Distribution Valve Spacing

2019 MPSC Safety Conference

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Agenda

- Code Requirements
  - 192.181
- Distribution System Considerations
  - Number of Customers
  - Valve Maintenance Considerations
  - System Reliability
- DTE Gas Standards
  - Steel Systems
  - Plastic Systems
- Valve Spacing in DTE's Main Renewal Design Process
  - "Valve Zones"

Code Requirements

Part 192.181

(a) “Each high-pressure distribution system must have valves spaced so as to reduce the time to shut down a section of main in an emergency. The valve spacing is determined by the operating pressure, the size of the mains, and the local physical conditions”

Key considerations

- Time to Isolate
- Operating Pressure
- Size of Mains
- Local Physical Conditions

Distribution System Considerations

Other Distribution system emergency valve spacing considerations:

- Consider the number of customers isolated
  - Manpower availability for purging/relights will impact the time that customers will be affected by outage

  - Customers without gas in cold weather
  - Discuss with Operations SMEs
    - Crew availability may vary by region

- Valve maintenance considerations
  - Balanced number of valves
- System reliability
  - Maintain reliable service to customers outside isolated area during peak conditions

DTE Gas Design Standards

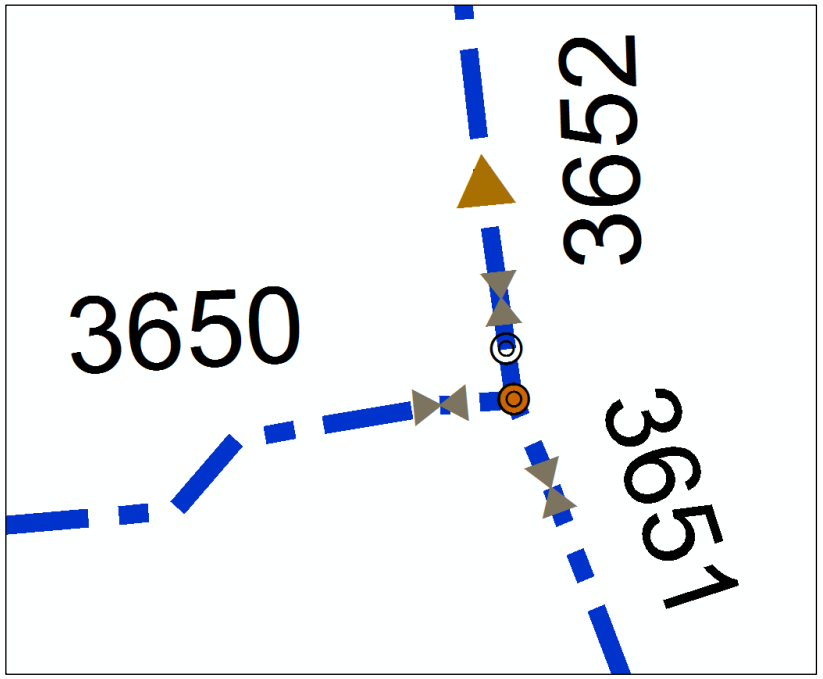
DTS 101A – Design of Distribution Piping Systems

- Steel systems ≤ 60 psig and Plastic Systems
  - May not solely rely on pinch-off of plastic mains
  - Sectionalizing valve(s) shall be specified for main extension or replacement projects that:
    - Supply > 2,000 customers
    - Connect mains which render existing valves ineffective
    - Connect systems supplied by more than one pressure regulating station

DTE Gas Design Standards

DTS 101A – Design of Distribution Piping Systems

- Steel systems > 60 psig
  - Every point on system must be within 5 miles of a valve
  - Valves installed at each branch location
- Additional considerations for high impact customers, major crossings, pipelines with limited access (depth, hard surface), permit requirements



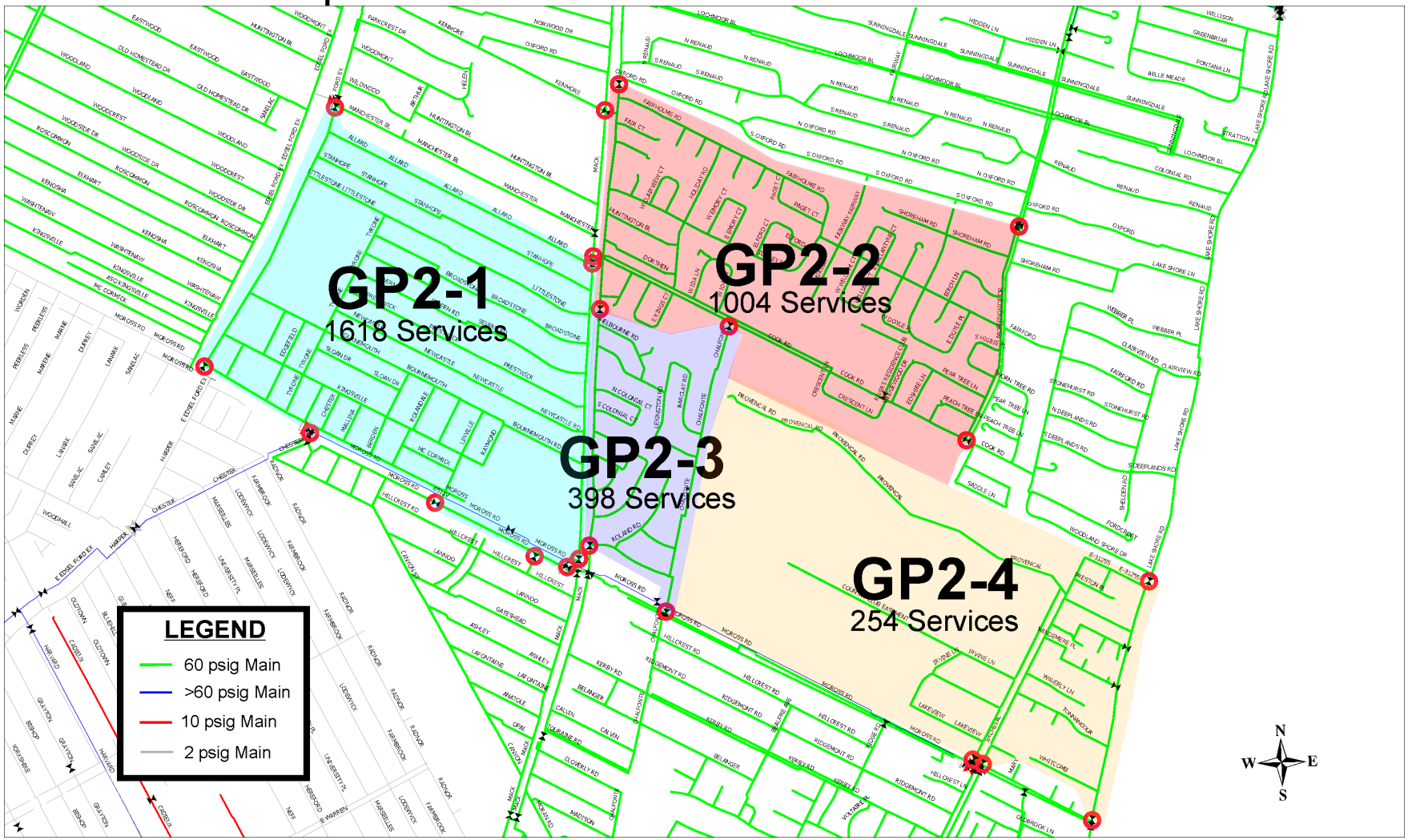
Valve Spacing in DTE's Main Renewal Design Process

Main Renewal Design Process

- 18 year plan includes replacing the 2, 5, and 10 psig cast iron systems in the Detroit area with 60 psig plastic grids
- Unique opportunity to redesign entire system
  - Developed "Valve Zone" guidelines that are aligned with our design standards for the design of the new 60 psig plastic distribution system
    - <2000 customers per zone
    - Design system with redundancy to ensure reliable system operation with valve zone isolation under peak conditions
    - Optimize number of valves to reduce time to isolate

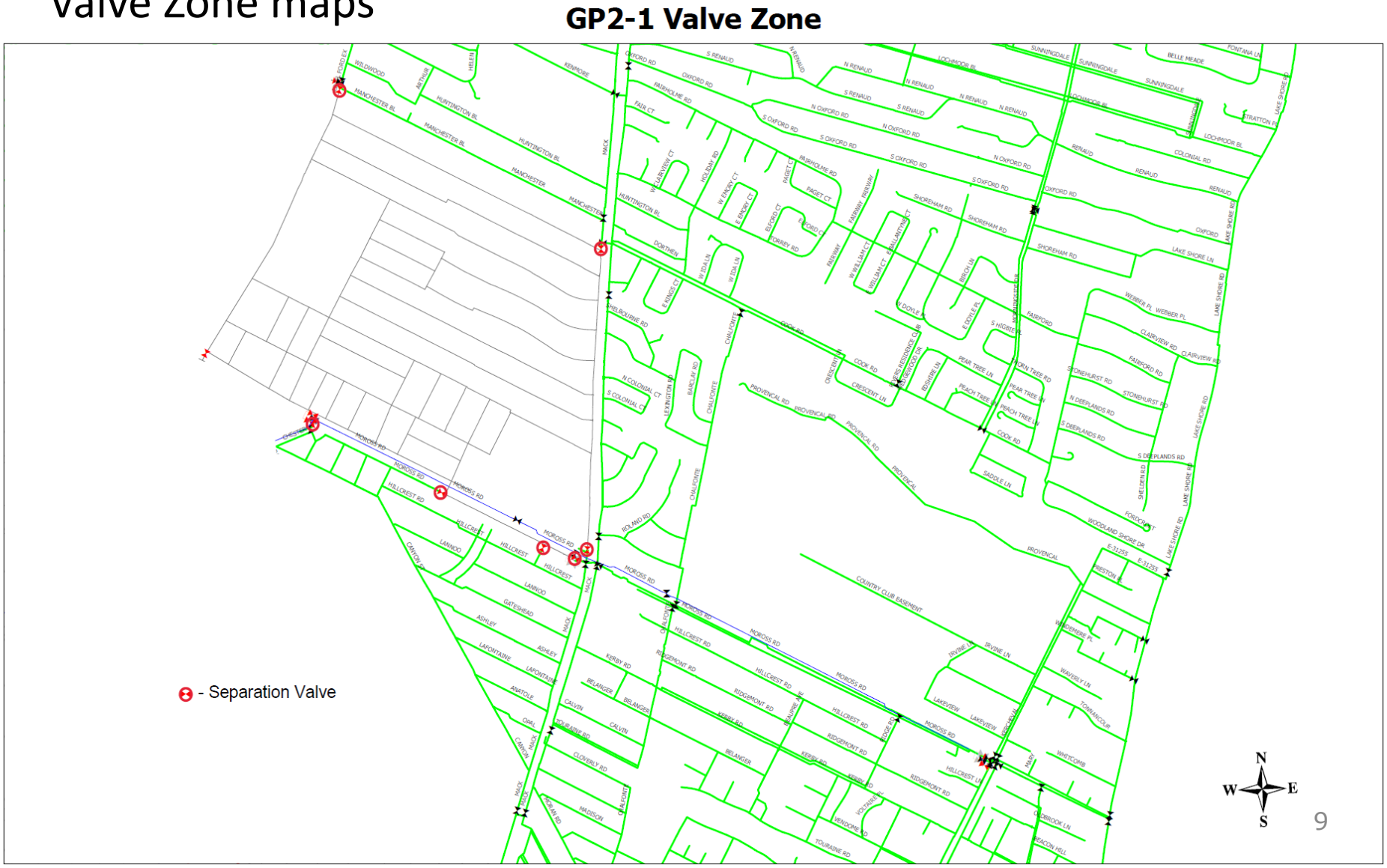
Valve Spacing in DTE's Main Renewal Design Process

Valve Zone maps



Hydraulic modeling of each isolated valve zone under peak design conditions ensures system reliability

Valve Zone maps



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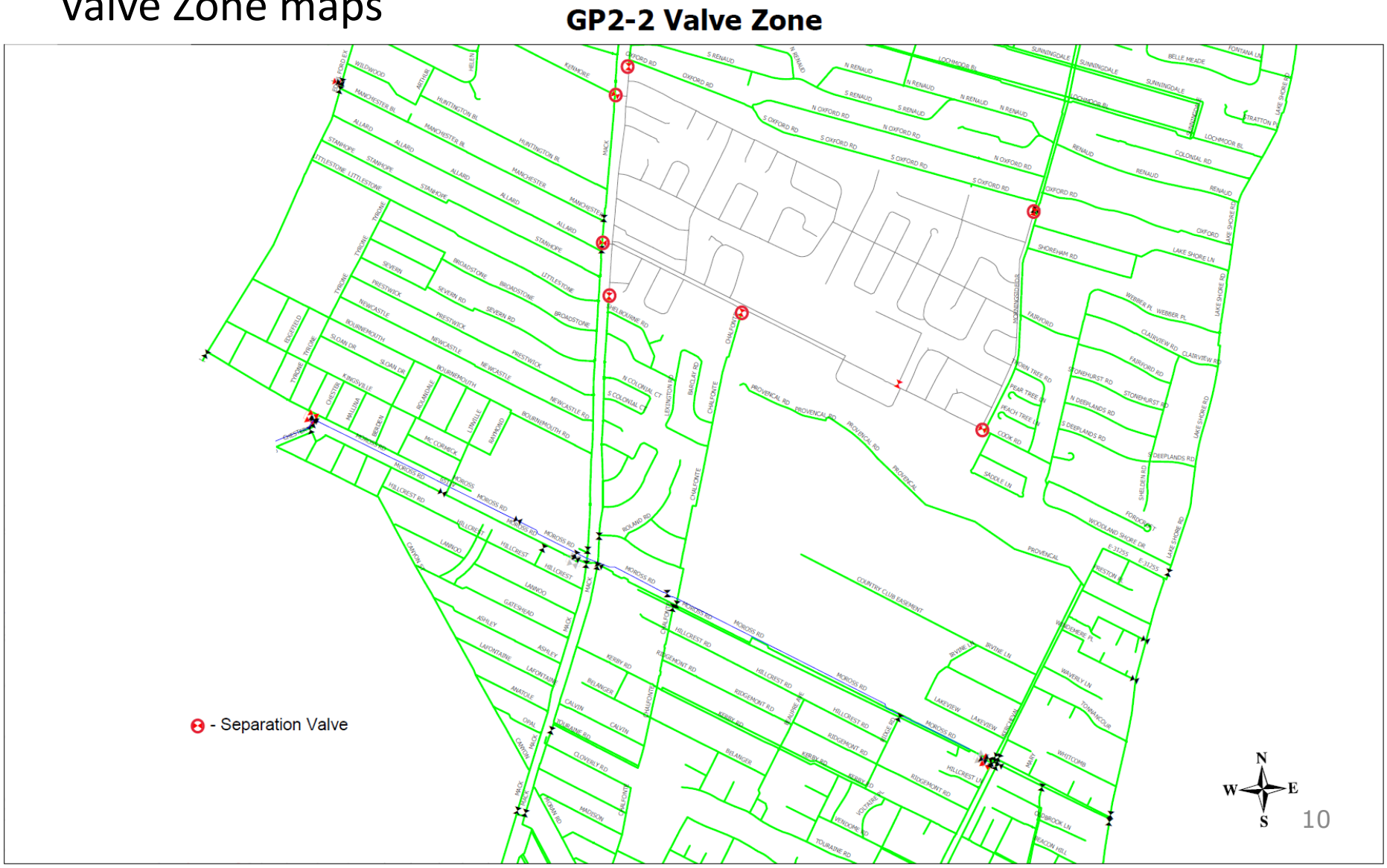

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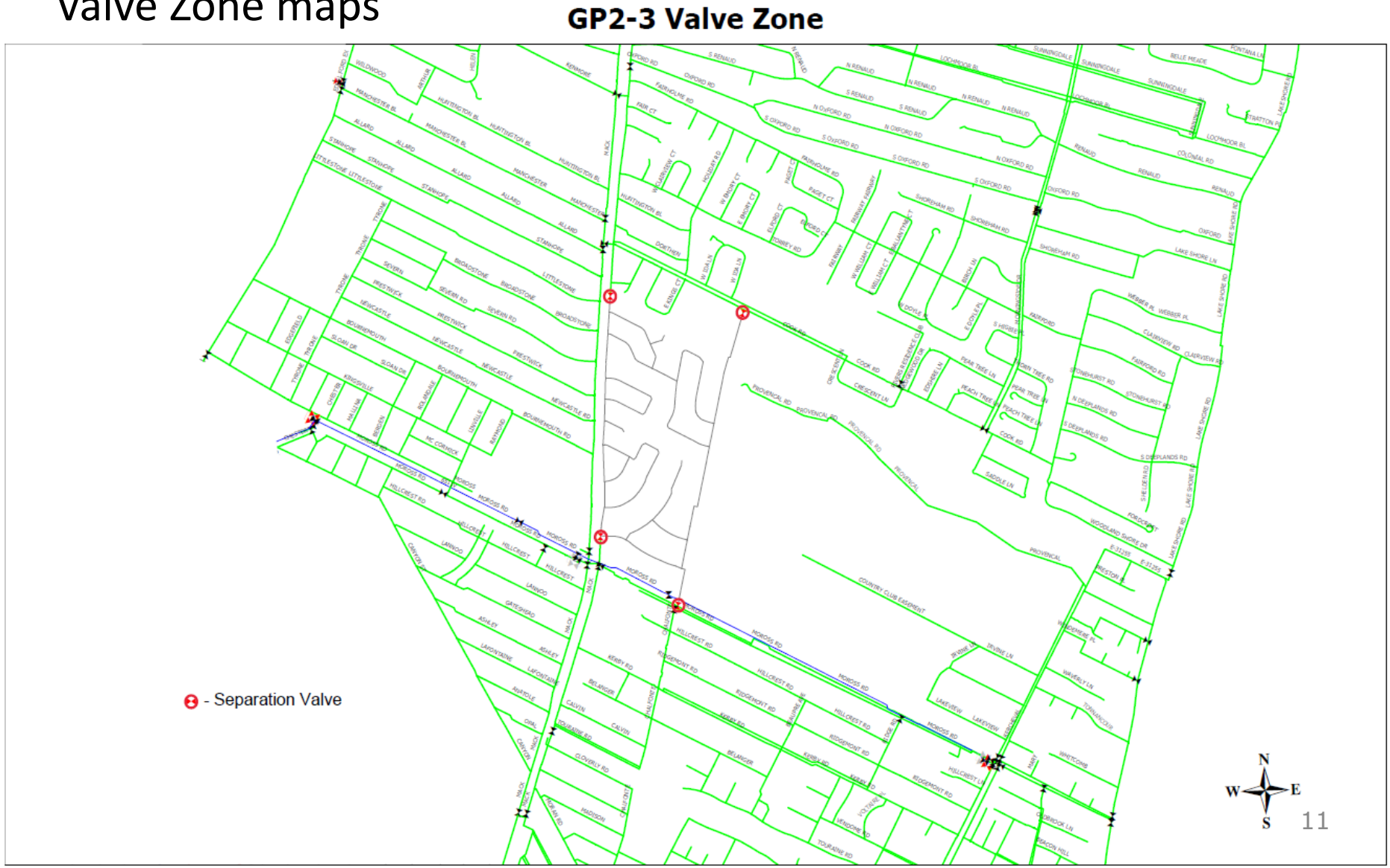

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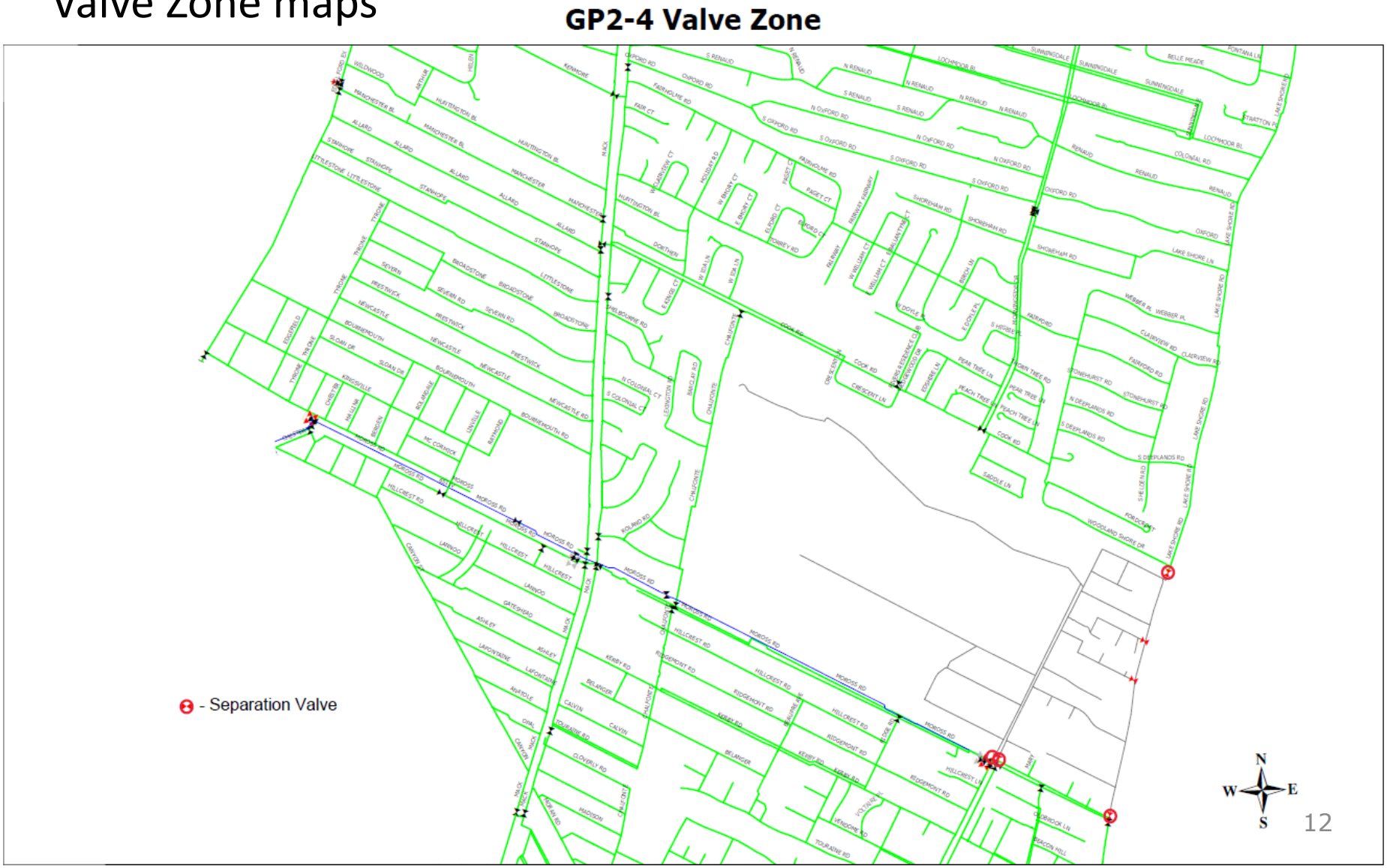
Valve Zone maps



DTE Gas Distribution Valve Spacing

Questions?