



# Advancing the Milwaukee Regional Medical Center Thermal Systems

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Bob Mlynarek, MRMC (Owner)  
Jay Ehrfurth, The Boldt Company (Constructor)  
Mike Burns, Ever-Green Energy (Operator)

# Introduction – What is MRMC?

Both a company and a location

- Company
  - Consortium composed of 6 members operating on the campus.
    - Froedtert Memorial Lutheran Hospital
    - Children's Hospital of Wisconsin
    - The Medical College of Wisconsin
    - Blood Center of Wisconsin
    - Milwaukee County Behavioral Health
    - Curative Care
  - Provides central planning, shared services, and infrastructure for the member entities

# Introduction – What is MRMC?

Both a company and a location

- Location
  - 250 acre Milwaukee Regional Medical Center campus
  - Part of original “Milwaukee County Grounds” which provided a variety of county-delivered services starting in the 1850s
- Among those county-provided services was district heating and district cooling to buildings on the campus

# Introduction – The Original System

- Campus Thermal Energy Systems
  - Built by County in 1955 as coal-fired steam with steam turbine electric generators
  - Chilled water added in 1970s
  - Purchased by the local electric utility in late 1990s
- Acquired by MRMC Thermal, a wholly-owned subsidiary of MRMC, in April 2016
  - MRMC and its members had a vision for the thermal energy systems that serve the campus

# Introduction – Goals for the MRMC Thermal Initiative

## Aspirations for a Steam and Chilled Water Future

<b>Redundancy</b>	A second plant to provide continuous supply of critical thermal service with geographic source diversity, on site alternate fuel backup
<b>Reliability</b>	Investment in plant and distribution infrastructure to enhance uninterrupted, consistent source of thermal service
<b>Environmental</b>	Reduce noxious emissions through elimination of coal
<b>Growth</b>	Creating capacity for growth including and beyond the new Center for Advanced Care at Froedtert & The Medical College of Wisconsin POB
<b>Transparency and Control</b>	Engaging member organizations in decision making from the source to the user to align clinical, economic, & accreditation values in decision making
<b>Rate</b>	Improved rates for steam and chilled water

# What Was Done? - Steam

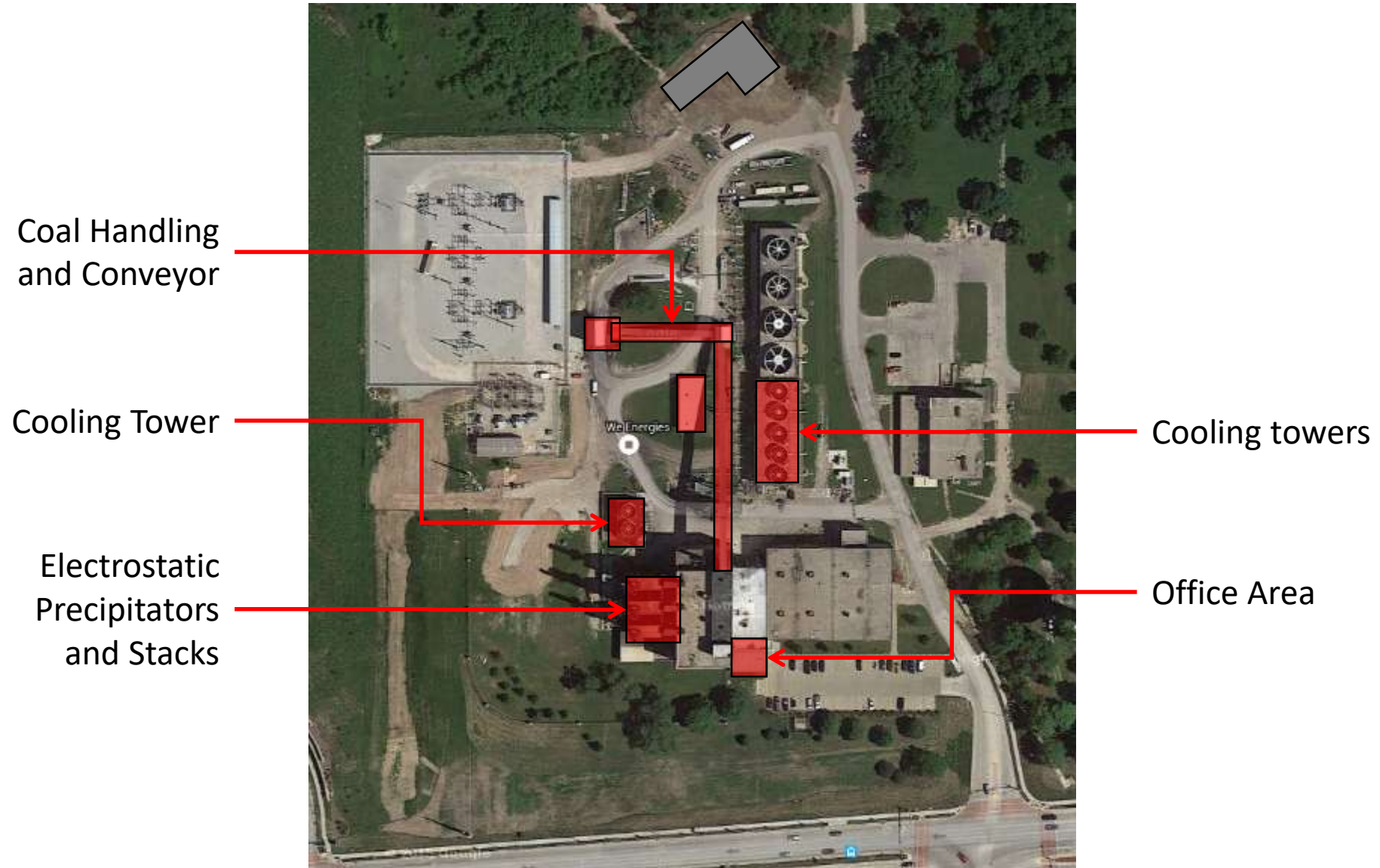
- Installed four temporary natural gas and distillate oil steam boilers
- Demolished three existing coal-fired stoker grate steam boilers and one existing (1960s-vintage) natural gas steam boiler including ESPs and fuel conveyors
- Demolished three steam turbine electric generators
- Installed four permanent 70,000 pph 135 psi natural gas and oil-fired boilers
- Installed emergency diesel generators to provide full steam capability on loss of offsite power
- Installed fuel oil storage to assure continuity of operation
- Separated production capacity between two facilities



# What Was Done? – Chilled Water

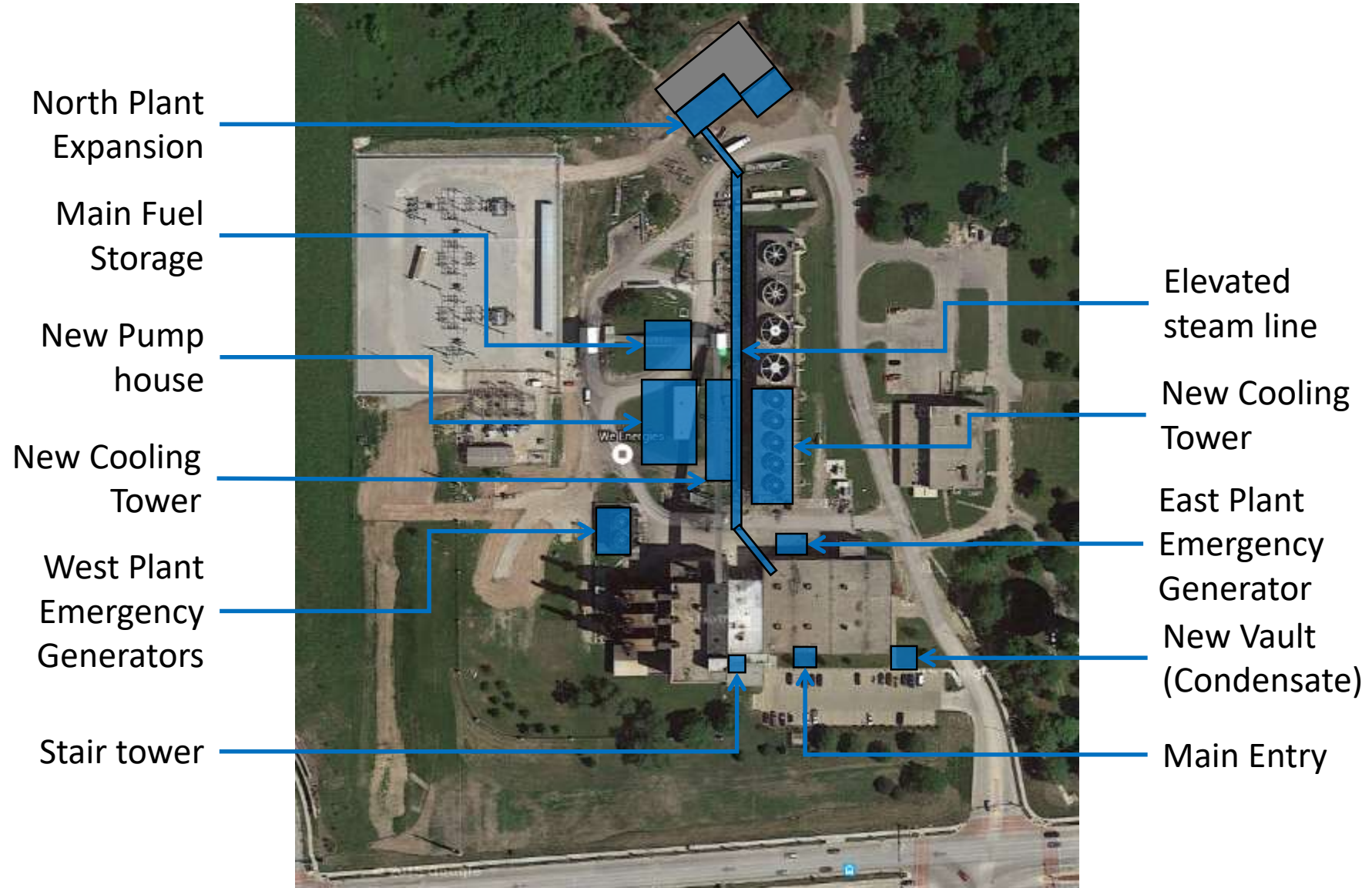
- Upgraded electrical feeders and all plant electrical switchgear to increase power supply diversification
- Installed emergency diesel generators to provide more than half of the peak cooling load
- Replaced chillers
  - Removed five 1000 ton absorption chillers
  - Installed three 2500 ton centrifugal chillers – two with VFD-drives
  - Installed new cooling towers and pumping
- Separated production capacity between two facilities

# Introduction – A Starting Point

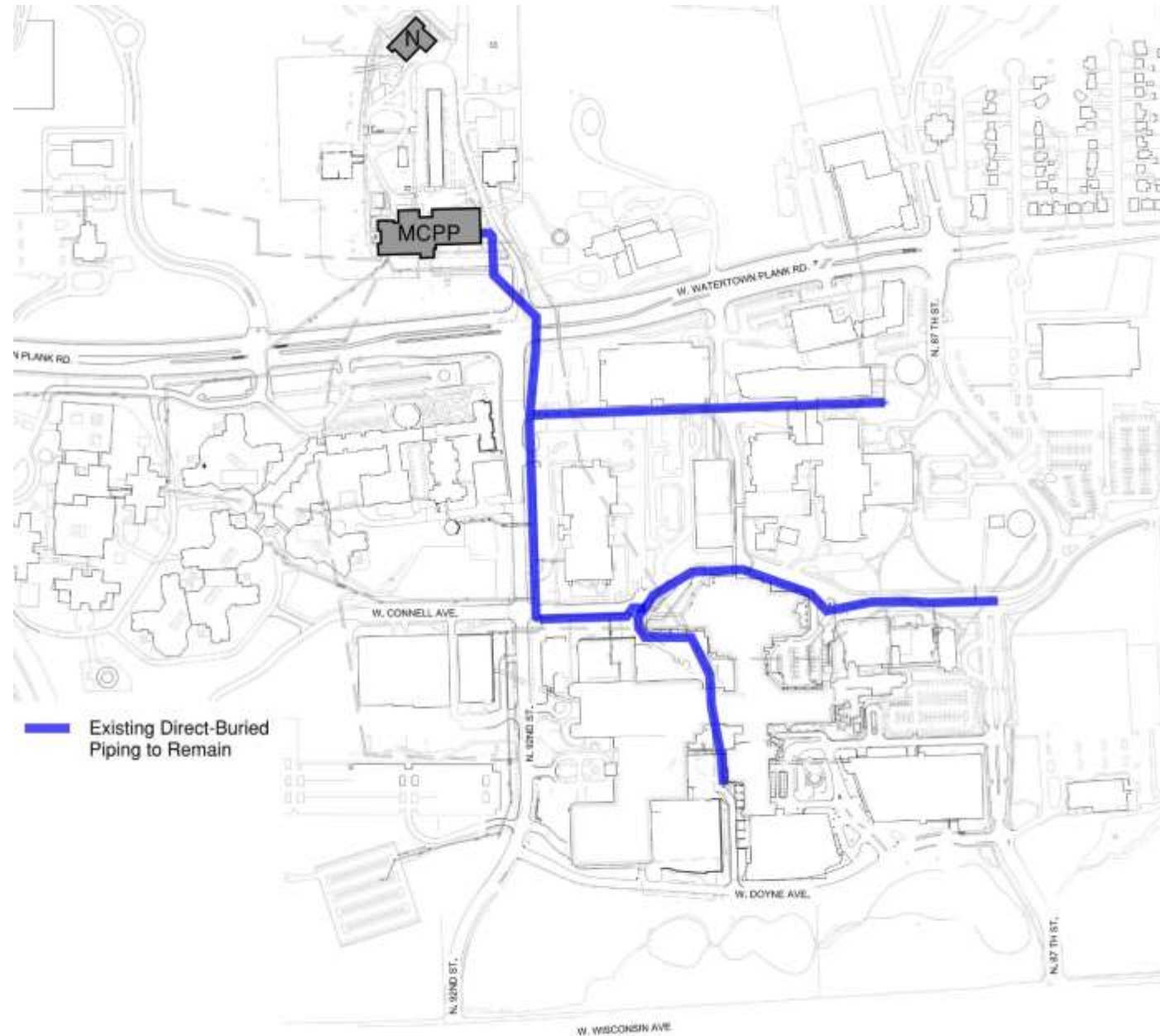




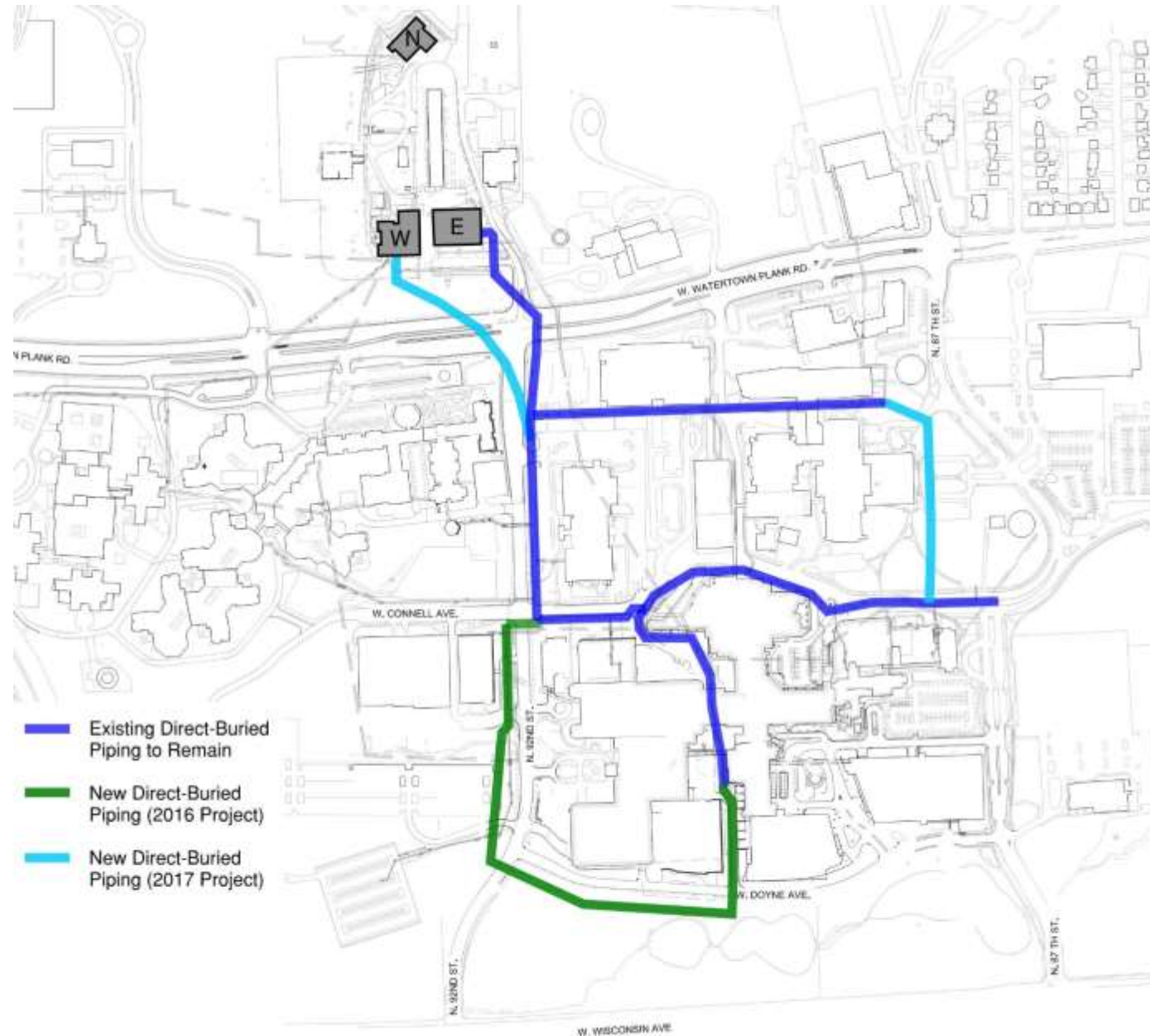
# What Was Done?



# Chilled Water Distribution - 2016

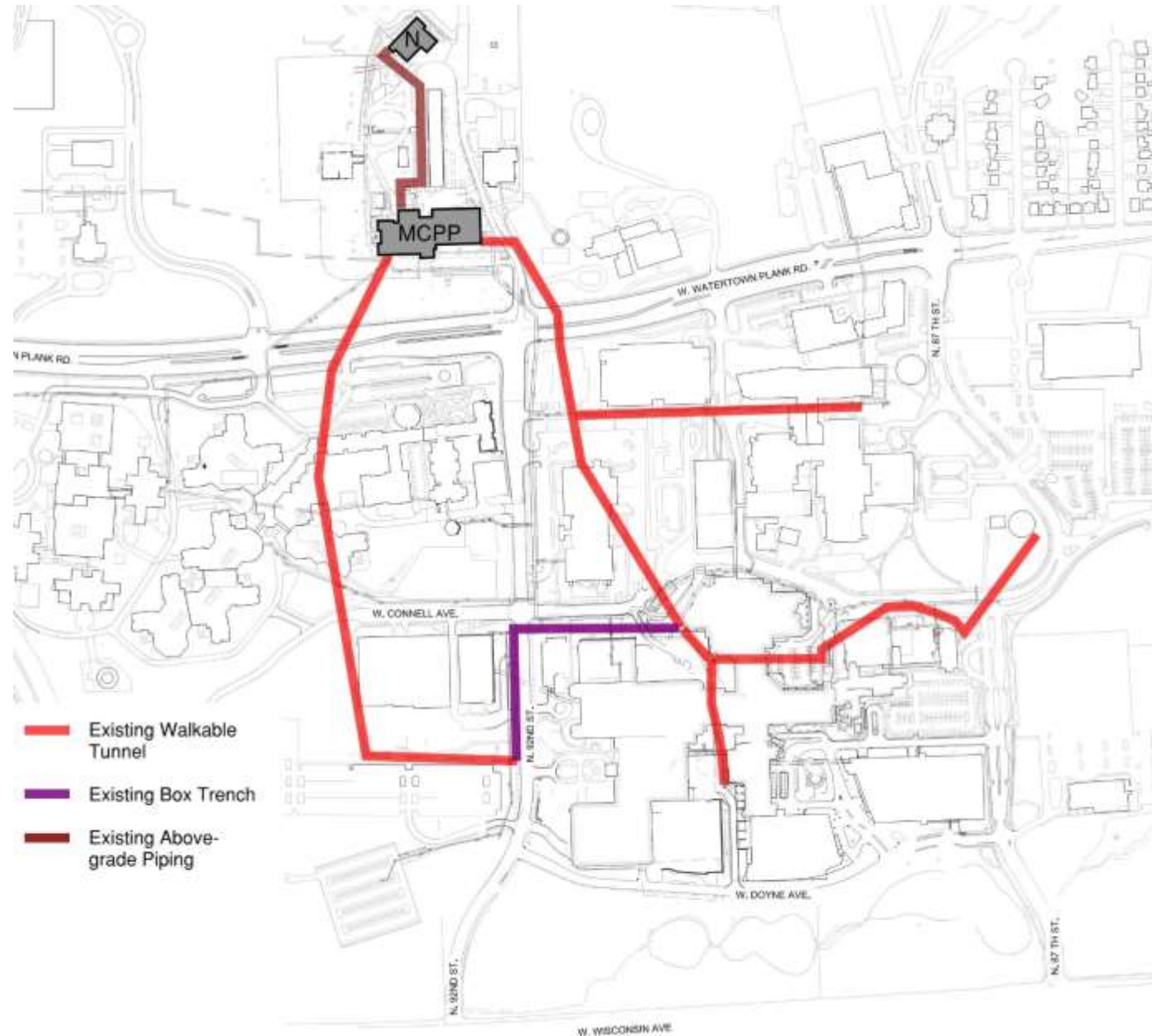


# Chilled Water Distribution - 2018

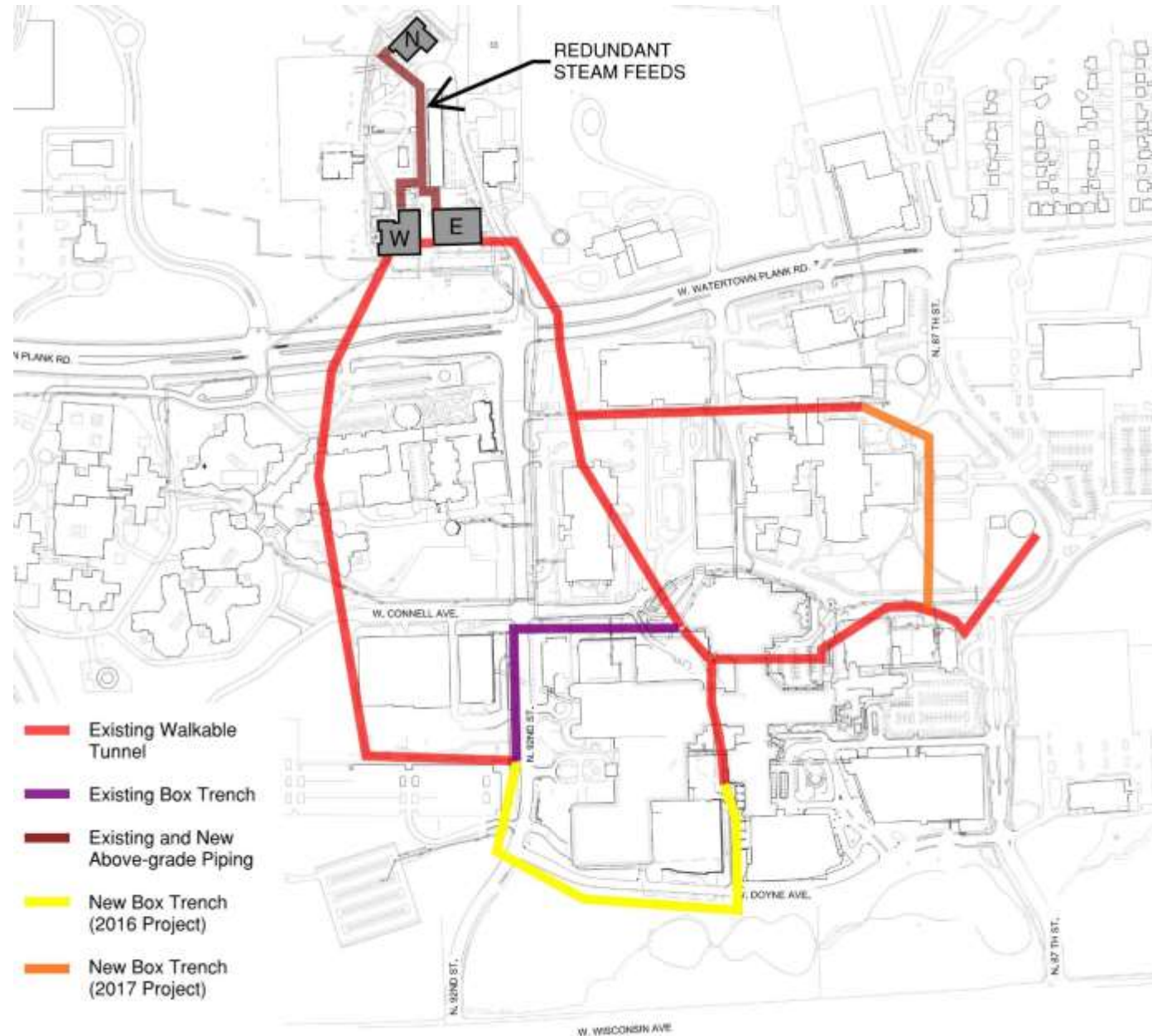




# Steam Distribution - 2016



# Steam Distribution - 2018





# How Was It Done?







# How Was It Done?



# How Was It Done?





# How Was It Done?





# Questions?

Bob Mlynarek, MRMC

[rmlynarek@mrmcfl.org](mailto:rmlynarek@mrmcfl.org)

Jay Ehrfurth, The Boldt Company

[Jay.Ehrfurth@Boldt.com](mailto:Jay.Ehrfurth@Boldt.com)

Mike Burns, Ever-Green Energy

[Michael.Burns@ever-greenenergy.com](mailto:Michael.Burns@ever-greenenergy.com)

# West Plant - Initial





# West Plant - Rendering

