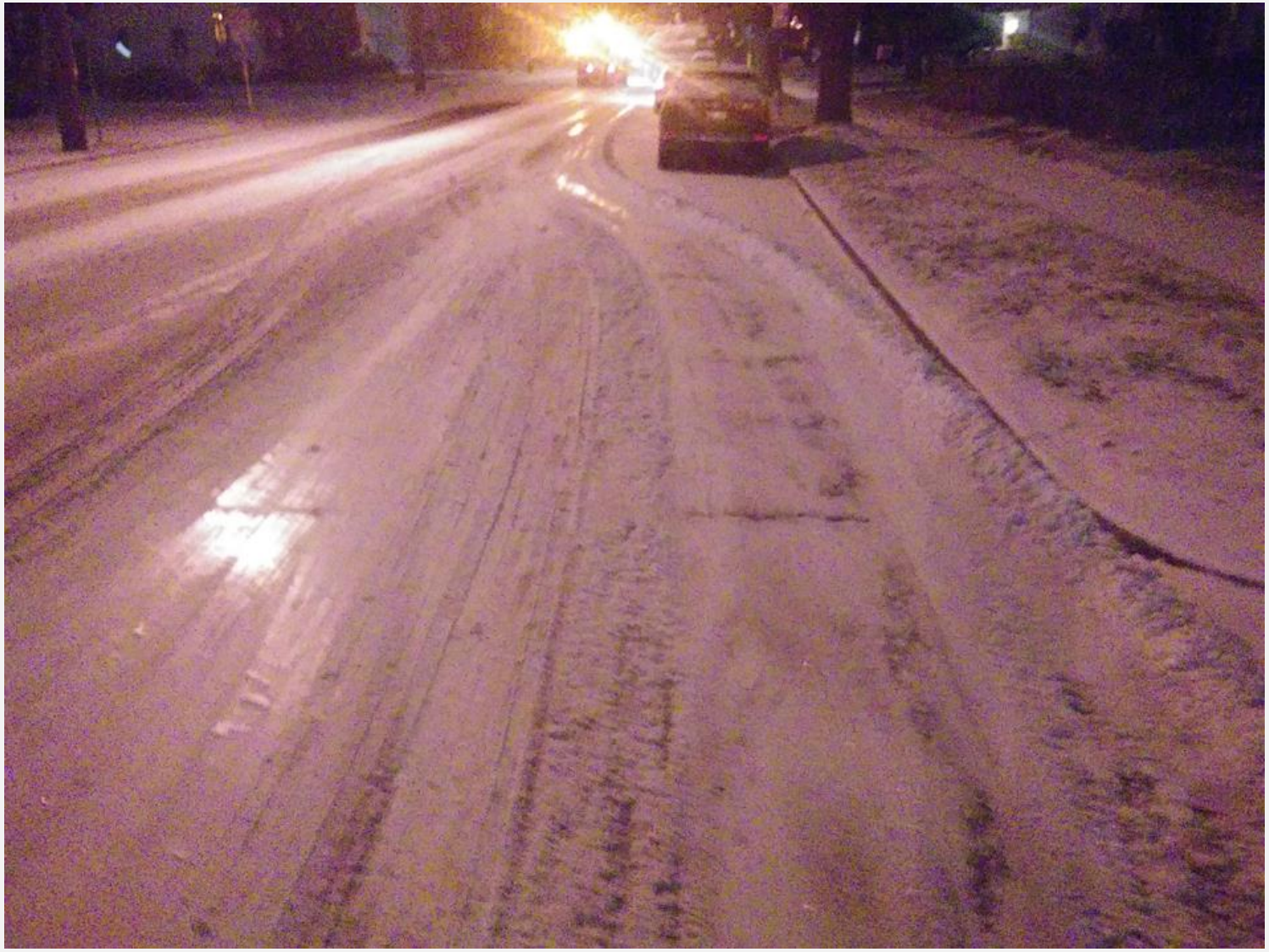
- Brine is a saltwater mixture that is 23.3% salt.
  - Used to prevent binding of snow/ice to pavement.
  - Brining only used when road temps are above 23, pavement is already bare, and forecasted storm does not begin as a rain.

WHAT ARE "STANDARD SALT ROUTE OPERATIONS"?



- When snowfall enough to leave tracks in the roadway, plow trucks are deployed to salt routes.
- Plow trucks work from the centers to the curb, pushing snow out of the traffic lanes toward the curb.
- While plowing, trucks on salt routes deploy salt to the traffic lanes at a maximum rate of 300 pounds per lane.
- 32 salt trucks deployed to cover city-maintained streets.
  - Each salt route approximately 30 miles long
  - Takes approximately 2 hours to complete one complete lap of the salt route

TRIAL ONE:
SNOW BEGINS & PLOWING/SALTING BEGINS



- During the early morning hours on December 12, normal plowing and traffic lane salting operations begin.
- Traffic lanes plowed and salted. Salt routes plowed to the curb where possible.
- Notice the pack of snow left on the road surface.

TRIAL ONE:
INITIAL RESULTS

INBOUND – S.O.P

OUTBOUND - BRINED

TRIAL ONE:
AFTER PLOW BACK

INBOUND – S.O.P

OUTBOUND – BRINED SIDE

TRIAL ONE OBSERVATIONS

- Brining did not remove all snow from bike lane like traffic lane after plowing
  - Still left hard pack
- Brining requires additional salt to be used
  - Brining uses less salt than standard salt application, but it still means more salt on the roads which means more salt in our waters.
- Salting may not help

TRIAL ONE OBSERVATION: VEHICLE TRAFFIC MAKES BARE PAVEMENT ON SALT ROUTES

BIKE LANE W/CAR TRAFFIC BEFORE FINAL CURB CUT

BIKE LANE W/O CAR TRAFFIC BEFORE FINAL CURB CUT

TRIAL ONE OBSERVATION: SALT WORKS SLOW IN ON-STREET BIKE LANES

- Insufficient traffic to create churn to disperse salt
- No pavement warming from tire friction.
- No heat/exhaust to warm the pavement.
- Crown on roads drains snow melt from traffic lane across bike lanes to gutter
- With no traffic, only relying on time to melt hard pack after plowing

TRIAL ONE OBSERVATION: PARKED CARS ALWAYS AN ISSUE

- Cars parked along Olin in front of CDA property on INBOUND (S.O.P) side of Olin.
  - This photo taken around 12pm on December 12.
  - Only area along Olin with noticeable snow in bike lane.
- Plows cannot get back to curb or too close to parked cars.

TRIAL TWO: BROOMING

Trial Two: January 2, 2019 in the afternoon.

Outbound bike lane broomed after plowing to remove slush and snow from the January 2 snow event.

Inbound bike lane received standard salt route procedure

TRIAL TWO:
BROOMING THE BIKE LANE W/O PARKED CARS (VIDEO)

TRIAL TWO:
BROOMING THE BIKE LANE W/PARKED CARS (VIDEO)

TRIAL TWO: BROOMING OBSERVATIONS

- **Results in clean, mostly bare pavement**
  - Cannot remove frozen hard pack (see photo)
- **Requires another piece of equipment on salt routes**
- **Process will be incredibly slow**
  - Brooms work at 1 to 2 MPH
  - Broom width may not cover whole lane
- **Traffic is a hazard**
  - For both the operator and passing cars
- **Throws snow & slush**
  - Can be angled away from the traffic lane, will slop onto sidewalks & parked cars
  - Will fling rocks and other road debris, too
- **Parked cars still an issue for curb access**

ANOTHER OPTION
SNOW REMOVAL

- Will reclaim bike lane space lost to parked cars
- Hard pack of snow will remain in lane
- Takes multiple days to perform
  - Must post no parking notices 48 hours in advance of snow removal operations
  - Ticket and tow scofflaws also takes time
- Very slow and takes multiple operators & vehicles
  - One loader, plus multiple haul trucks.
  - Difficult to gauge time estimate to clear all bike lanes that are obstructed with parking

CONSIDER THE SIZE OF THE NETWORK

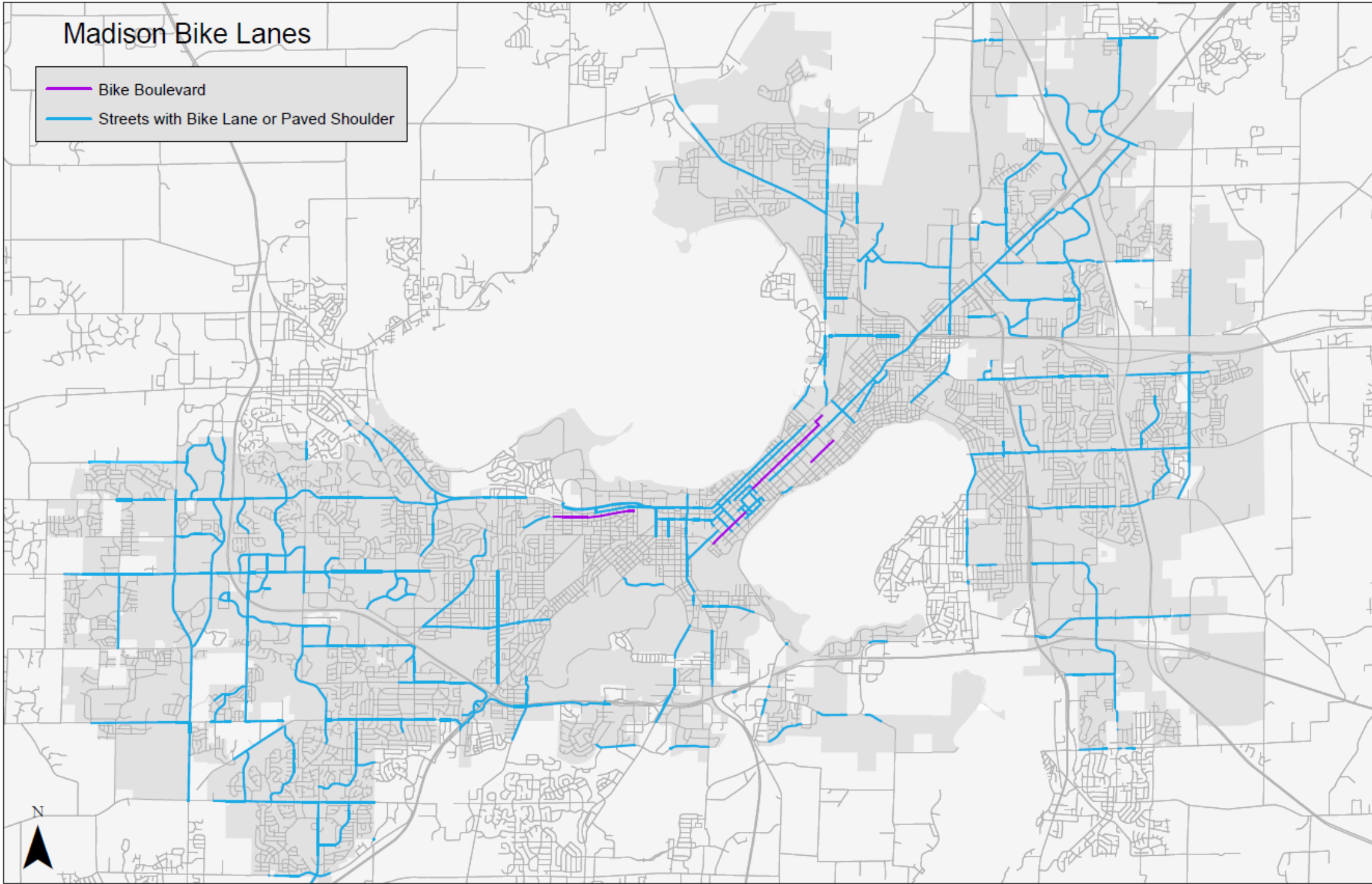
Approximately185 miles* of street with bike lanes

Mileage above is "center-line miles" only.

Does not account for streets with bike lanes on both sides of the road – like Olin.

Number above may underestimate the mileage that needs to be cleared.

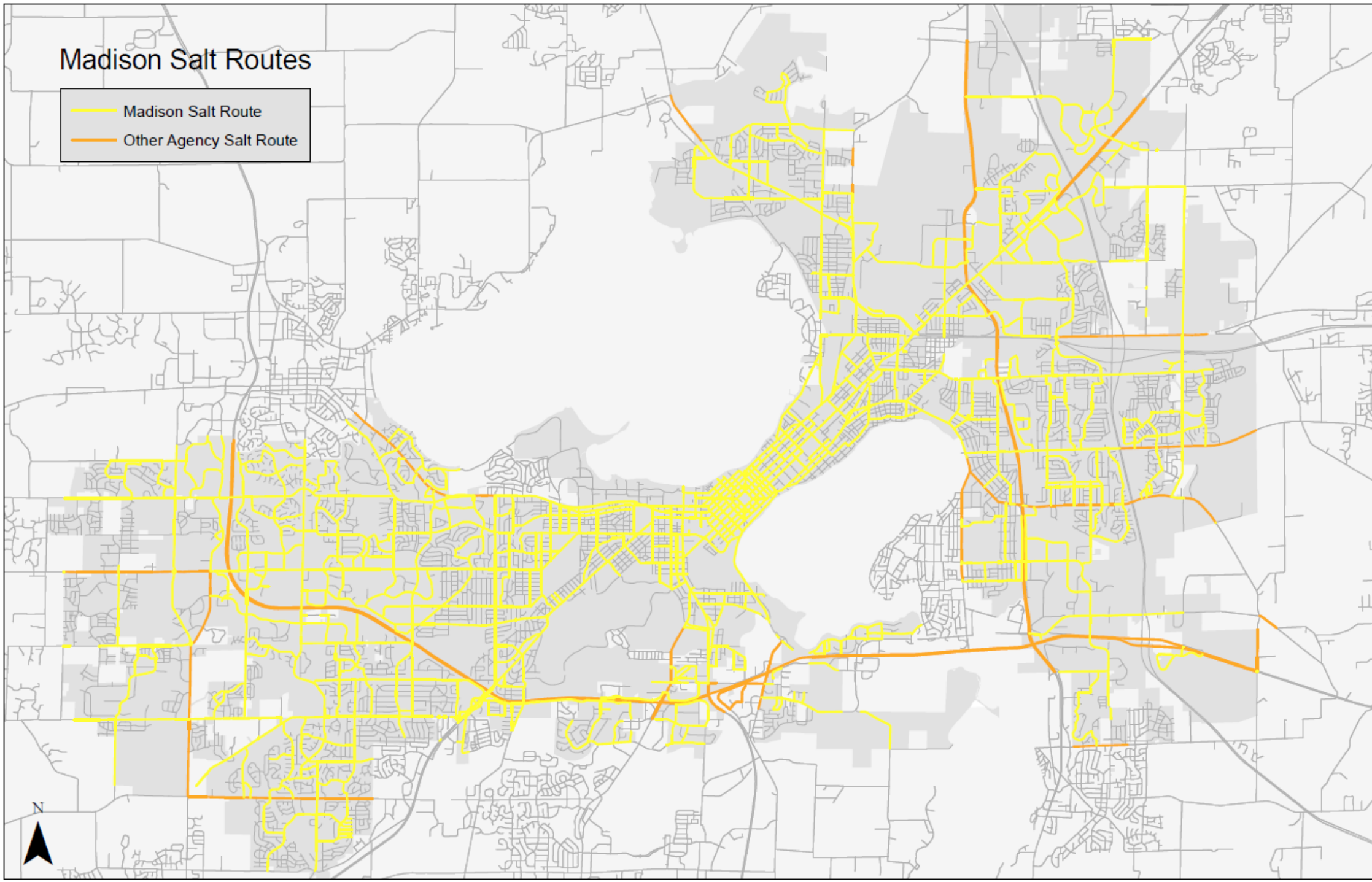
*Bike lane mileage from Traffic Engineering. The number includes mileage not shown on this map because it lies outside city limits, such as bike lanes on the UW Campus



STREETS DIVISION SALT ROUTES

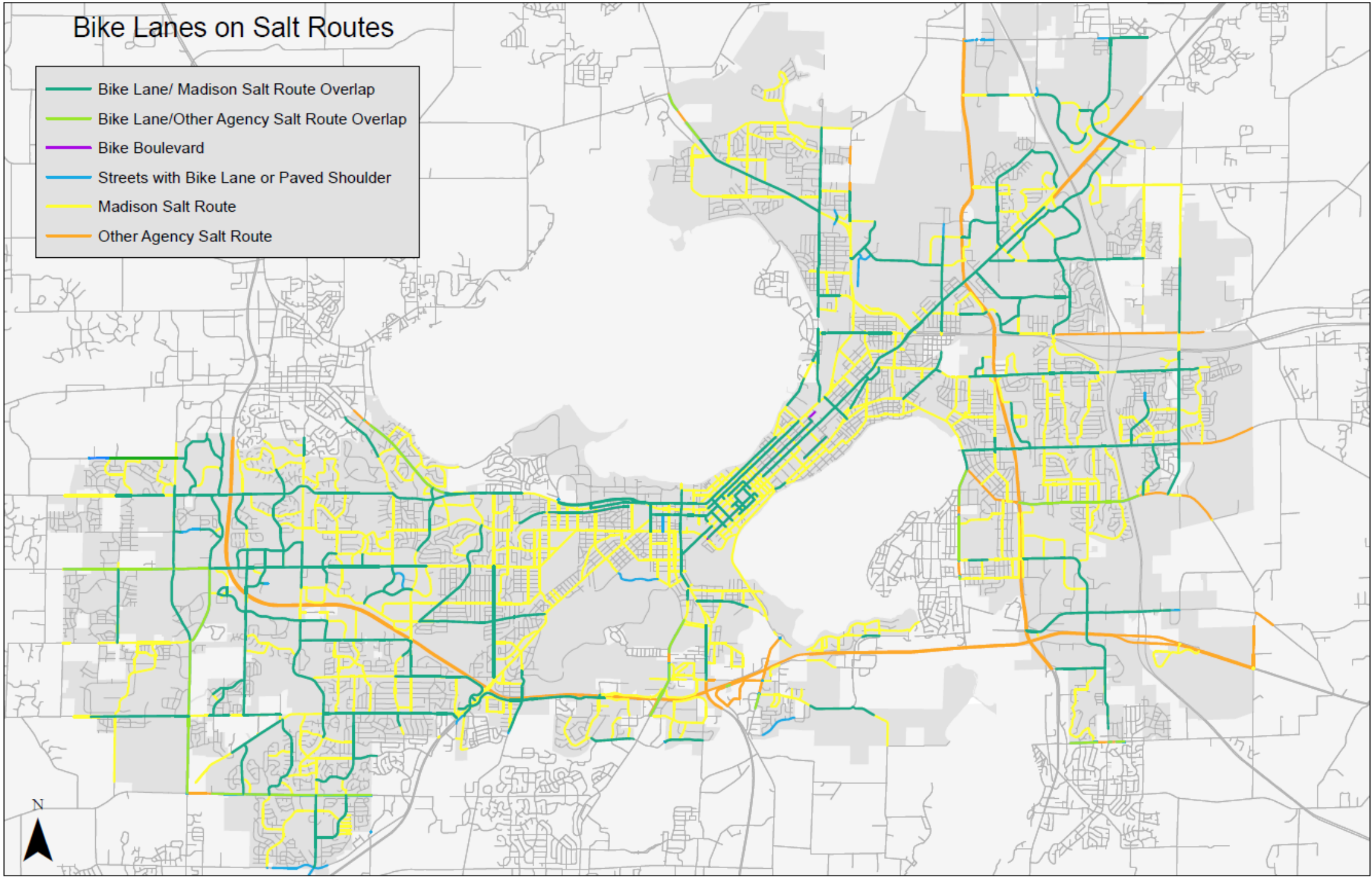
Streets Division covers 900 lane miles on salt routes.

Some on-street bike facilities exist on county-salted lanes (i.e. Monona Drive)



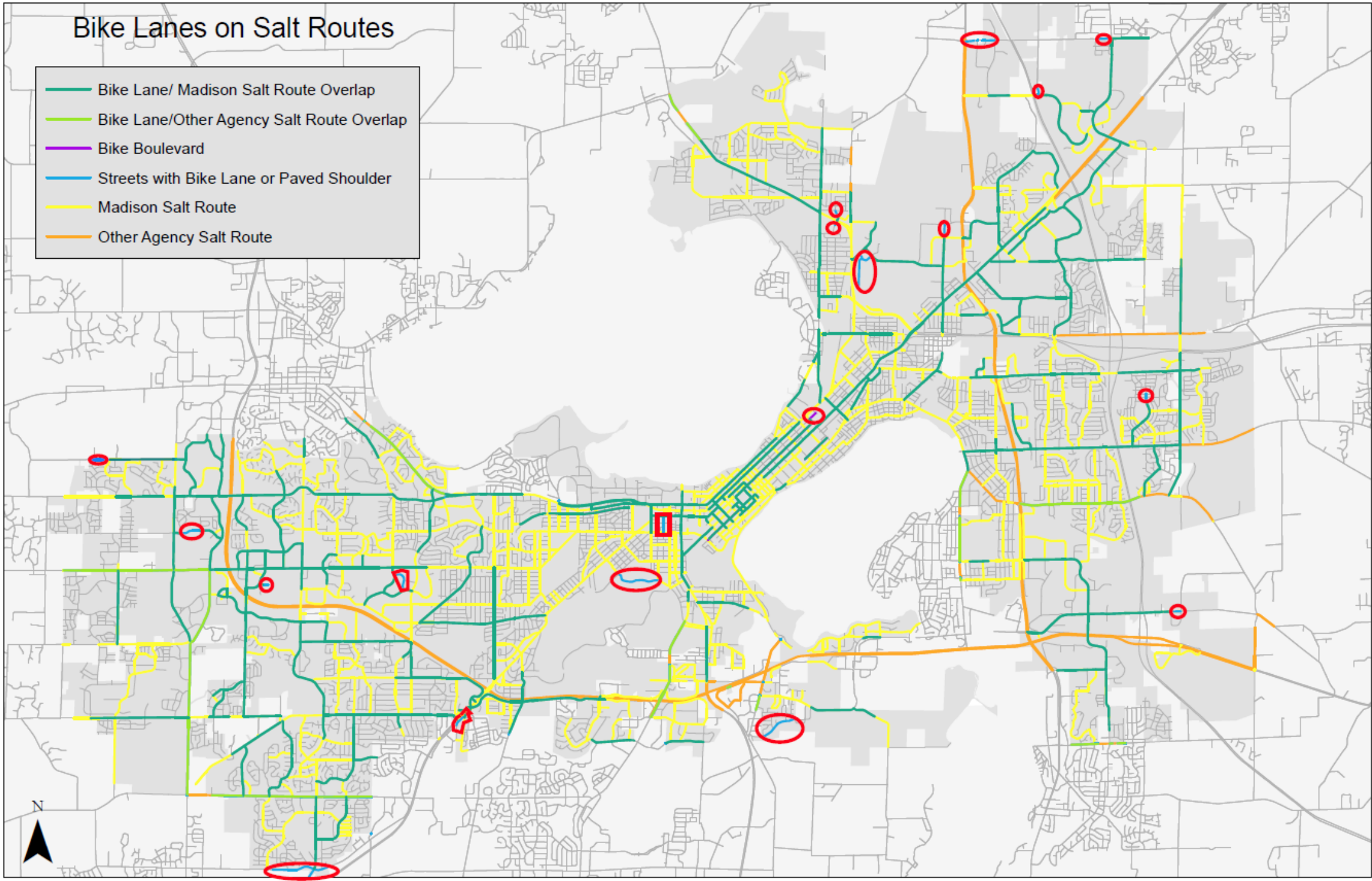
BIKE LANE/SALT ROUTE OVERLAP

Substantial overlap between salt route network and existing on-street bike lanes



BIKE LANE GAPS

Red circles are the areas of on-street or paved shoulder bike lane not covered by city or other agency salt routes.



DISCUSSION:

CITYWIDE PLOWING
DECEMBER 31 – JANUARY 1

Photos to follow were taken at 11:00a.m. on January 1.

This would be 11 hours after the start of the citywide plowing operation.

PAVEMENT BARE WHERE THERE IS SALT AND FREQUENT VEHICLE TRAVEL

NOTICE THE TIRE TRACKS THROUGH THE SLUSH

VEHICLE TRAFFIC MAKES A SIGNIFICANT DIFFERENCE

PARKED CARS PREVENT CLEARER BIKE LANES

CAN TAKE MULTIPLE DAYS TO CORRECT – IF WEATHER ALLOWS

NEED 2 SIMULTANEOUS THINGS TO PLOW/CLEAR A BIKE LANE:

1. PERSONNEL
2. ACCESS

EVEN WITH PERSONNEL AND ACCESS

STILL NEED SALT, TIME, TEMPERATURES, AND VEHICLE TRAFFIC FOR BARE PAVEMENT

QUESTIONS?