I-84 HARTFORD PROJECT

Air Quality Analysis Overview

State Implementation Plan Revision Advisory Committee (SIPRAC)

March 9, 2017

Established 1972…an open forum for information exchange and discussion on the State's Air Quality Programs, proposed regulations and status of efforts to achieve and maintain air quality standards in the State.

U.S. Department of Transportation
Federal Highway Administration

CONNECTICUT DEPARTMENT OF TRANSPORTATION

Agenda

- Project Overview
- Environmental Review
- Air Quality Analysis
  - Emission Sources
  - Regulatory Context
  - Methodology
  - Analysis Update
- Next Steps

Project Overview

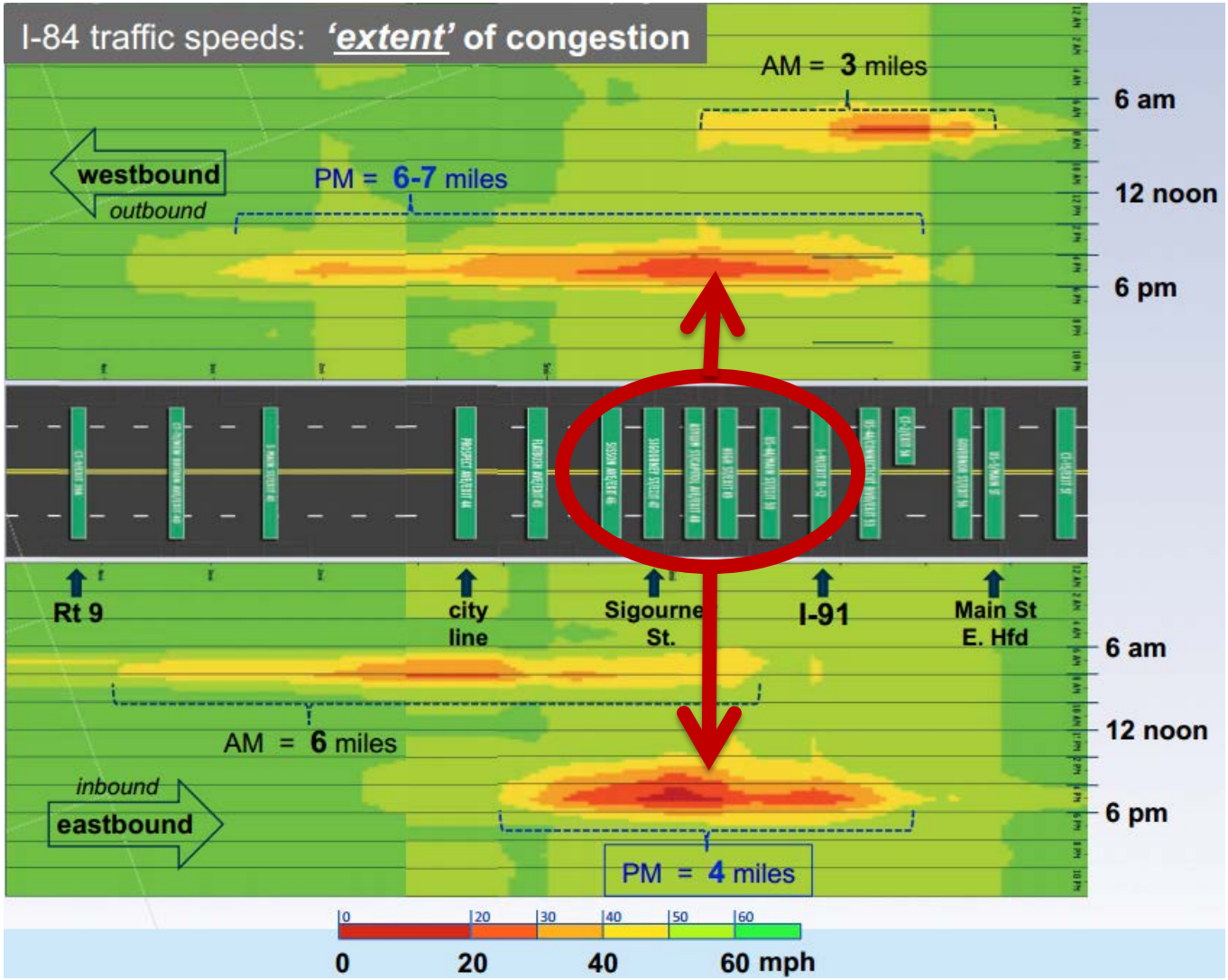
Where is the project?

Corridor View

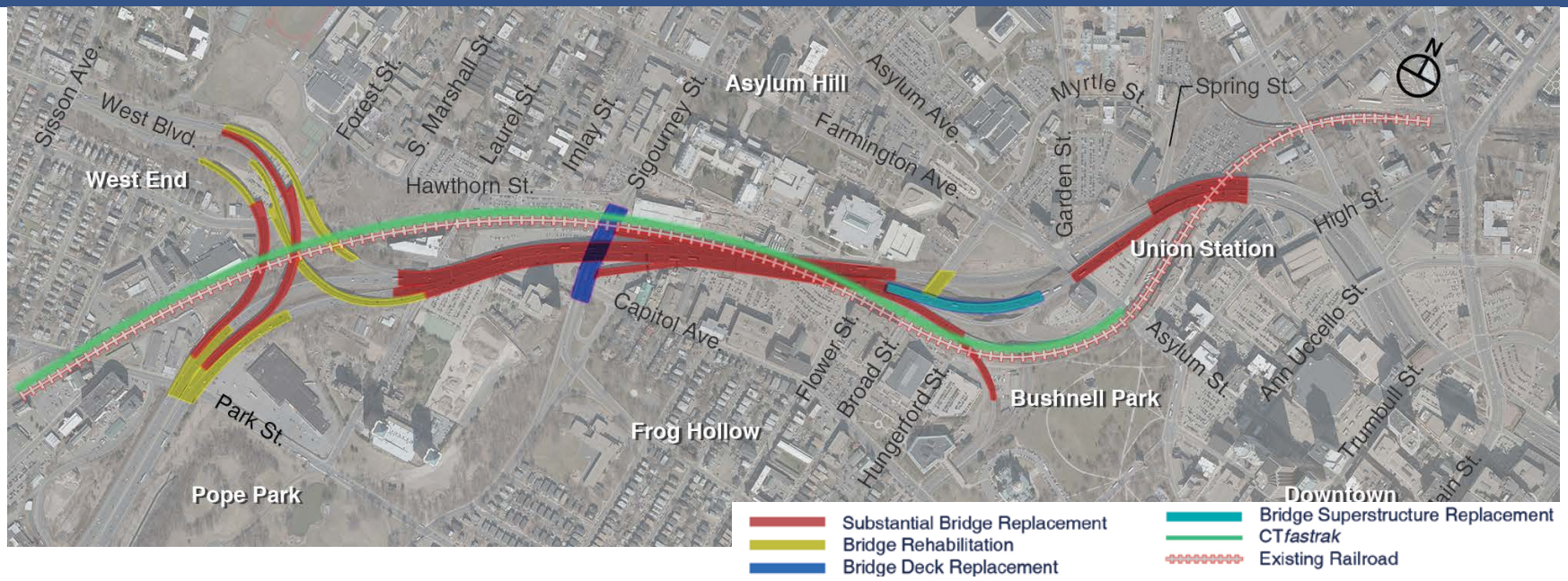
Why is it Needed?

- Bridge structural deficiencies
- Operational and safety deficiencies
- Mobility deficiencies

Traffic Congestion

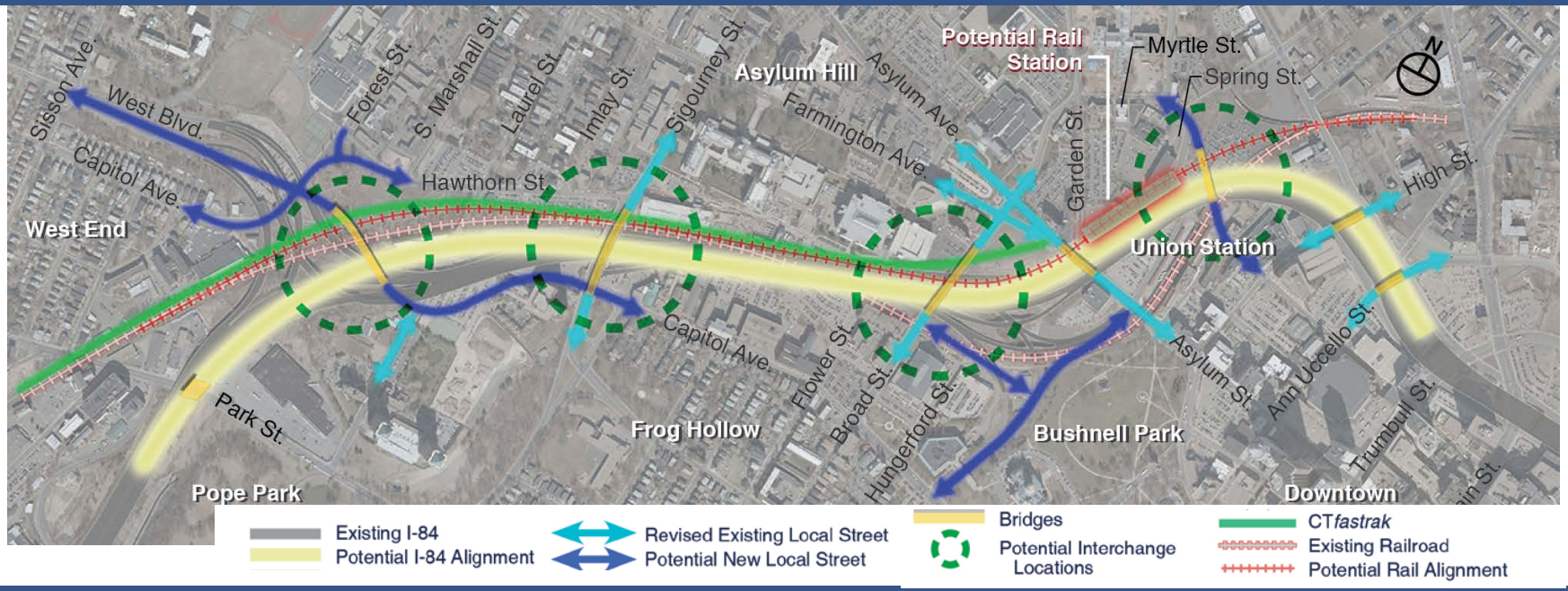


Alternative 1: No-Build

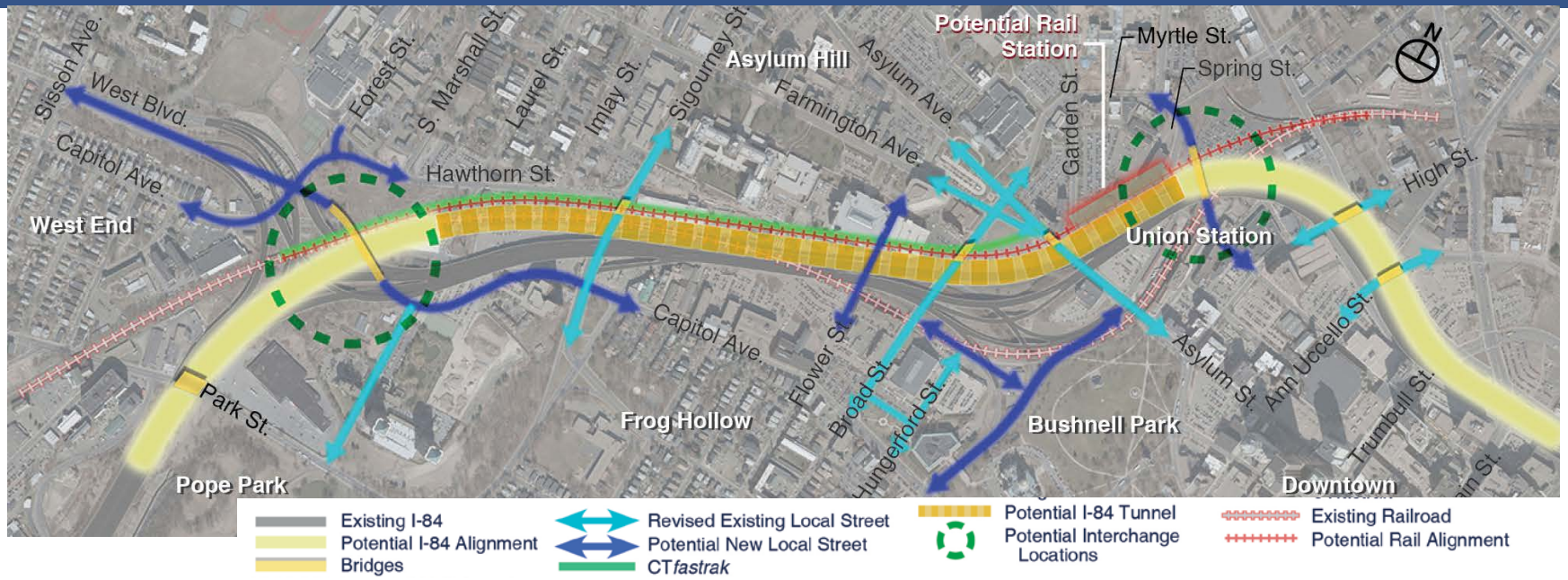


Alternative 2: Elevated Highway

Alternative 3: Lowered Roadway

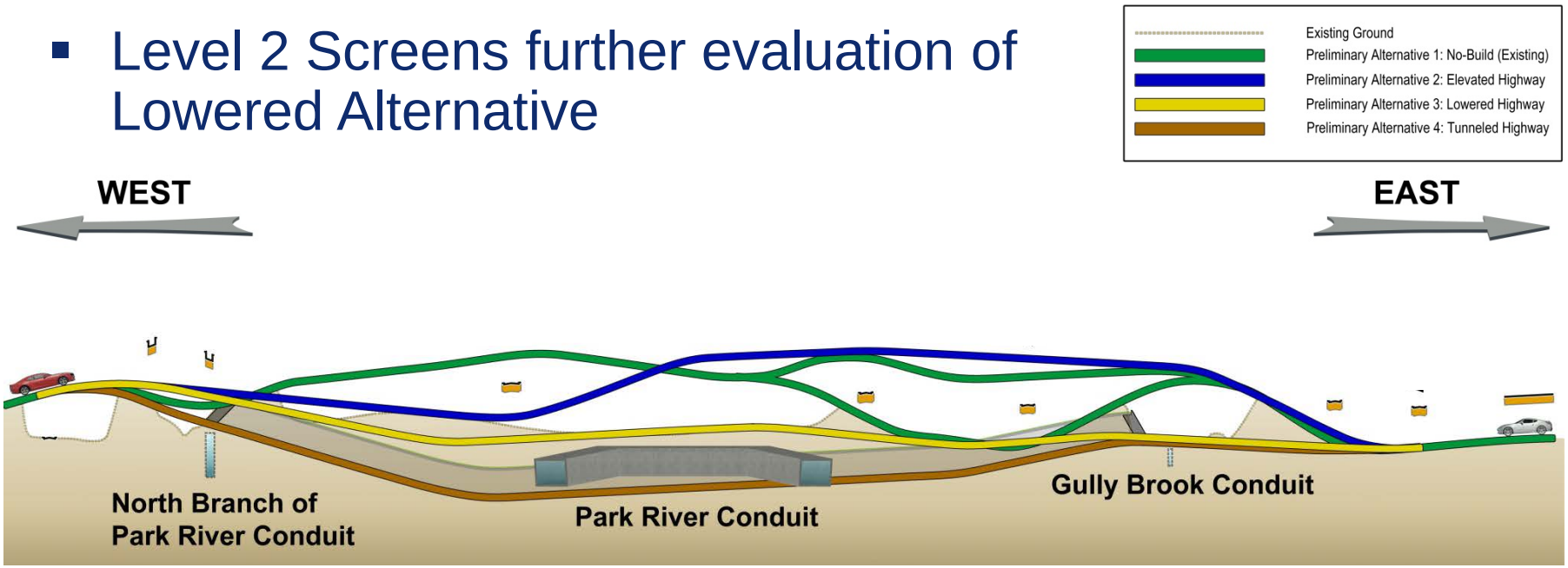


Alternative 4: Tunneled Highway



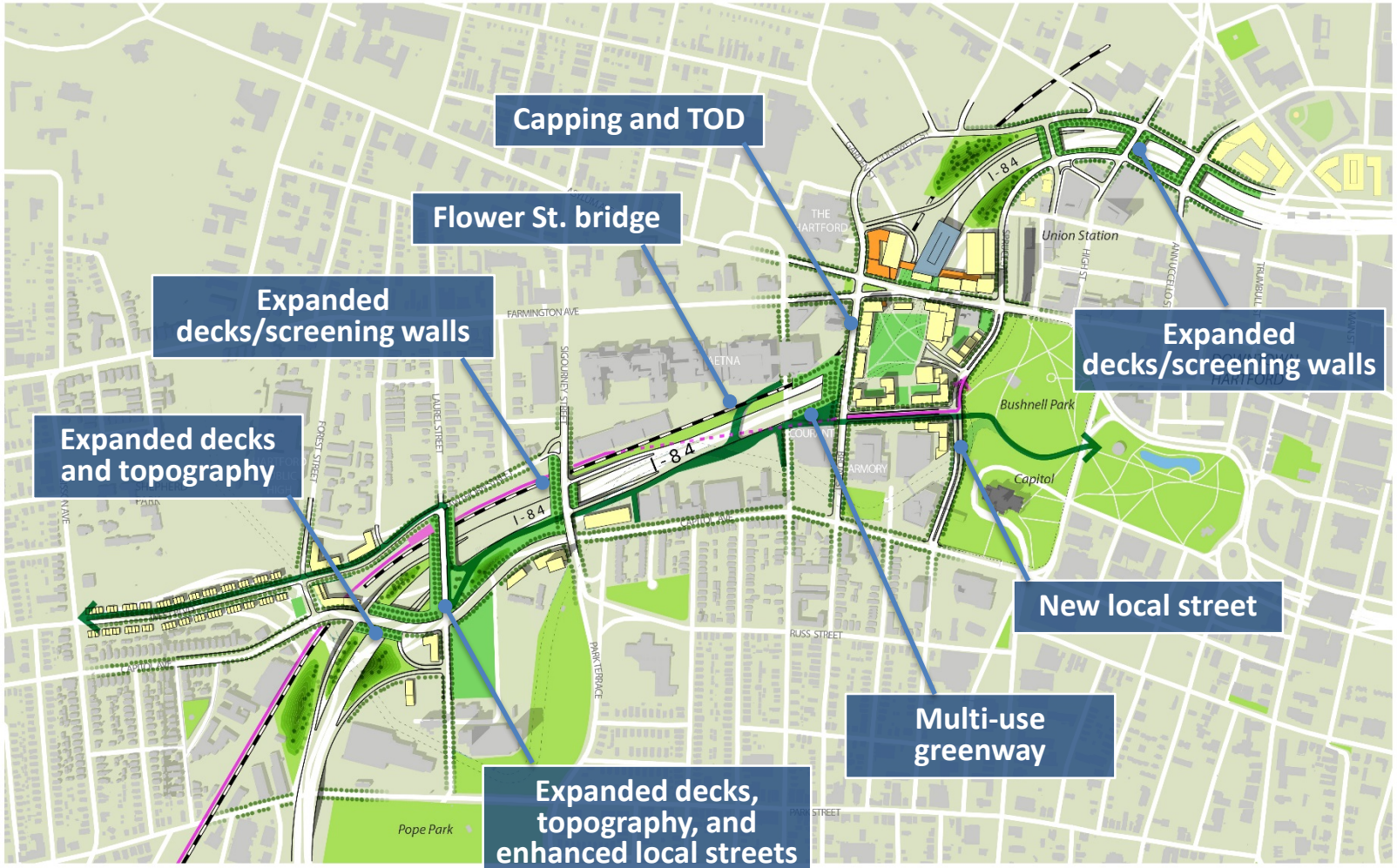
Alternatives Analysis Process

- Level 1 Screening Analysis
  - Recommended eliminating Tunnel Alternative
  - Recommended eliminating Elevated Alternative
  - Recommended further study of No-Build and Lowered Alternative
- Level 2 Screens further evaluation of Lowered Alternative



Existing Conditions

Integrating I-84 Into the City

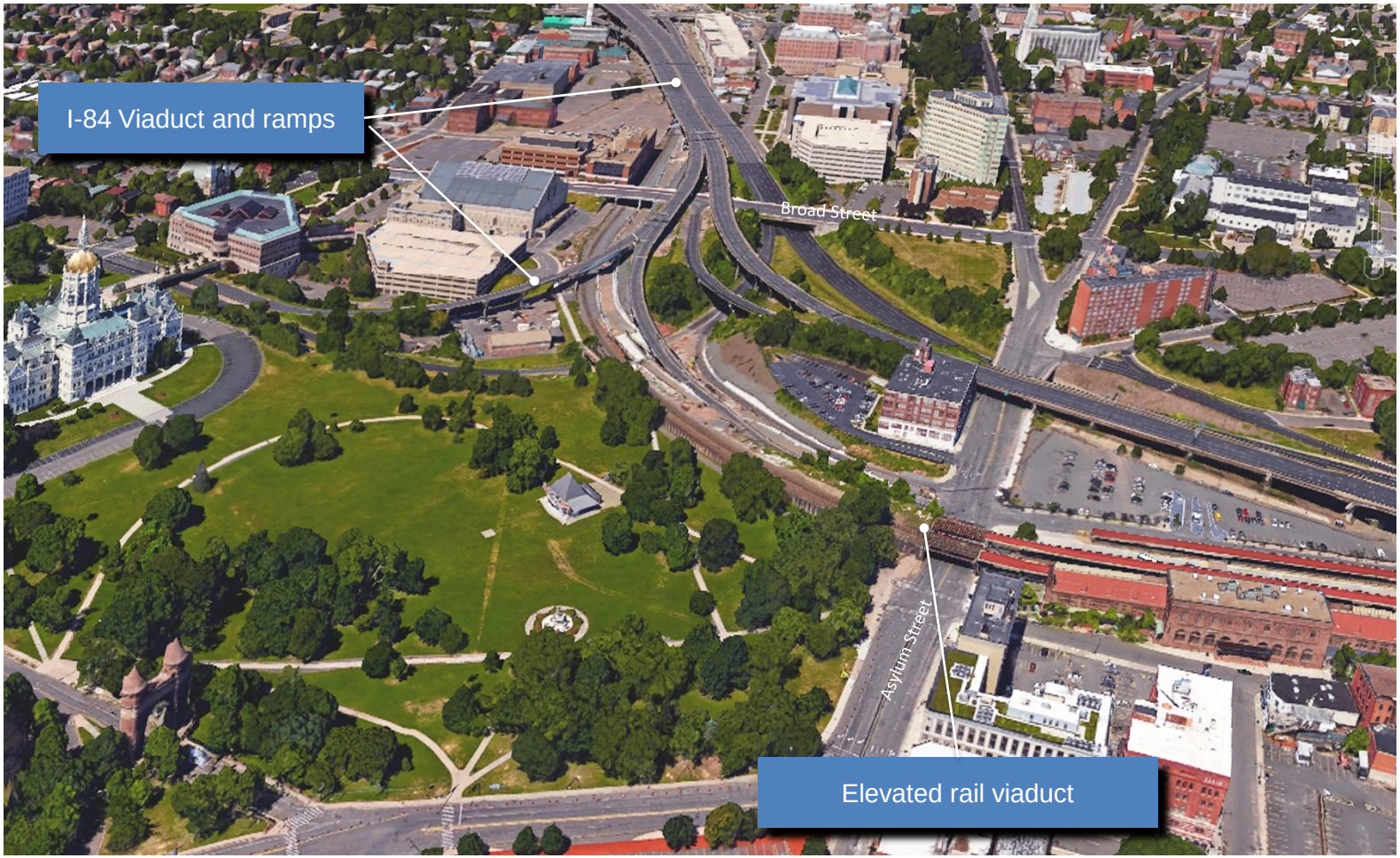


Multi-Use Greenway

Connectivity

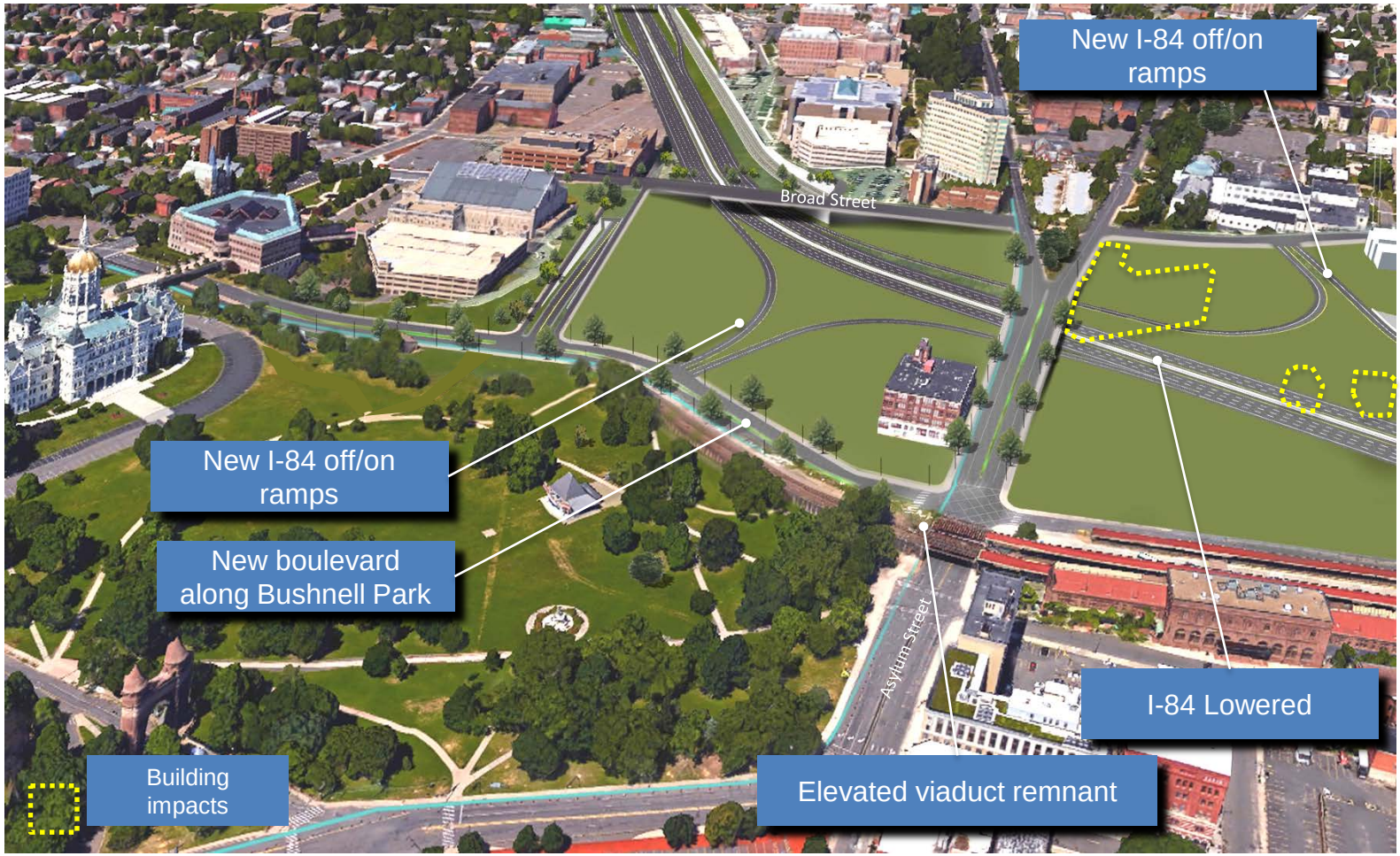
Asylum / Broad / Bushnell Park

Existing Conditions



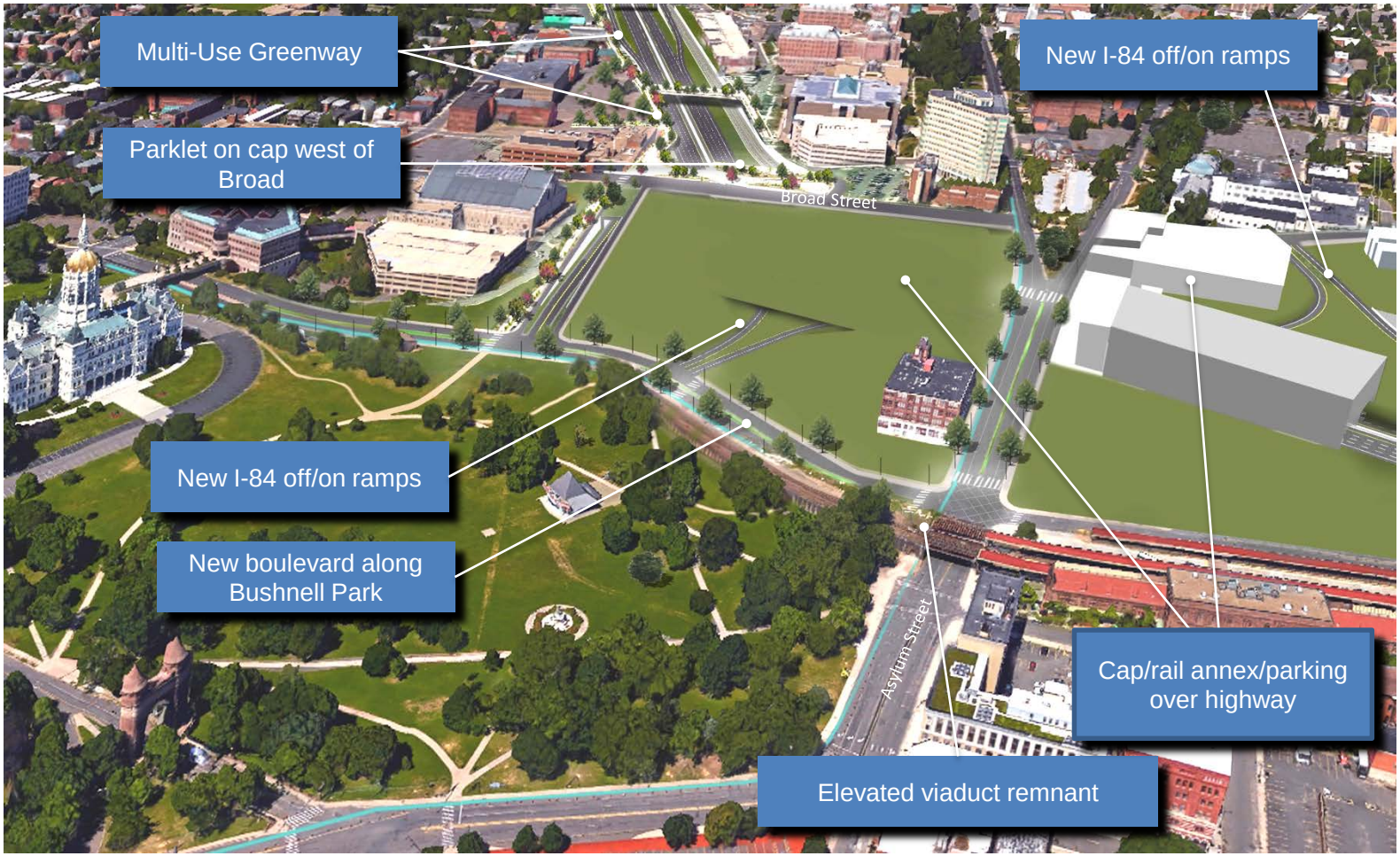
Asylum / Broad / Bushnell Park

Lowered Highway



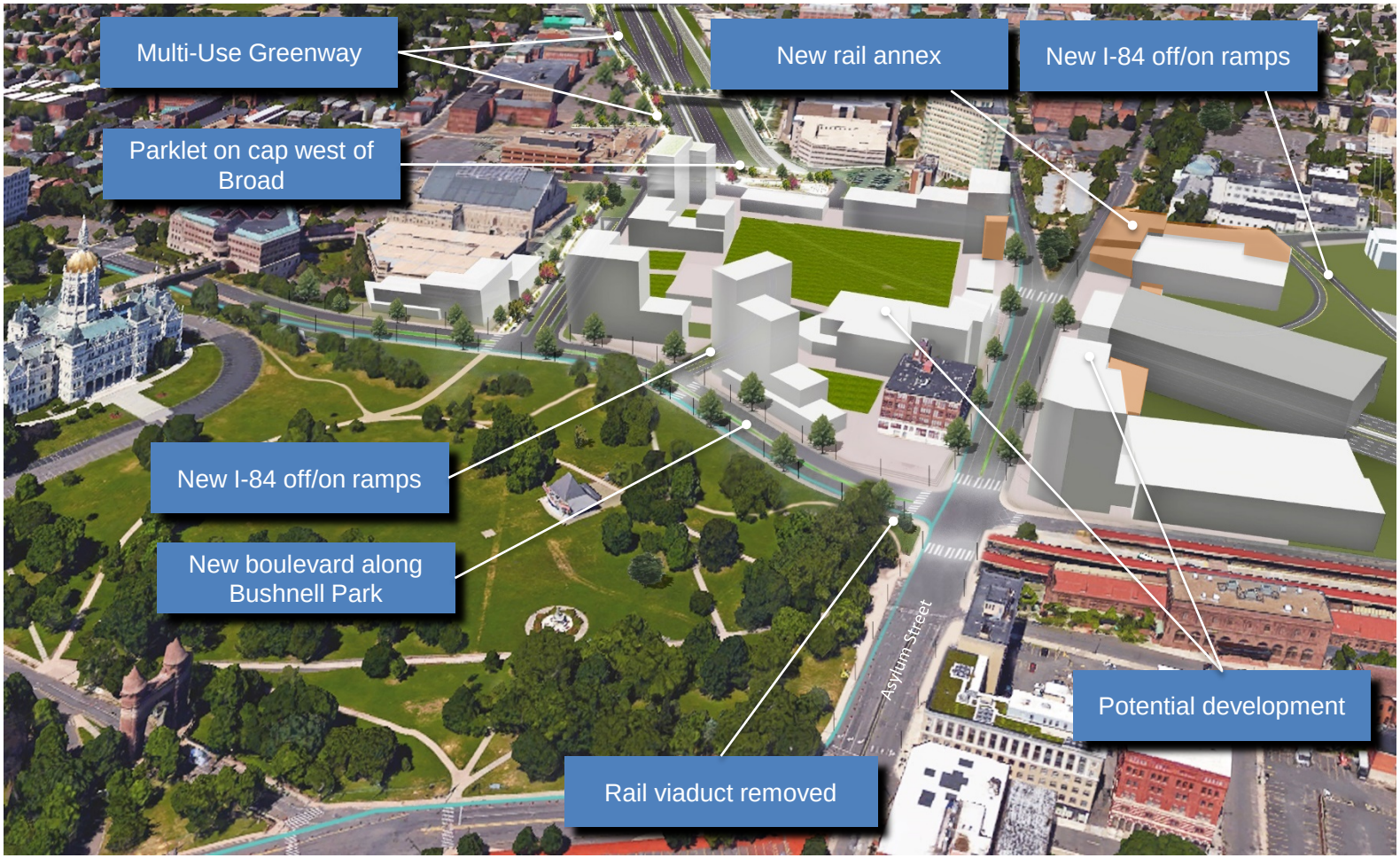
Asylum / Broad / Bushnell Park

Lowered Highway, Greenway, and Cap



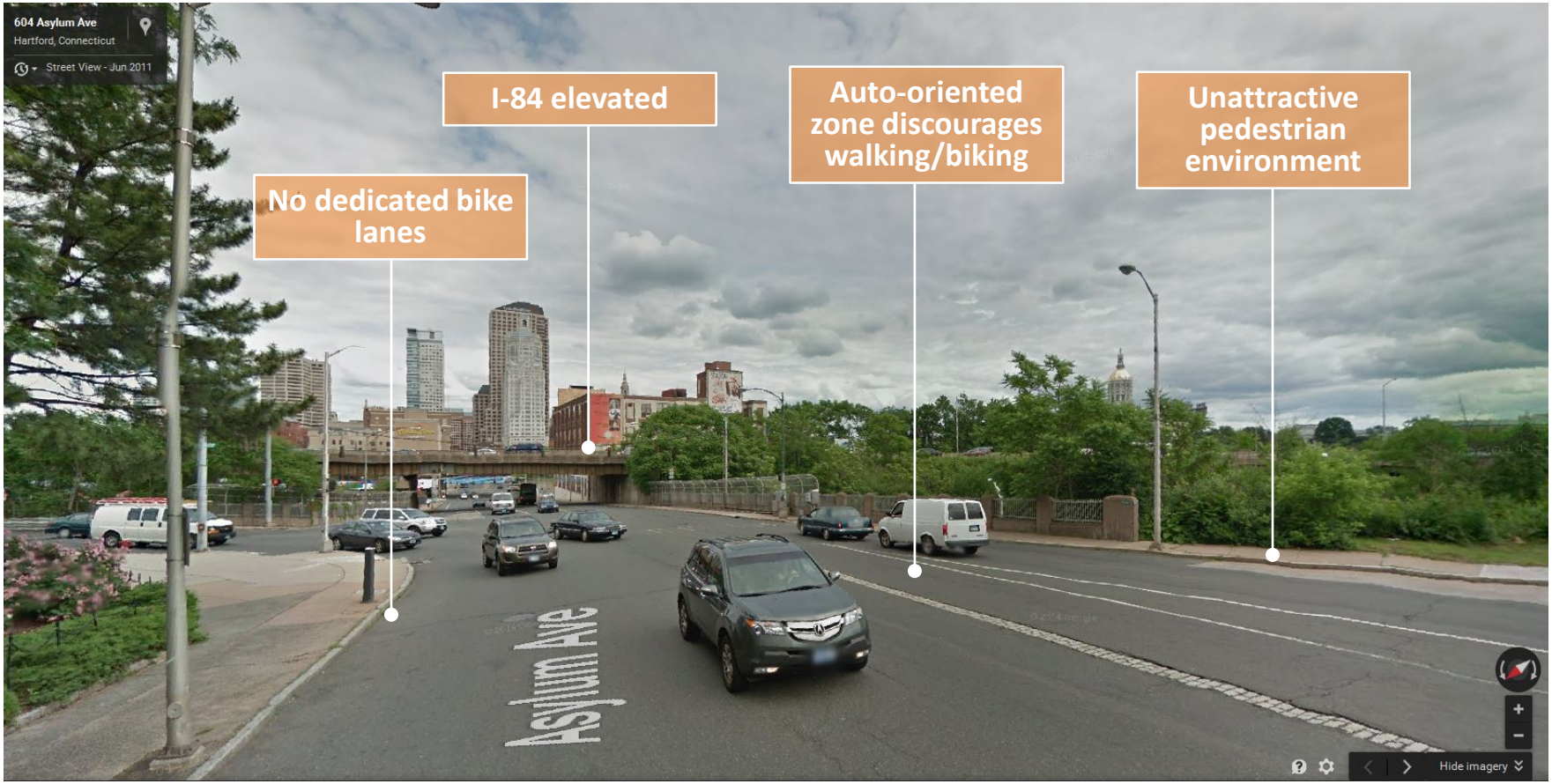
Asylum / Broad / Bushnell Park

Potential Development



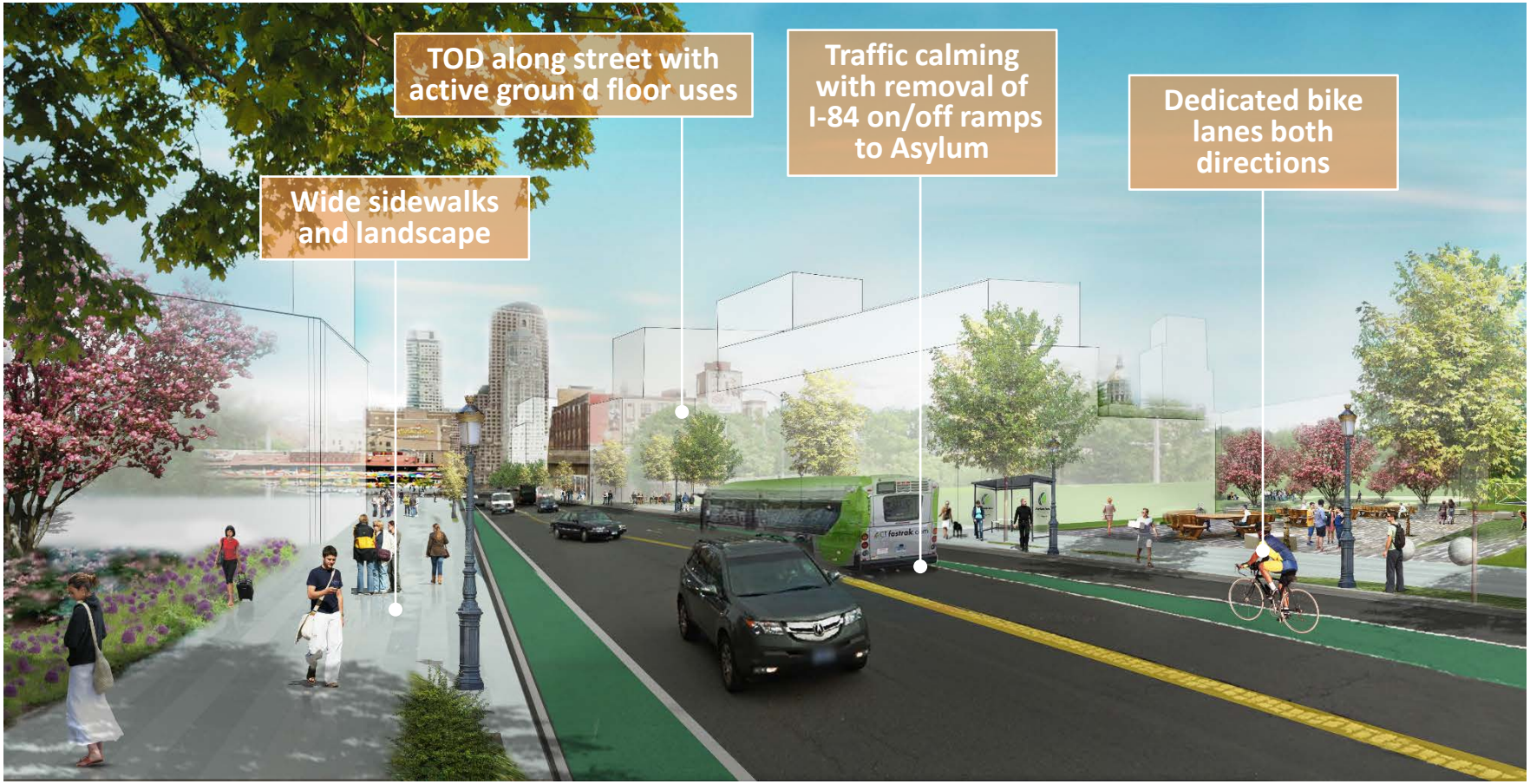
I-84 between Broad and Asylum

Existing view on Asylum Street



I-84 between Broad and Asylum

Potential view on Asylum Street



Union Station looking towards Capitol

Existing

Existing rail viaduct

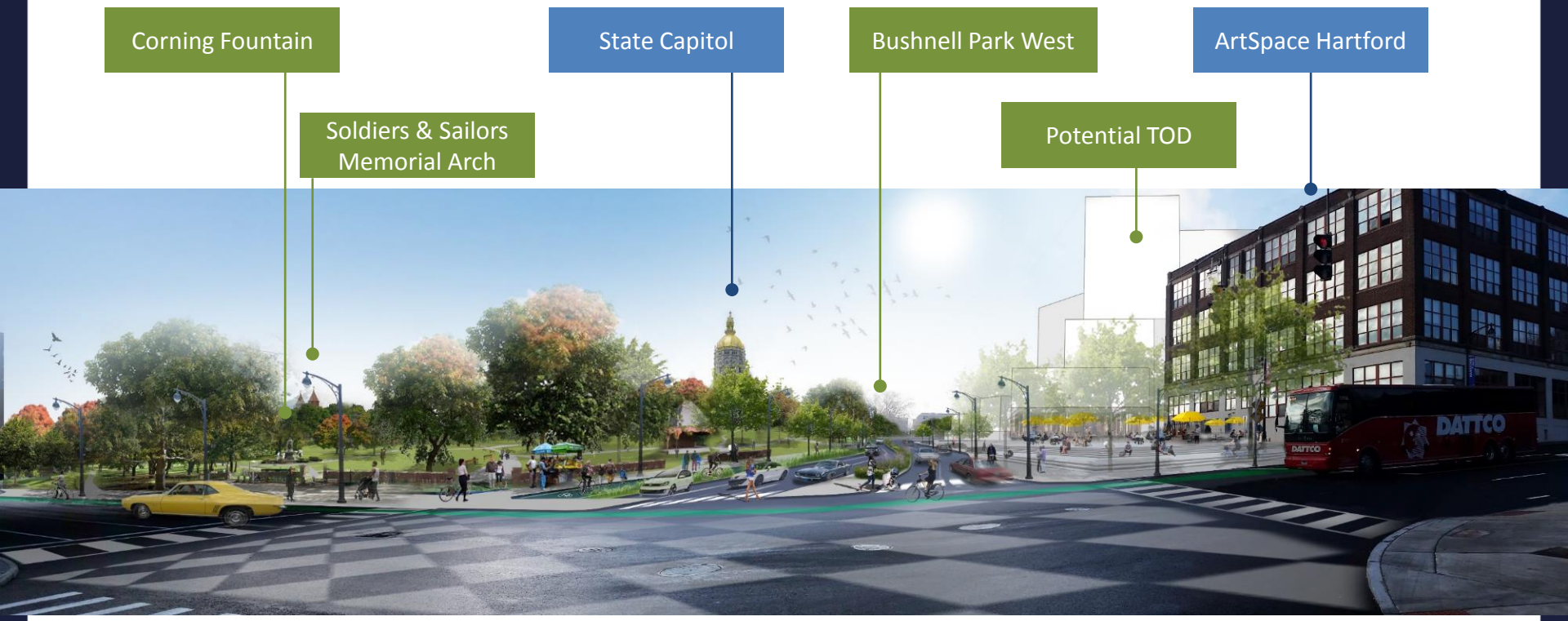
State Capitol

I-84 on/off ramps

ArtSpace Hartford

Union Station looking towards Capitol

Potential (without rail viaduct)



Capitol Avenue

Existing view looking east at Sisson Ave. Ramps

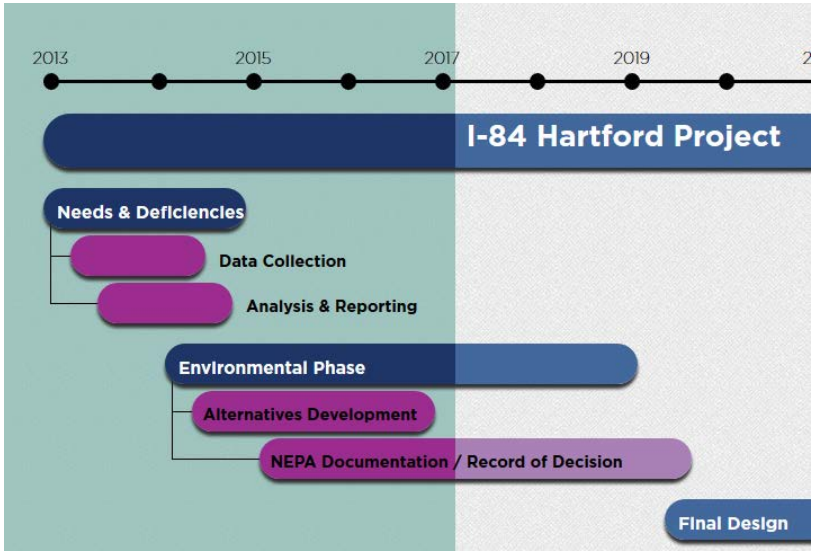
Capitol Avenue

Potential view looking east

Environmental Overview

NEPA / CEPA Timeline

- On-going technical analysis
- Draft EIS out for public review, summer 2018
- Public Hearing, end of 2018
- Final EIS, Summer 2019
- Record of Decision, Fall 2019



Draft EIS Format

- Purpose and Need
- Alternatives
- Agency Coordination and Public Outreach
- Existing Conditions, Impacts and Mitigation
- Indirect and Cumulative Impacts
- Construction Impacts
- Appendices

Draft EIS Appendices

- Air Quality
- Noise and Vibration
- Cultural Resources
- Hazardous Materials
- Land Use and Socioeconomic Conditions
- Natural Resources
- Power Plant Impacts
- Alternatives Analysis Screening Report
- Traffic Analysis Report
- Project Correspondence

Air Quality Analysis

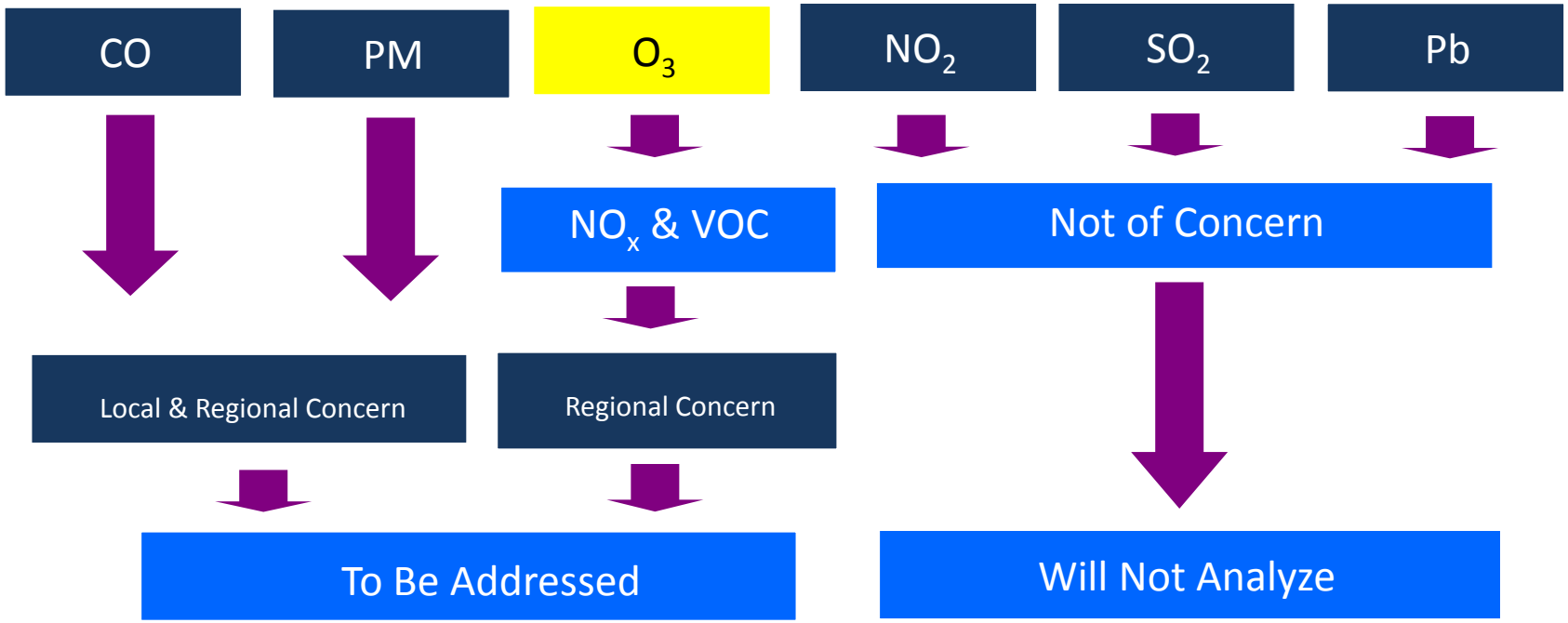
Key Terms

- Microscale “hot spot” – local concerns
- Mesoscale – emissions burdens within large scale areas around project corridor affected by the project
- Regional – emission effects over a region that is not in compliance with applicable ambient air standards

Project Related Emission Sources

- Operational Mobile Sources
  - Highway vehicle
  - Locomotive
- Operational Stationary Sources
  - Tunnel exhaust vent, if applicable
- Construction Mobile Sources
  - Non-road vehicle (equipment and trucks)

Criteria Pollutants of Concern For Transportation Project



Hartford County is in marginal nonattainment for ozone (O_3)

Hazardous Pollutants

- Priority Mobile Source Air Toxics (MSATs)
  - Acrolein
  - Benzene
  - 1,3-butadien
  - Diesel PM/diesel exhaust organic gases
  - Formaldehyde
  - Naphthalene.
  - Polycyclic organic matter (POM)

Greenhouse Gas

- Carbon Dioxide Equivalent (CO2e)
- Approximately 85% of greenhouse gas from energy consumption activities

Regulatory Requirements

- Criteria Pollutants – Compliance under CAA Conformity Rule and NEPA
  - CAA – 40 CFR Part 51 Subpart T and Part 93 Subpart A
    - SIP emission reduction goals for nonattainment pollutants
    - NAAQS including microscale hot spot analysis for localized nonattainment pollutants
  - NEPA
    - NAAQS including microscale analysis to address local concerns, particularly for a large scale transportation project
    - Mesoscale emissions burdens for disclosure for alternative comparisons
- MSATs under NEPA
  - 2012 FHWA Interim Guidance on MSAT and Further 2015 FHWA's Guidance on Conducting Quantitative MSAT Analysis for FHWA NEPA Documents
    - Quantitative MSAT analysis (AADT exceeds 140,000)

Agency Specific Guidance

- CTDEEP
  - CTDOT: consult with Air Planning & Standards Division
    - Develop air quality model to assess project traffic flow impacts
    - Identify how emissions from increased VMTs will be offset
- U.S. EPA
  - Confirm alternative of consistent design concept and scope is in most recent conforming Plan and TIP

Criteria Pollutant Impact Analysis

- Microscale Local Impact nonattainment pollutant hot spot analysis guidelines)
  - 40 CFR 93.123(a) on CO Project Level Hot Spot Analysis
  - 40 CFR 93.123(b) on PM Project Level Hot Spot Analysis
  - EPA 2015 methodology guidelines for using MOVES for Project Level CO and PM hot spot analysis
  - EPA 1992 guideline in selecting worst-case intersections for CO analysis
- Mesoscale Emissions within project-affected subarea network
  - Quantify and compare daily emissions based on daily volume and MOVES emission factors for pollutants of concern
- Project-level Transportation Conformity Determination
  - Demonstrate microscale impacts are in compliance with the NAAQS
  - Confirm in DEIS that preferred alternative will be included in the future TIP, provide subarea traffic model and work with MPO to make formal conformity determination from MPO during Final EIS

MSAT Analysis

- Microscale Local Impact
  - Define sensitive land uses
  - Quantify corridor mainline and ramp daily MSAT emissions and compare among alternatives
- Mesoscale Emissions
  - Quantify daily emissions based on daily volume and MOVES emission factors and make alternative comparisons

Greenhouse Gas and Climate Change Analysis

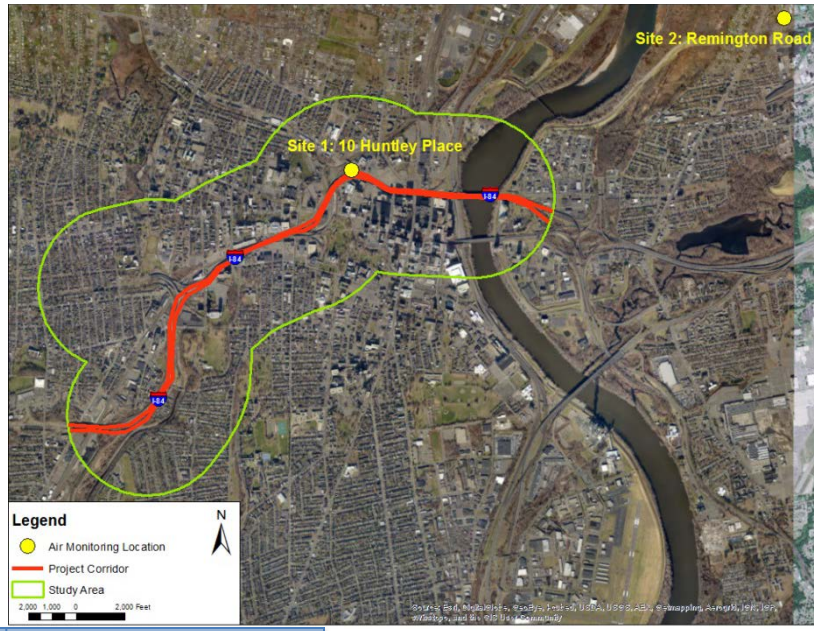
- Methodology development is still evolving
- Mesoscale Emissions within subarea network
  - Quantify annual change in emissions using MOVES-predicted emission factors
- Climate change impact on project
  - Provide discussion of climate trend within the area based on historical data
  - Evaluate potential vulnerability of project area to climate change

Analysis Summary

- Localized Impact Analysis
  - Screening/Microscale Analysis for CO
  - Qualitative Analysis for PM
    - PM unlikely required for further microscale modeling analysis
  - Corridor Network MSATs Emissions Burden Analysis
- Mesoscale Emissions Burden Analysis
  - Disclosure of all pollutants including greenhouse gas emissions for each alternative
- Regional Impact
  - Preferred Alternative to be included in the future conforming TIP
- Project-level Transportation Conformity Determination
  - Localized impact analysis results
  - Project TIP inclusion statement for regional impact
- Construction Impact Analysis
  - Qualitative analysis based on construction duration that would be less than 5 years at individual site (40 CFR 93.123(c))

Affected Environment

- Good air quality condition other than ozone



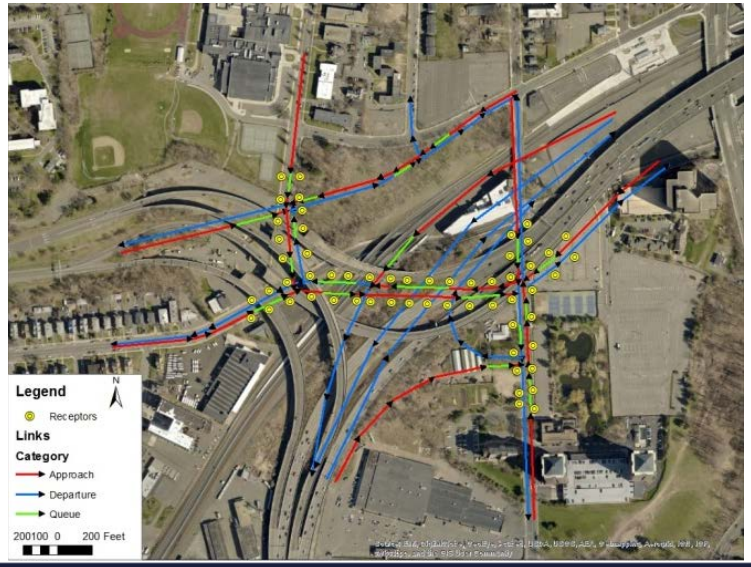
Pollutant	Location	Units	Averaging Period	NAAQS	Years		
					2013	2014	2015
Carbon Monoxide (CO)	10 Huntley Place, Hartford	ppm	8-hour	9	1.3	1.5	1.5
			1-hour	35	1.9	1.8	1.8
Ozone (O_3)	Remington Road, East Hartford	ppm	8-hour	0.070	0.077	0.077	0.075
					0.076		
Nitrogen Dioxide (NO_2)	10 Huntley Place, Hartford	ppb	1-Hour	100	48.0	51.0	51.0
					50.0		
			Annual	53	15.2	14.5	15.7
Particulate Matter (PM_{10})	Remington Road, East Hartford	$\mu g/m^3$	24-Hour	150	28.0	25.0	27.0
					26.7		
Particulate Matter ($PM_{2.5}$)	10 Huntley Place, Hartford	$\mu g/m^3$	Annual	12	7.7	7.6	9.9
					8.8		
			24-Hour	35	24.0	18.0	23.0
					20.5		
Sulfur Dioxide (SO_2)	Remington Road, East Hartford	ppb	1-Hour	75.0	9.0	7.0	5.0
					7.0		

Environmental Consequences – Localized CO Modeling

- 6 worst-case intersections have been selected for further dispersion modeling
- Partial geometric models have been developed

Worst-case Intersections

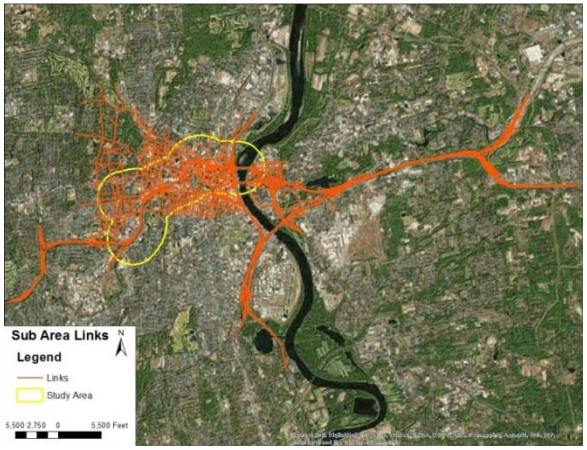
Sample Geometric Model



Environmental Consequences – Localized MSATs/Mesoscale Emissions Burden

- Work in progress
- Corridor/Subarea link networks have been identified and correlated with MOVES-predicted emission factors for all relevant pollutants

Corridor area network for MSATs



Subarea network for all intersections

Next Steps

- Complete Air Quality Technical Report
- Complete Draft EIS
- Draft EIS public hearing and public comment period
- Final EIS/Record of Decision (ROD)

Additional Questions and Comments