

# How the West Was Dug

*Integrating CSO Abatement and Stormwater Management through Renewed Urban Infrastructure in the City of Cambridge*

*Kate Goyette & Ed Mitiguy*

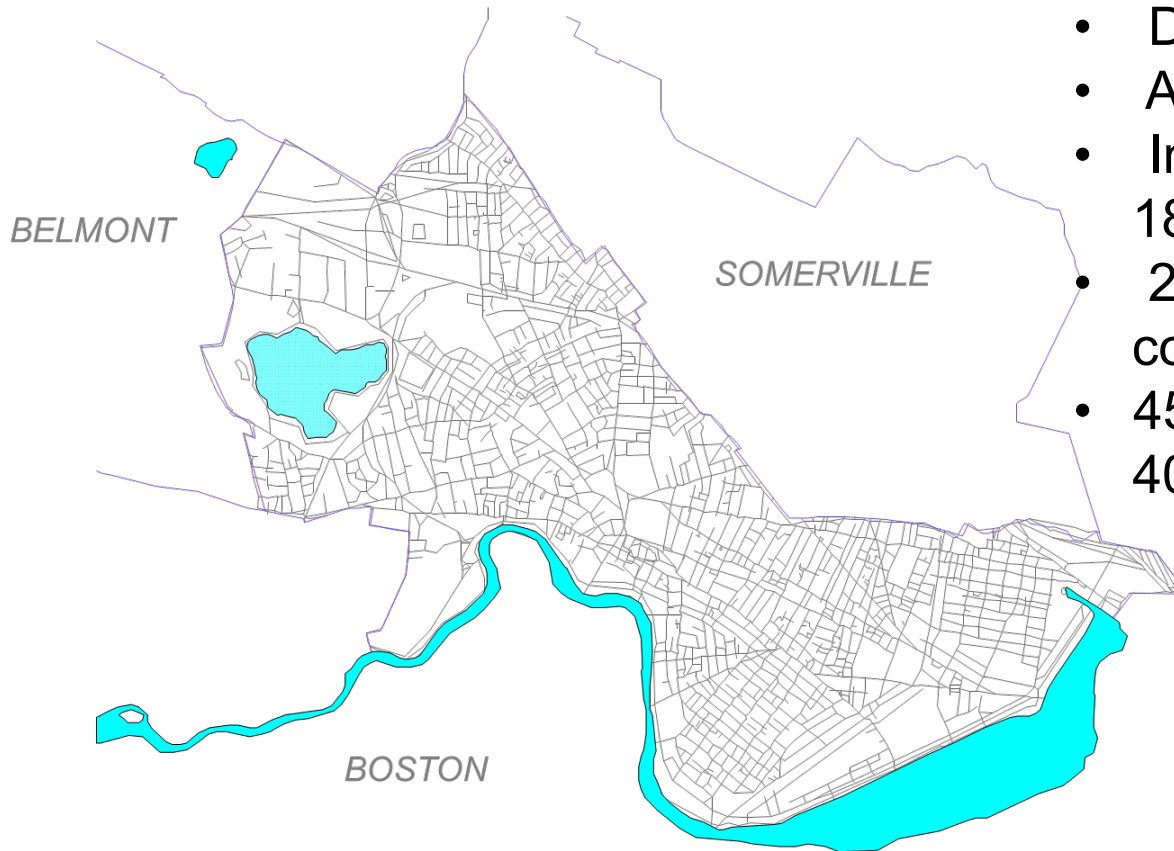


*“Life is a journey, not a destination”*

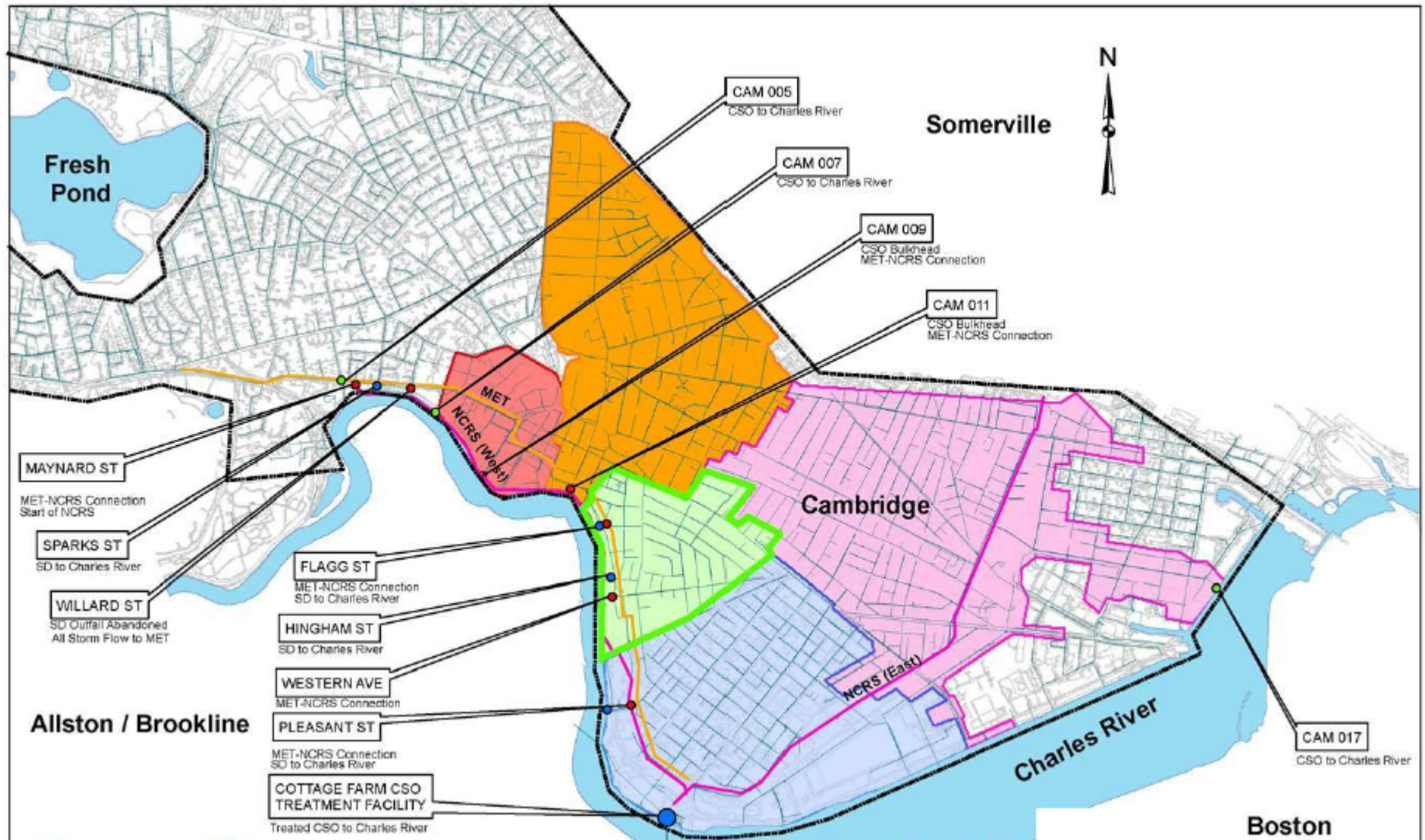
*Ralph Waldo Emerson*

# Cambridge, MA

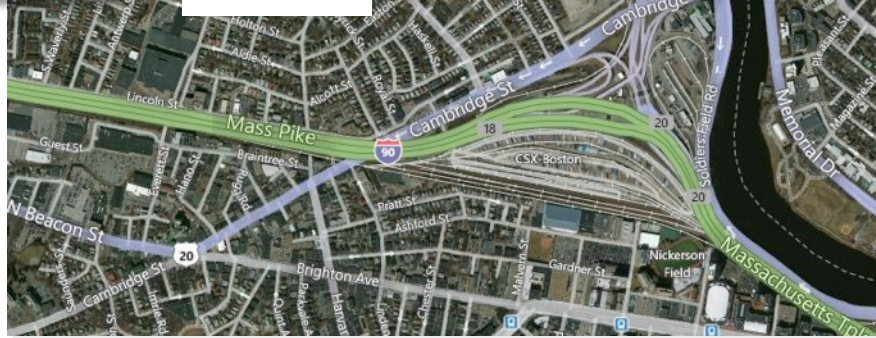
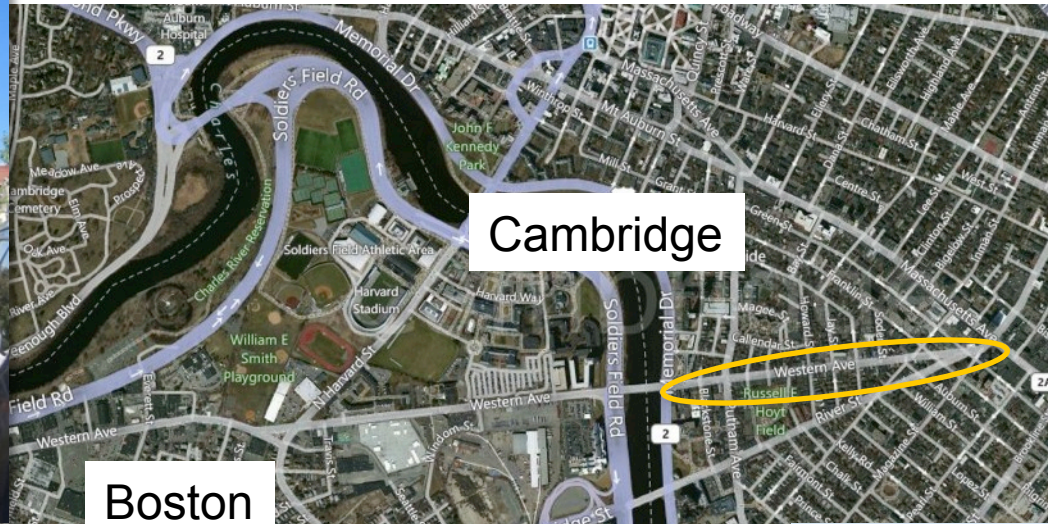
- Resident population: 100,000
- Daytime population: 300,000
- Area: 6.5 square mile
- Infrastructure dates back to 1850's
- 221 miles of storm drain/sewer/combined sewer
- 45 catchment areas; 40% separated



# Eastern Cambridge Drainage

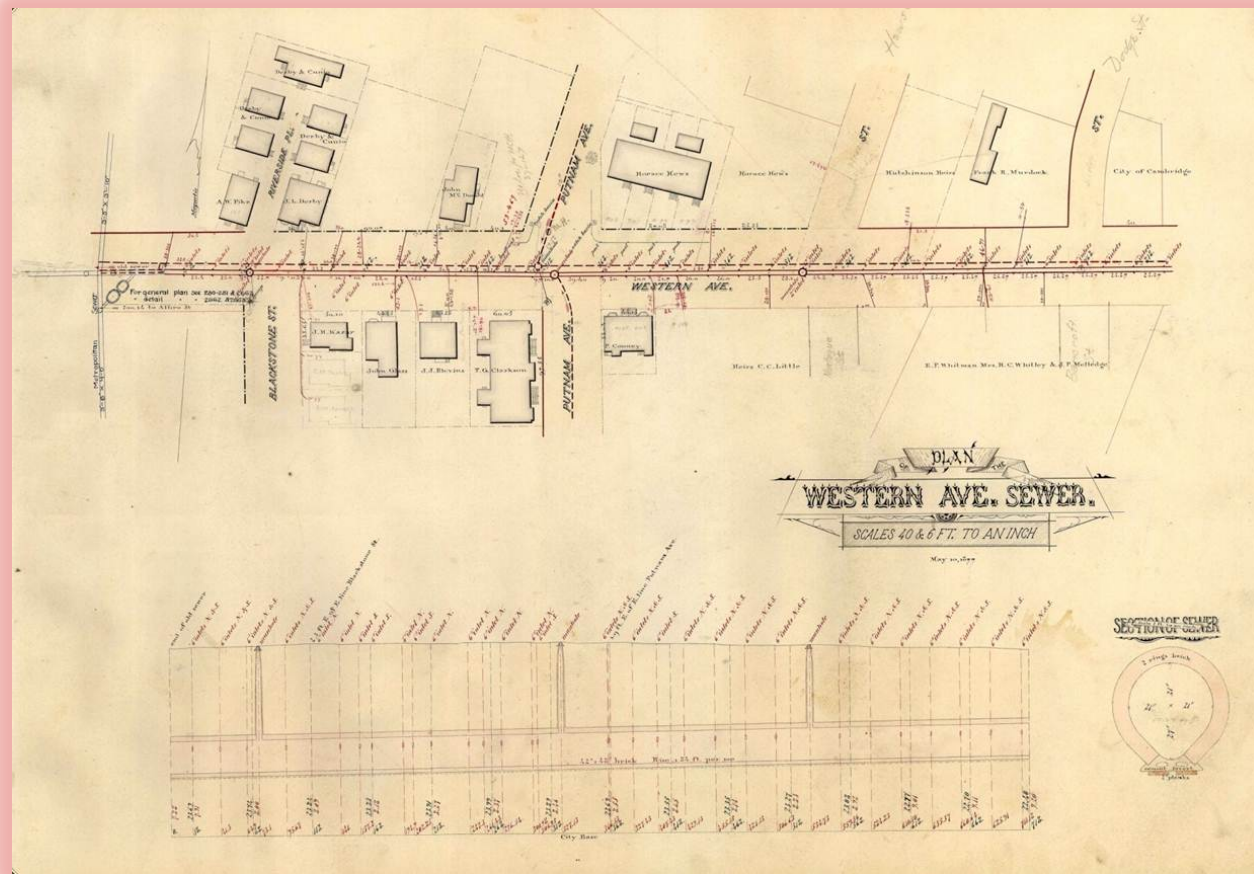


# Western Avenue



# Subsurface Infrastructure

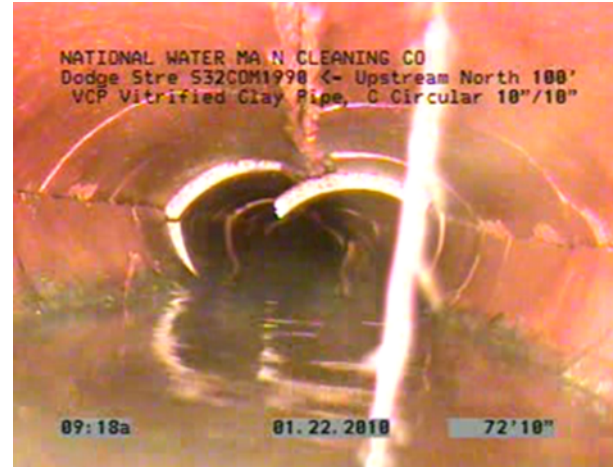
- Combined sewer dates back to late 1800's



# Existing Pipe Condition



Slate collapse into sewer



Sewer collapse at crown of pipe



Sinkhole in roadway due to sewer collapse

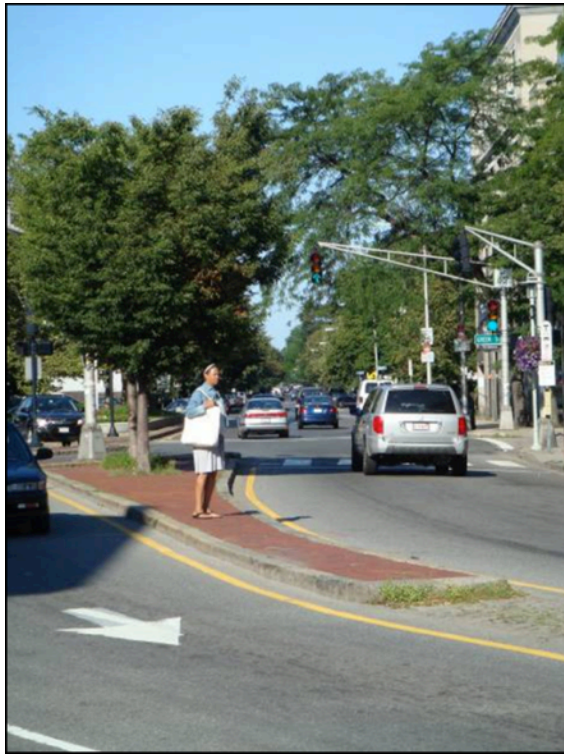
# Street Flooding and Surcharging





# Surface Deficiencies

- Accessibility
- Degraded sidewalks





# Success is

Revitalized  
Neighborhood

Pedestrian &  
Bicycle Safety

Improved Level  
of Service

# Subsurface Design

- Separate Combined Sewer
- New 36" Storm drain and Outfall
- Rehabilitated Sewer
- Water main upgrades
- Other utility upgrades



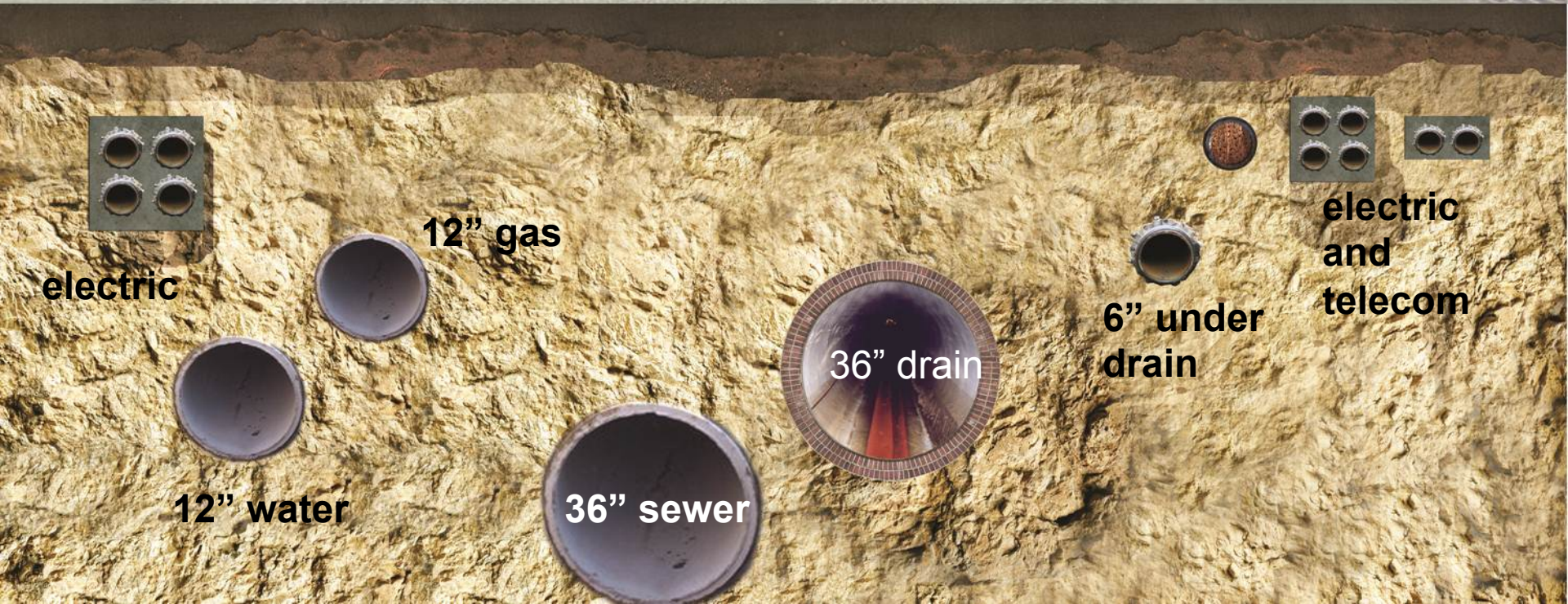
# Surface Design



# Green Infrastructure

- Pervious pavement
- Rain Garden





# Controlled Chaos – The Journey





# Success is

Community  
Involvement

Cooperation

Protecting  
homes and  
businesses



# No such thing as a “Good Vibration”



# No such thing as a “Good Vibration”



- Interior & Exterior Pre-construction inspection



# No such thing as a “Good Vibration”



## Roadway Subbase

- Concrete Slab Subbase
- Buried Railroad Tracks
- Buried Granite Cobblestone Roadway



# No such thing as a “Good Vibration”

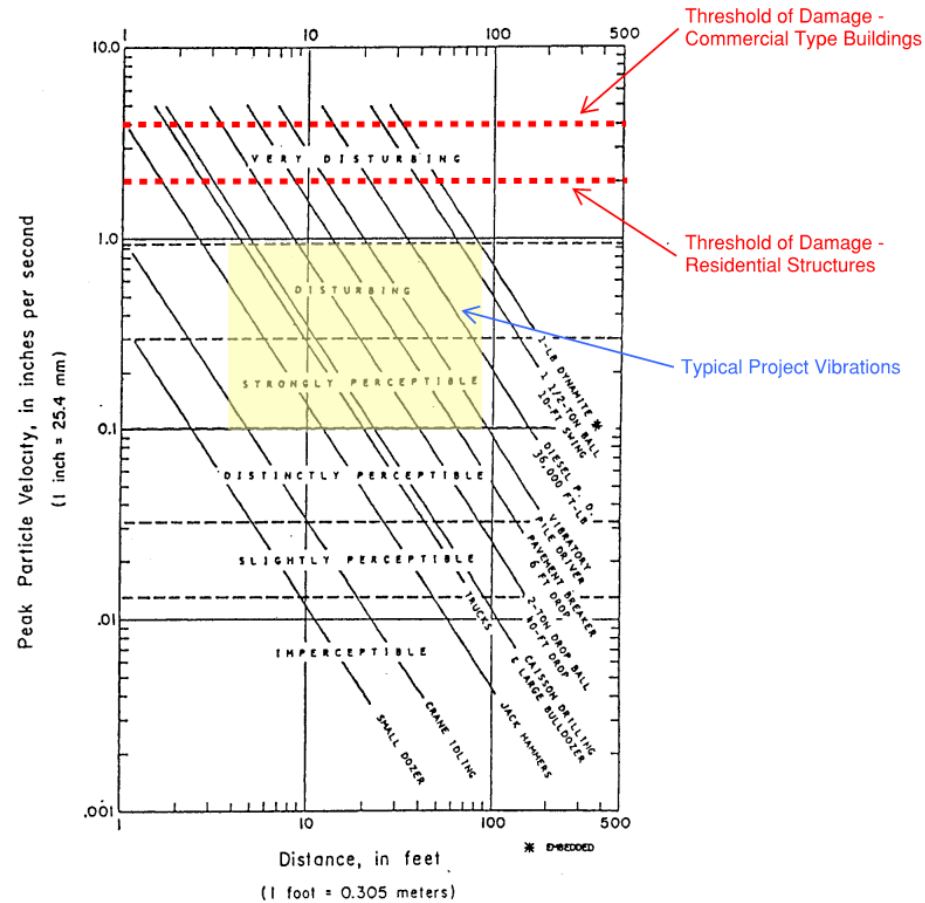


FIG. 10.—Construction Vibration Intensities Related to Human Evaluation of Vibrations (23)

# Cooperation

## Keep Traffic and Contractor Moving



# Utility Cooperation

## Construction Challenges

- Coordinating utility crews in the work zone
- Lowering the roadway

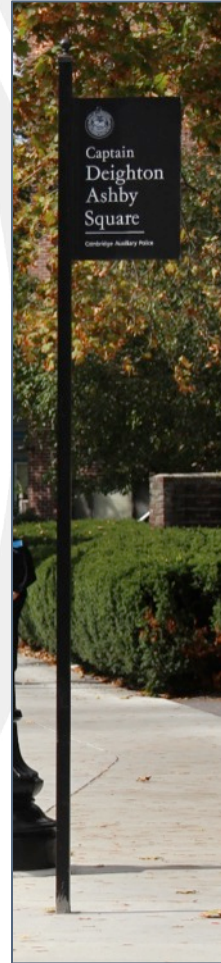


# Community Involvement

- Coordination with Businesses
- Block Captain Meetings
- Social Events



# Community Features

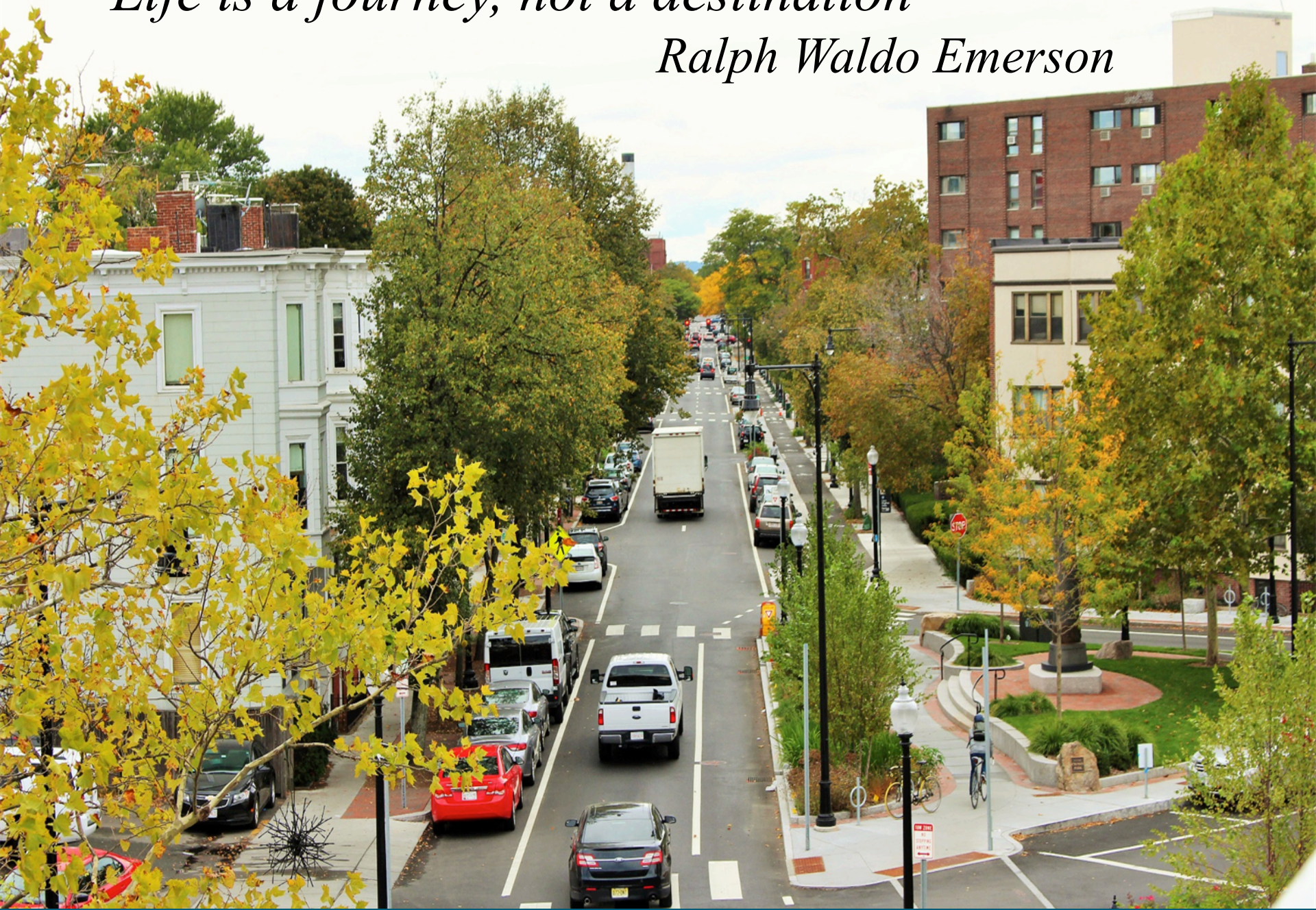




# Summary



*“Life is a journey, not a destination”*  
*Ralph Waldo Emerson*



# Western Ave Project Team

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- City of Cambridge DPW
- Cambridge Community Development
- Western Ave Community
- Kleinfelder
- MWH Global
- HDR
- Halvorson Design Partnership
- Jacobs
- Contractor - D'Allessandro Corp.

# Questions?

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