

# LTAP 2016 MICHIGAN WINTER OPERATIONS CONFERENCE

*BRINE PRODUCTION PANEL DISCUSSION*

October 18 & 19, 2016



# FH's History

- 33 sq. miles
- Major Roads - 170 lane-miles
- Local Rds - 526 lane-miles (44 LM gravel)
- 6 Major Rd snow routes (approx. 28 LM ea)
- 5,500 tons of salt annual avg.

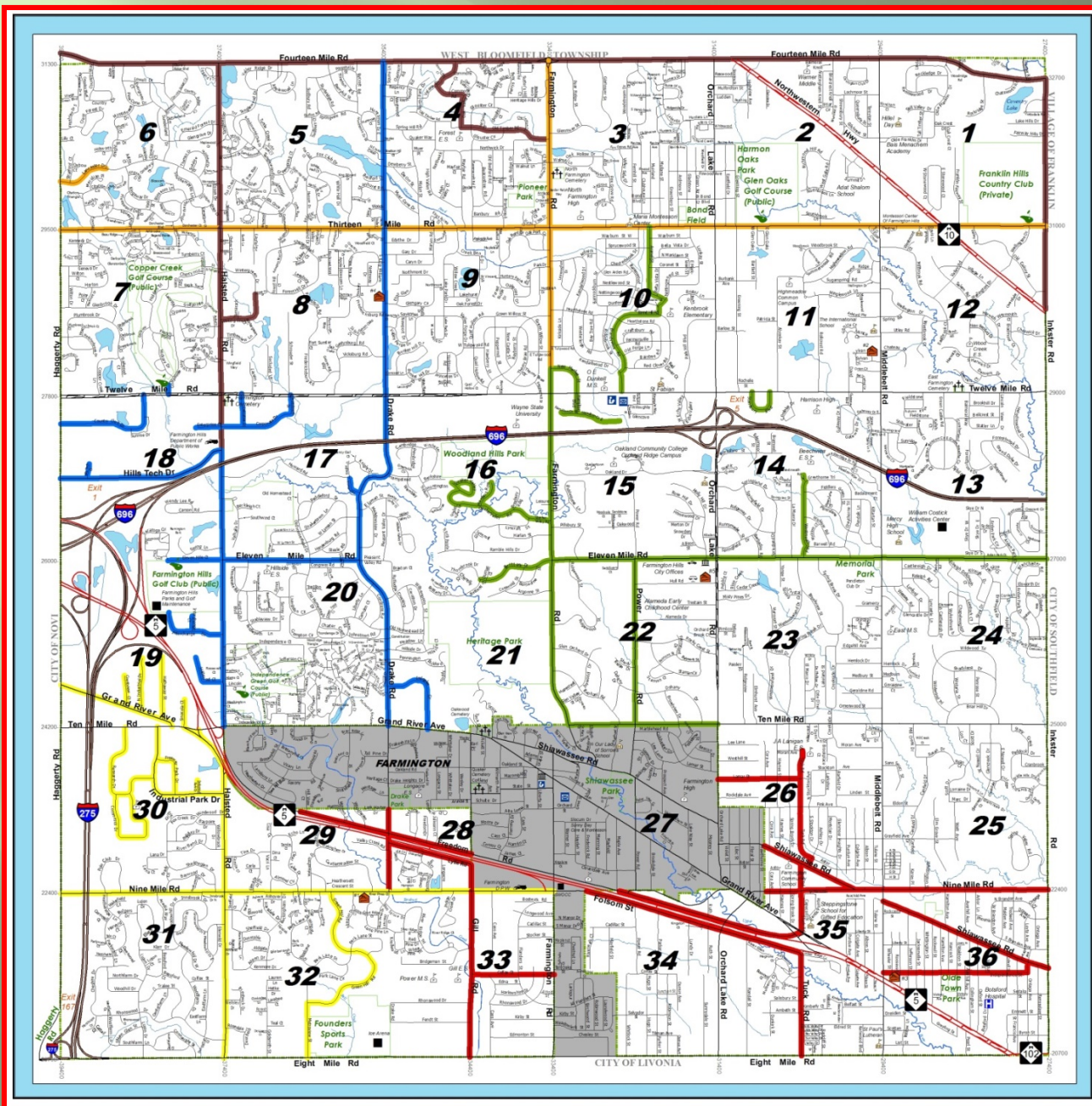


# FH's History



- Began using Brine & Blends '05-'06 ( Wixom)
- Anti-ice, Pre-wet, Direct Liq. Application
- 9,000 gal to anti-ice majors per application





# FH's Road Network

# The Old



- 800 gal/hr. (12-15 hrs. to recover from anti-icing)
- Fully manual operation & cleanout
- 1 fill point (2,600 gal/hr.)
- Stop operation to clean or truck fill
- Blend in 1- 3,000 gal tank and transfer

# The Old



- Salometer: Used for traditional measurements.
- Refractometer: Used for more accurate salinity, which automatically accounts for temperature, air bubbles and calibration which improves productivity. 2 functions- Saturation & Temp.



# The Old





# The Old

- 3,000 gal storage for anti-icing fluid
- 9,000 gal storage (6,000 outside)
- Issues with elements
- Draining & De-Icing Containment Tub
- Looking for ways to improve
- Blending in one tank, limiting options



# Here Comes the Water Tower



- 3 Million Gallons
- 207 ft. tall
- Loss of 1,200 tons of salt storage
- Loss of covered off-season storage
- Construction = Disruption of operations
- 30 in. water main cutting through the site



# 10,000 SQ FT ADDITION



# An Opportunity Not a Problem

## “Our Dream on a Napkin”

- Additional indoor/covered liquid storage capacity
- Improve production
- Covered equipment storage
- Increase our fill points



# The New

- 4,400 SF Secondary containment
- Off-season equipment storage



# The New



- 12,000 gal storage for anti-icing fluid
- 30,500 gal of brine storage
- 72,000 gallons total storage
- Blend *at* the fill points (Parks Div.) 3 products



# The New

- Log of vehicle, user and product or blend
- Interior Salt bin
- Plumb all fixtures @ 3" from 2" to fill and blend more efficiently



# The New



- 4,000 gal/hr.  
(7,000 gal/hr.  
\*\*test equip.)
- Automated
  - Tests salinity
  - Transfers to storage
  - Pings phones when needs salt



# The New



- 3 fill points (10,000 gal/hr. each)
- Concurrent fill 3 trucks and produce brine
- Stop operation only to clean (\*\*)
- Remote monitoring, operation & adjust blends



# The New

- Hardened floor
  - Fiberglass Entryway Doors
  - Aluminum Coiling Overhead Doors
  - Hot dipped galvanized / painted roof support system
  - Corrosion resistant roof decking
  - Heated!
- 
- Site Work Included:
    - Curb & Gutter, concrete & asphalt surfaces
    - Storm sewer, storm water separator
    - Material storage bldg.

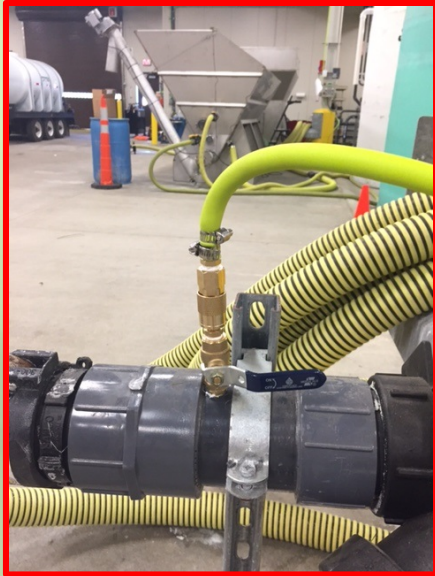


# Funding & Construction

- Winter Maintenance Addition aka Cold Storage Addition – Fishbeck, Thompson, Carr & Hubler, Inc.
  - Integrated Design & Construction Mgt Project
    - Contractors work as subs for FTC&H
  - \$1,600,000 construction cost
  - Funded through water & sewer fund
  - WRC bonded the Water Tower project phases
  - Addition started mid-May 2015, completed mid-October 2015
  - Re-design of plumbing due to new brine system
    - New Brine System \$180,000
- Site work – OHM Advisors.
  - Drainage, curbing, fabric bldg, pavement & **CMATC**



# The New & Improved



- Air Purge of Fill Lines
- Additional Strainers and Filters
- Clear Piping
- Flexible sight tubes



# Production & Application Costs



| <b>Brine Cost - Winter 16/17</b>                        |             |              |                |
|---------------------------------------------------------|-------------|--------------|----------------|
| <u>Unit Costs</u>                                       |             |              |                |
|                                                         | \$/1000 cft | gal/cft      | \$/gal         |
| Water                                                   | \$36.43     | 7.48         | \$0.005        |
|                                                         | \$/ton      | gal/ton      | \$/gal         |
| Salt                                                    | \$58.61     | 900          | \$0.065        |
|                                                         | \$/gal      | \$/gal (15%) | \$/gal (20%)   |
| Beet                                                    | \$1.38      | \$0.21       | \$0.28         |
|                                                         |             |              | \$/gal (32%)   |
| Liq Calc. Chloride                                      |             |              | \$0.63         |
|                                                         | \$/hr       | gal/hr       | \$/gal         |
| Labor                                                   | \$44.73     | 5000         | \$0.002        |
| Operator 2 - loaded                                     |             |              |                |
| <u>Pure Brine Cost</u>                                  |             |              |                |
|                                                         |             |              | \$/gal         |
|                                                         |             |              | \$0.07         |
| <u>85/15 Blended Brine</u>                              |             |              |                |
|                                                         |             |              | \$/gal         |
|                                                         |             |              | \$0.27         |
| <u>80/20 Blended Brine</u>                              |             |              |                |
|                                                         |             |              | \$/gal         |
|                                                         |             |              | \$0.33         |
| <u>Cost per 1 Application 85/15</u>                     |             |              |                |
| 5 Hours, 3 Operators, #221, #223, #224, #267T, 9000 gal |             |              |                |
| #221/hr                                                 | \$103.89    |              |                |
| #223/hr                                                 | \$103.89    |              |                |
| #224/hr                                                 | \$60.46     |              |                |
| #261T/hr                                                | \$27.65     |              |                |
| \$/hr                                                   | \$295.89    |              |                |
|                                                         |             |              | \$/Application |
|                                                         |             |              | \$4,565.95     |



# Benefits

- More brine = more uses
  - Pre-wetting
  - Anti-Icing
  - Direct Liquid application
  - Parks Div. (Sidewalks & Parking lots )
- More storage = larger quantity of additives to purchase at lower cost
  - Dust control too during the summer
- Quicker truck fill = more time on the road



# Benefits

- More brine uses = reduced annual granular salt use (30% - 50%)
  - High years before liquid 12,000 tons/yr.
  - 2013 snow-mageddon only 6,400 tons
  - Avg. annual use about 5,500 tons
- Production of 100,000 gallons of brine/yr. to 1,000,000 gal. of brine last year.
- Longevity of equipment due to inside storage



# QUESTIONS?



# Contact Information

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