Illinois Tollway – Materials Update

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Recycling Will Continue to Grow

Fractionated RAP (FRAP)

Recycled Asphalt Shingles (RAS)

“Selling” FRAP

Dr. Don Brock

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2007 FRAP Research Goals and Results

- ✓ Quality control maintained
- ✓ Retain long-term performance at lower costs
- Fatigue and Dynamic Modulus analysis
  - ✗ Are mix properties compromised with higher RAP?
    - How soft for the PG? (64-22? vs. 58-22 vs. 58-28)

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2011 – 2013 FRAP Research with Concrete

- Durability of concrete using Tollway FRAP will be adequate for composite pavement applications
- Durability of concrete using IDOT FRAP is currently being studied

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Tollway RAS Research

- Collaborative effort
  - Illinois Environmental Protection Agency
  - U.S. Environmental Protection Agency
  - RAS FHWA Pooled Fund
- Field production tests
- Research results

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IDOT RAS Research

Tollway Asphalt Binder Replacement

- SMA – 40 percent
- Shoulder Surface – 40 percent
- Shoulder Binder – 50 percent
- Asphalt Subbase – 65 percent

Tollway WMA - 2012

- 762,000+ total tons
- SMA mainline
  - 304,000 tons
- N50 Shoulder Binder
  - 204,000 tons
- N70 Shoulder Surface
  - 210,000 tons
- Stabilized Subbase
  - 8,400 tons

Tollway WMA - 2012

- 10 different plants
- 2 used chemicals
  - Evotherm (4)
  - Rediset LQ (3)
- 3 used water injection
  - ASTEC (1)
  - MAXAM AQUABlack (1)
  - Stansteel Accu-Shear (1)

Tollway WMA - 2012

- High recycle in Tollway WMA:
- SMA
  - All used RAS (2 GTR, 7 SBS)
  - ABR – 31 to 38%
- Shoulder Binder and Surface
  - ≈ Half used RAS
  - Binder ABR – 33 to 50%
  - Surface ABR – 30 to 40%
- Stabilized Subbase
  - Both used RAS; both had 64% ABR
  - RAS needs higher temperature

WMA Lessons Learned

- Mix temperature ranges
  - Mix type
    - Shoulder mixes and moderate RAP: 250 - 270F
    - Shoulder mixes with RAS: 280 – 300 F
    - SMA with RAS: 280 – 320F
  - Plant and personnel
  - Weather (night, day, summer, fall)

WMA Lessons Learned

- Contractor Learning Curve – some: steep
- All technologies “performed” effectively
- Industry-wide: plant operations need reviewing to fully implement WMA
  - Flighting, air flow – for both WMA and high recycle
  - Combination of high recycle and lower temperatures
  - Stress on motors from stiff mixes (SMA + RAS + modified PG)

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WMA – Moving Forward

- Contractor
  - Personnel need to become comfortable with the practice
  - Plant “optimization” to incorporate WMA and high recycle
  - Investigation of benefits
    - Lower energy
    - Compaction aid

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WMA – Moving Forward

- Suppliers
  - WMA processes have to be made more compatible with RAS containing mixes to make the materials more workable at lower temperatures

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WMA – Moving Forward

- Agencies
  - Proven to improve performance
  - Better definition of “Warm Mix” needed
    - Temperature only?
    - Simply “use of the technology” ?
    - Mix variables (RAP, RAS, modified PG)
  - Combination of Warm Mix and RAS
    - Minimum temperature needed for RAS?
    - RAS + Rejuvenators?

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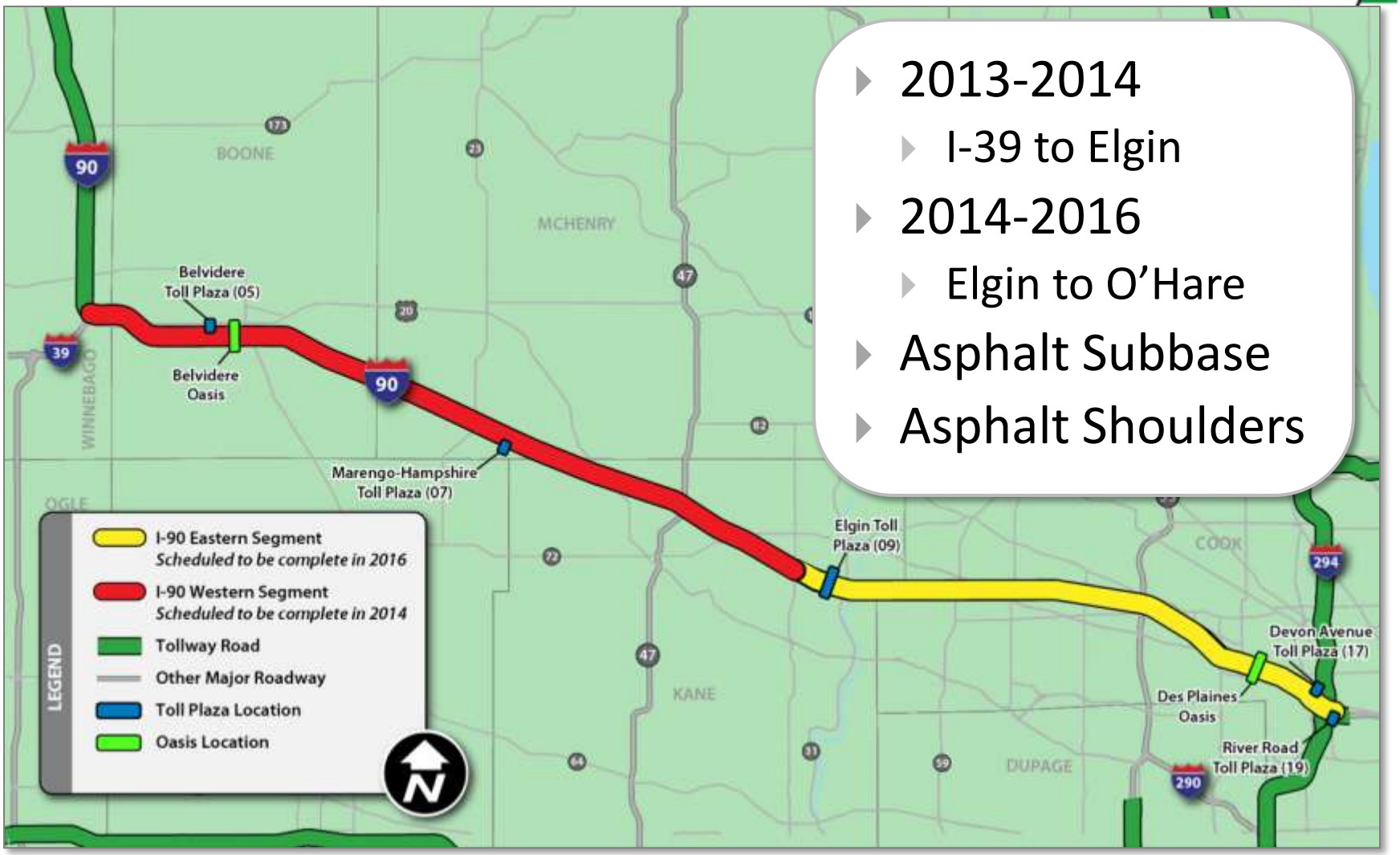
Tollway Reconstruction: I-90



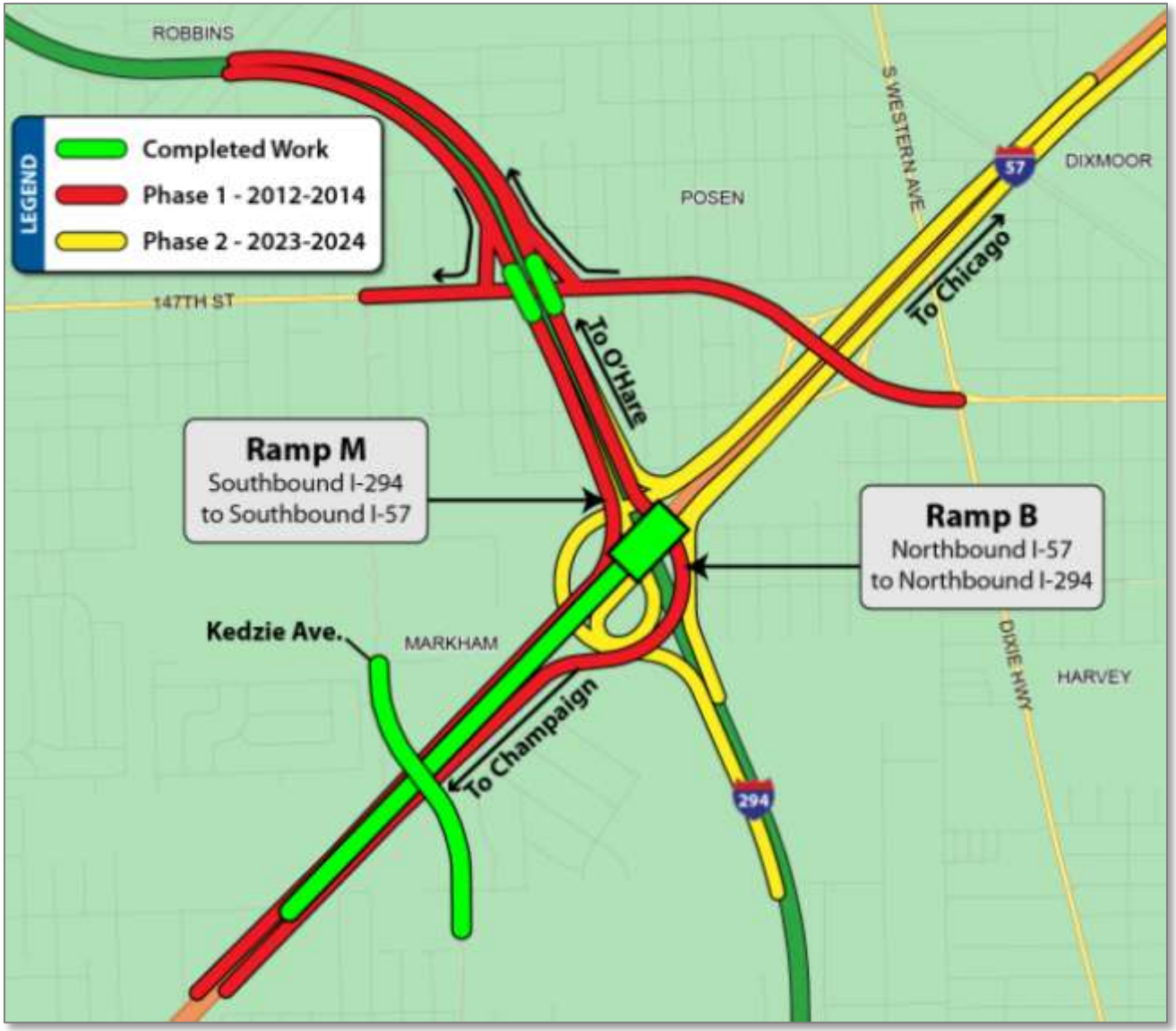
- 2013-2014
  - I-39 to Elgin
- 2014-2016
  - Elgin to O'Hare
- Asphalt Subbase
- Asphalt Shoulders

2013 Veterans Memorial (I-355) Rehabilitation

- Between I-55 and 83rd Street
- Collector and distributor roads at Butterfield Road
- Mainline roadway in both directions between Army Trail Road and Fullerton Avenue

Elgin O'Hare Western Access

Tri-State Tollway (I-294)/I-57 Interchange



NAPA Environmental Leadership Award

THANK YOU