



# UNDERGROUND CONSTRUCTION TECHNOLOGY

The Underground Utilities Event | July 13-15, 2021 | Music City Center | Nashville, TN



Life is Good –  
Finally in Control

Owner/Decision-Maker



## Drew Muirhead, PE

- Assistant Director Water Services, City of Brentwood, TN
- BS in Civil Engineering, Mississippi State University
- 16 years as a consultant and municipal engineer
- 11 years with the City of Brentwood's Sewer Rehabilitation Program





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It ain't easy being me....but it does get easier





## Rehabilitation Program Timeline

- 2006 - Tennessee Department of Environment and Conservation (TDEC) Agreed Order
- 2007 – Corrective Action Plan / Engineering Report (CAP/ER) – Phase 1 & 2
- 2008 – Rehabilitation Construction Services
- 2015 – CAP/ER Phase 3
- 2019 – Post CAP/ER Rehabilitation Program





## CAP/ER Phase 1 & 2 Rehab Program

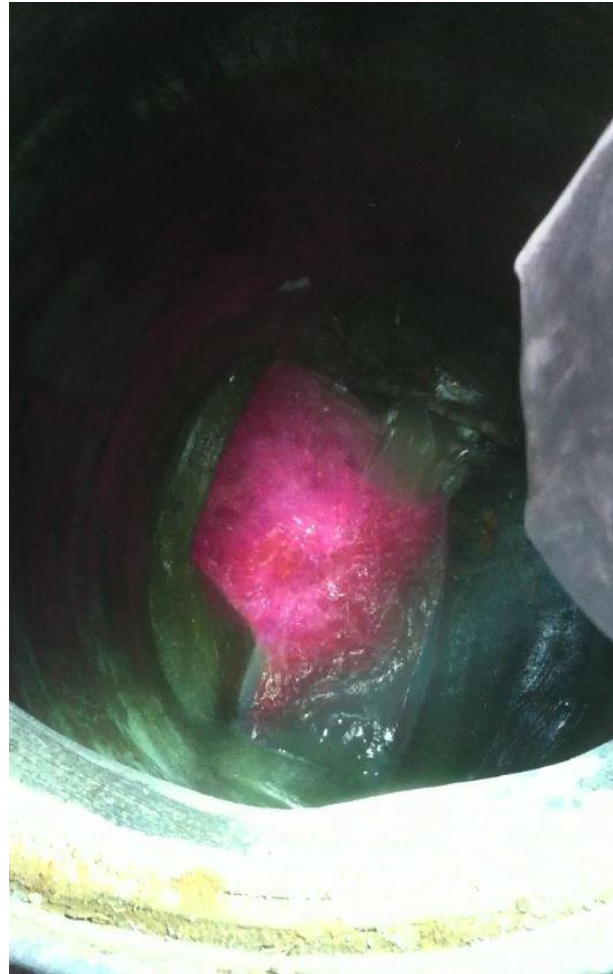
- 2008 – 2015
- 20% of System Rehabilitated
- 25 miles of CIPP for Clay and Concrete Pipe
- 1200 Manholes Rehab
- 300 Laterals Rehab





## 2014 Significant Manhole Leak

- 2012 - 2013
- Repaired Dec. 2013
- 750,000 Gal/Day







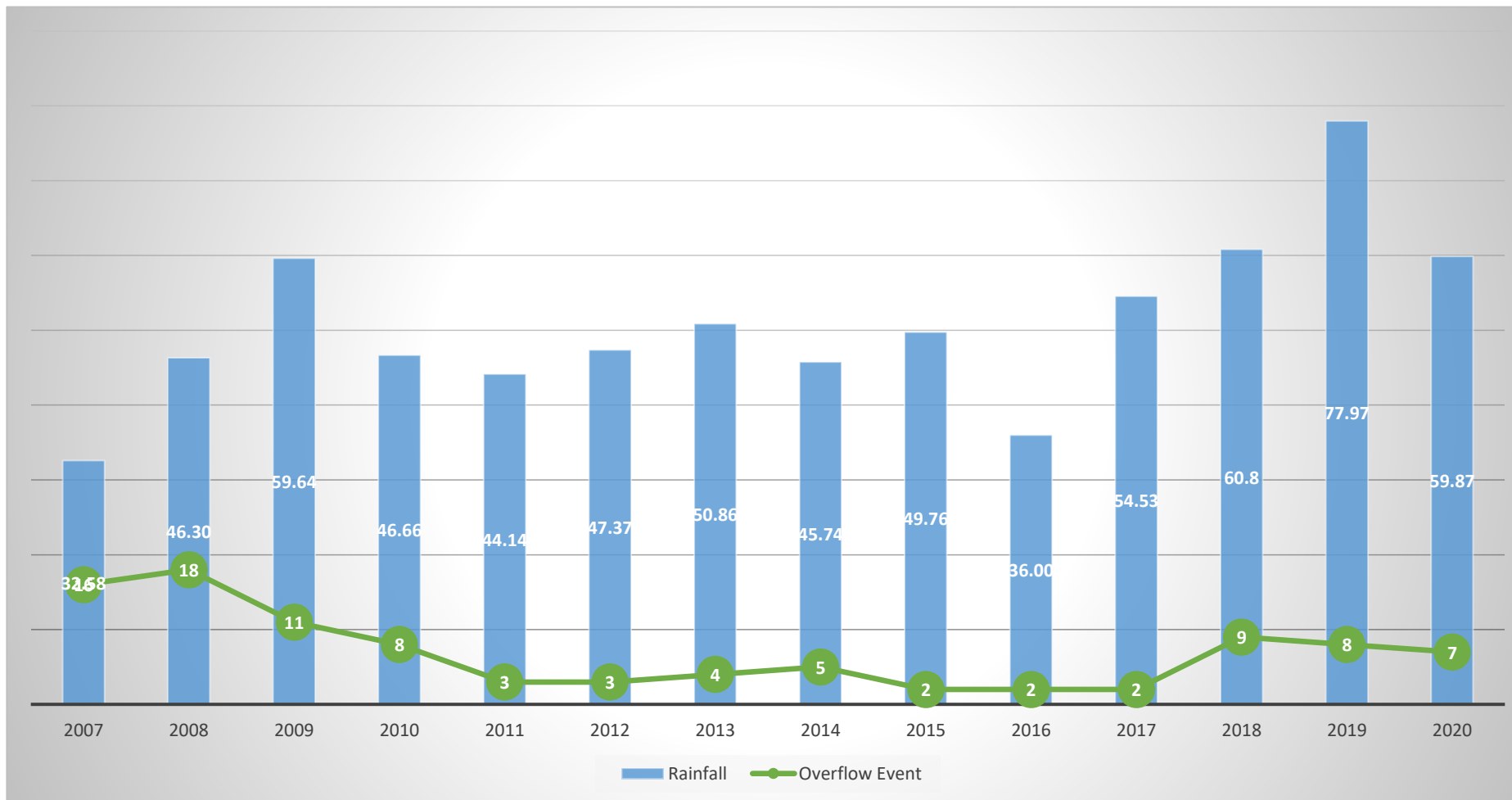
## CAP/ER Phase 3 Rehab Program

- 2015 - 2018
- 6 miles of CIPP for Clay and Concrete Pipe
- 400 Manholes Rehab
- 100 Laterals Rehab





## Annual Overflow Events and Rainfall







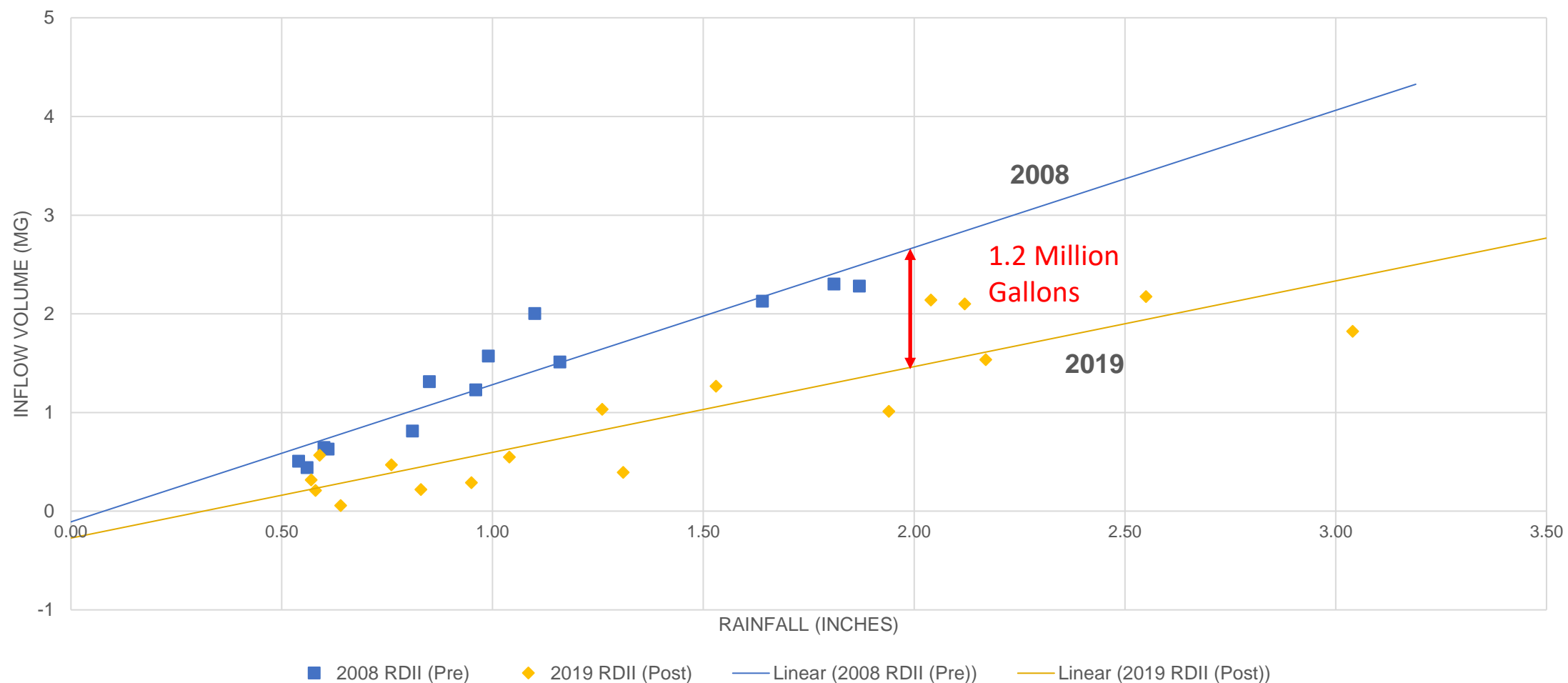
## Annual Overflow Events and Rainfall

Year	Total Annual Rainfall (In.)*	Number of Overflow Events (-)	Total Overflow Duration (Hours)
2008	46.7	18	1881
2020	59.9 (+28%)	7 (-61%)	186 (-90%)

\* Rainfall data from BRNT\_BRRG



## Pre & Post Rehab I/I Analysis





## City Growth

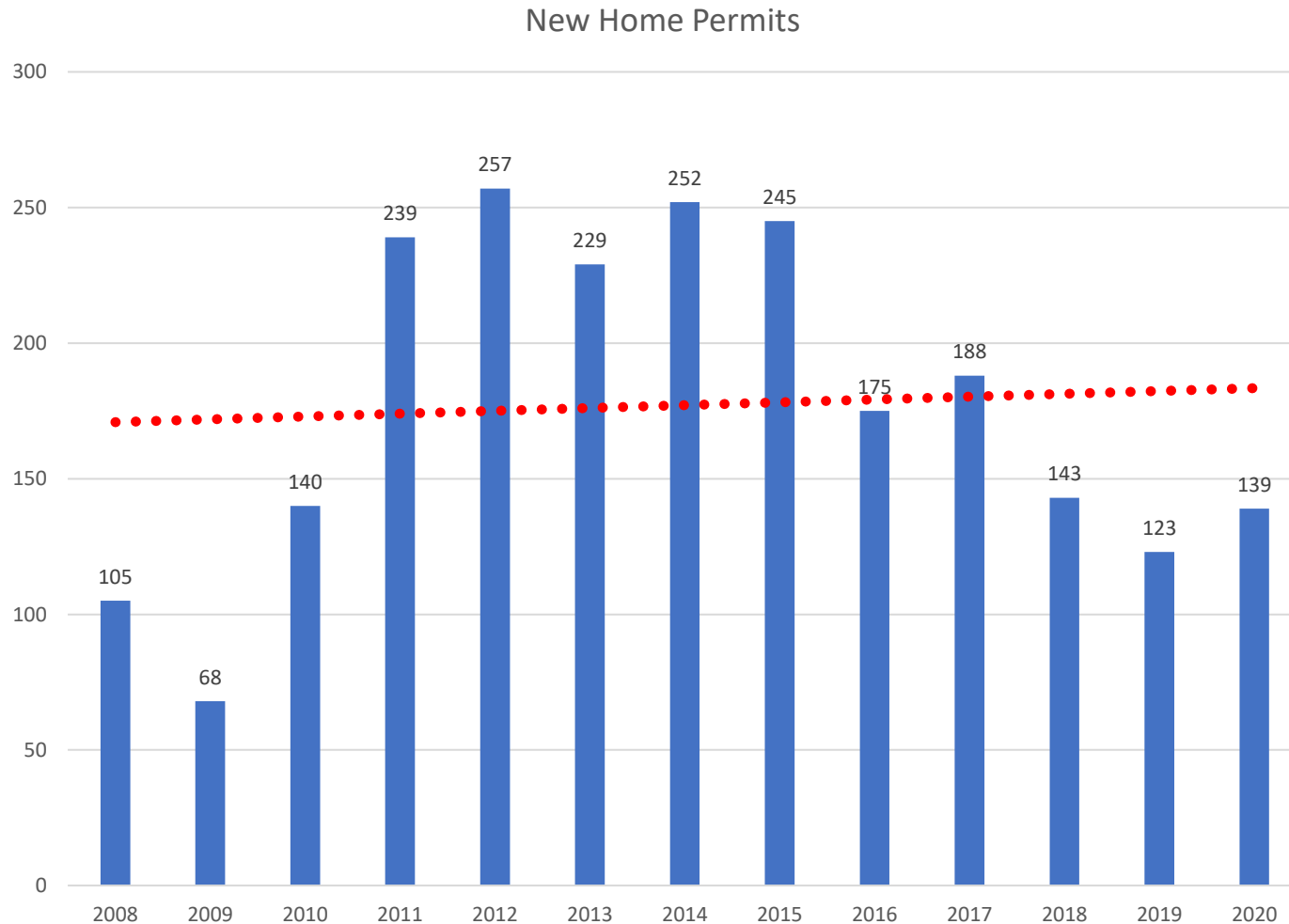
- City Population 2010 – 37,060
- City Population 2020 – 42,783
- ~ 15% Increase







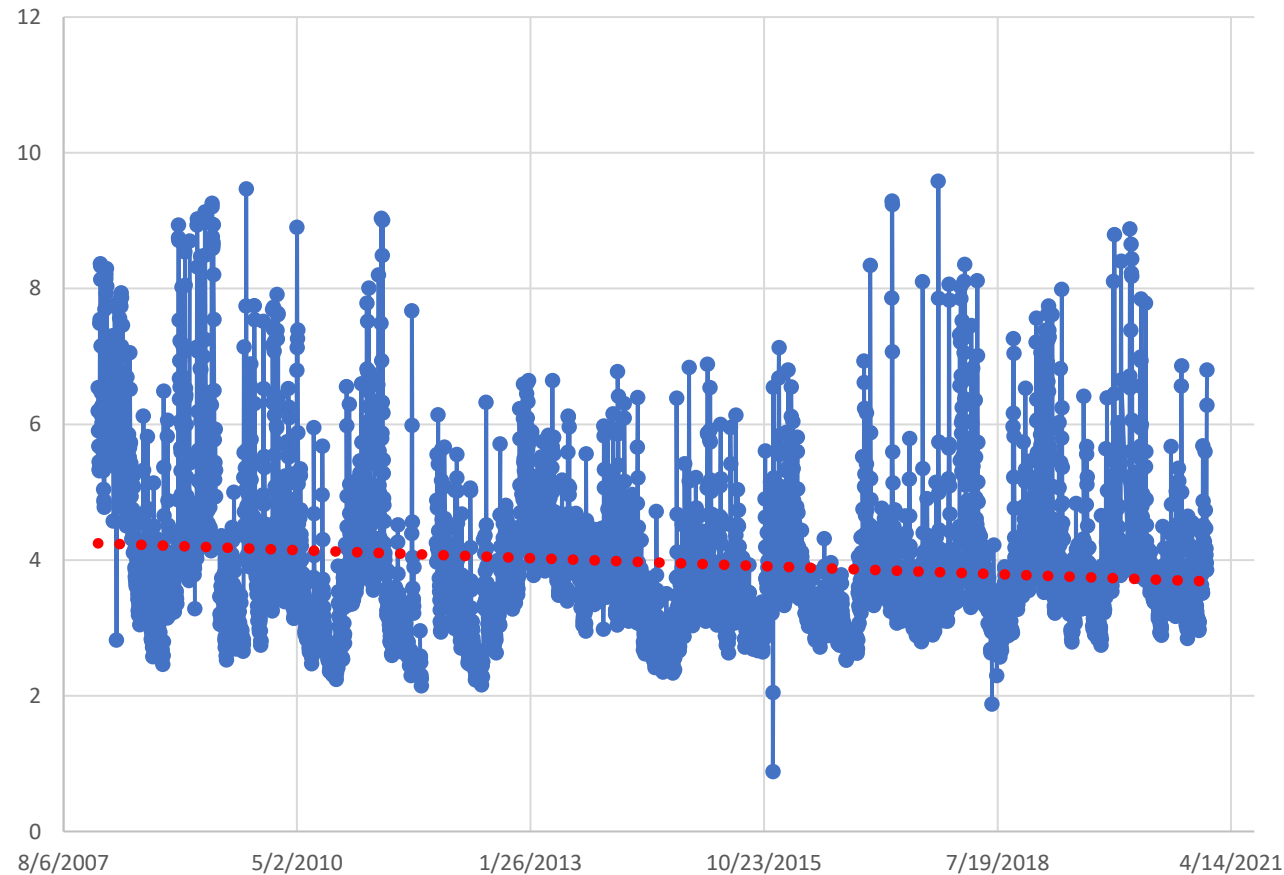
## City Housing Permits, 2008 - 2020





## Average Daily Flows, 2008 - 2020

2008 - 2020 Daily Flow (MGD)





## Post CAP/ER Rehab Program

- 2019 – 2027
- 60,000 LF of Gravity Sewer CCTV
- 200 Manhole Inspections
- 60,000 LF for Smoke Testing







## Equalization Basin

- Online Dec. 2022
- 4 Million Gallon Storage
- 1 of 2 Tanks Designed to Prevent Overflows for a 2-year/24 hour Event







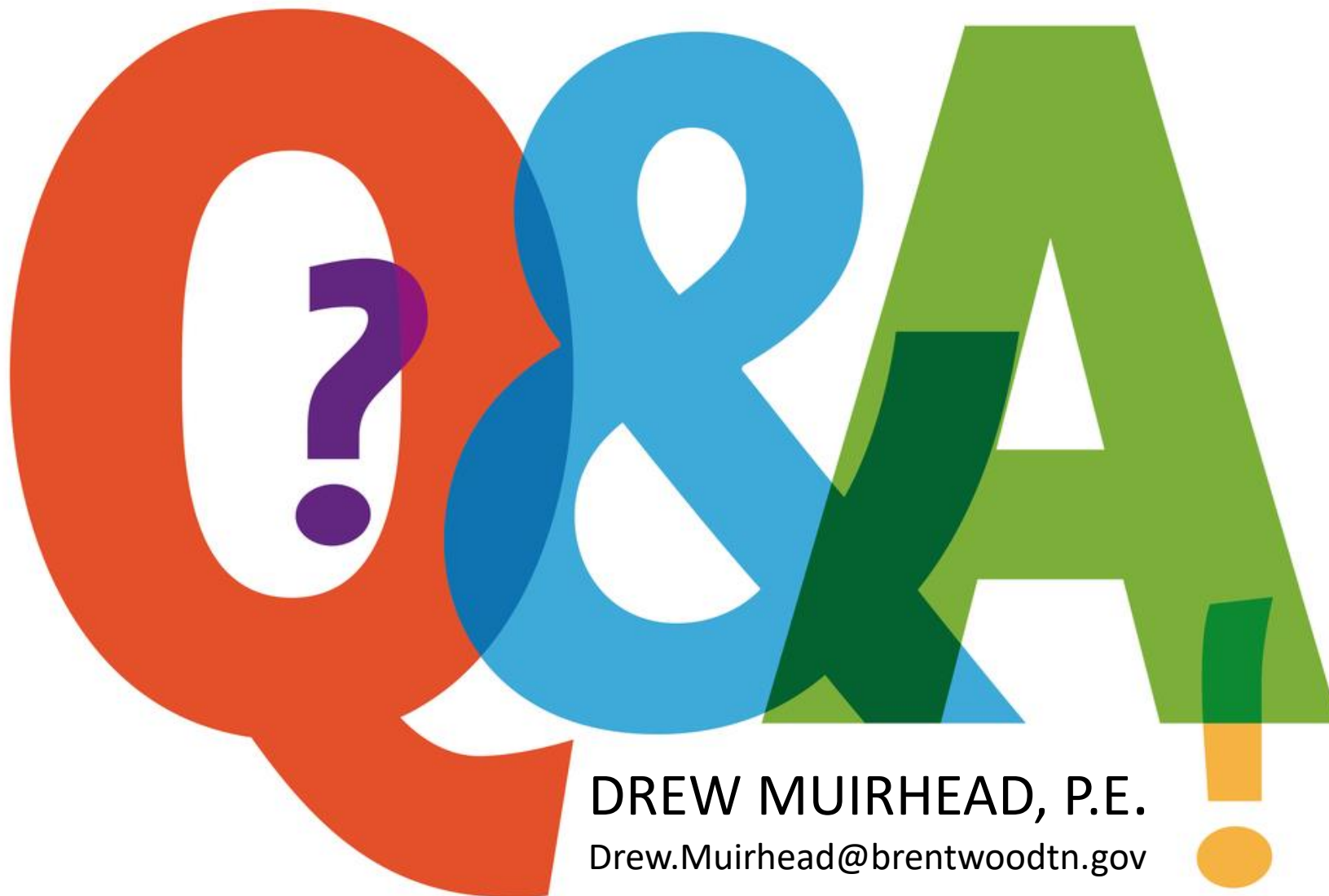
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