Eisenhower expressway

Illinois Department of Transportation

Austin Boulevard Interchange Design Discussion

September 28, 2015

Expressway Construction Pre-dates Modern Design Standards

- Expressway designed and constructed in 1950's
- No past experience to base design standards on
- Little or no data – safety vs. design
- No noise or air quality standards at the time
- Existing ramps designed to minimize ROW footprint.

PROJECT NEEDS

- Safety
- Mobility
- Facility condition and design
- Create an asset for the communities

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DENSE URBAN SETTING POSES MULTIPLE DESIGN CONSTRAINTS

- Constrained existing right-of-way
- CTA Blue Line
- CSX Railroad
- Vehicle & non-motorized crossings
- Drainage

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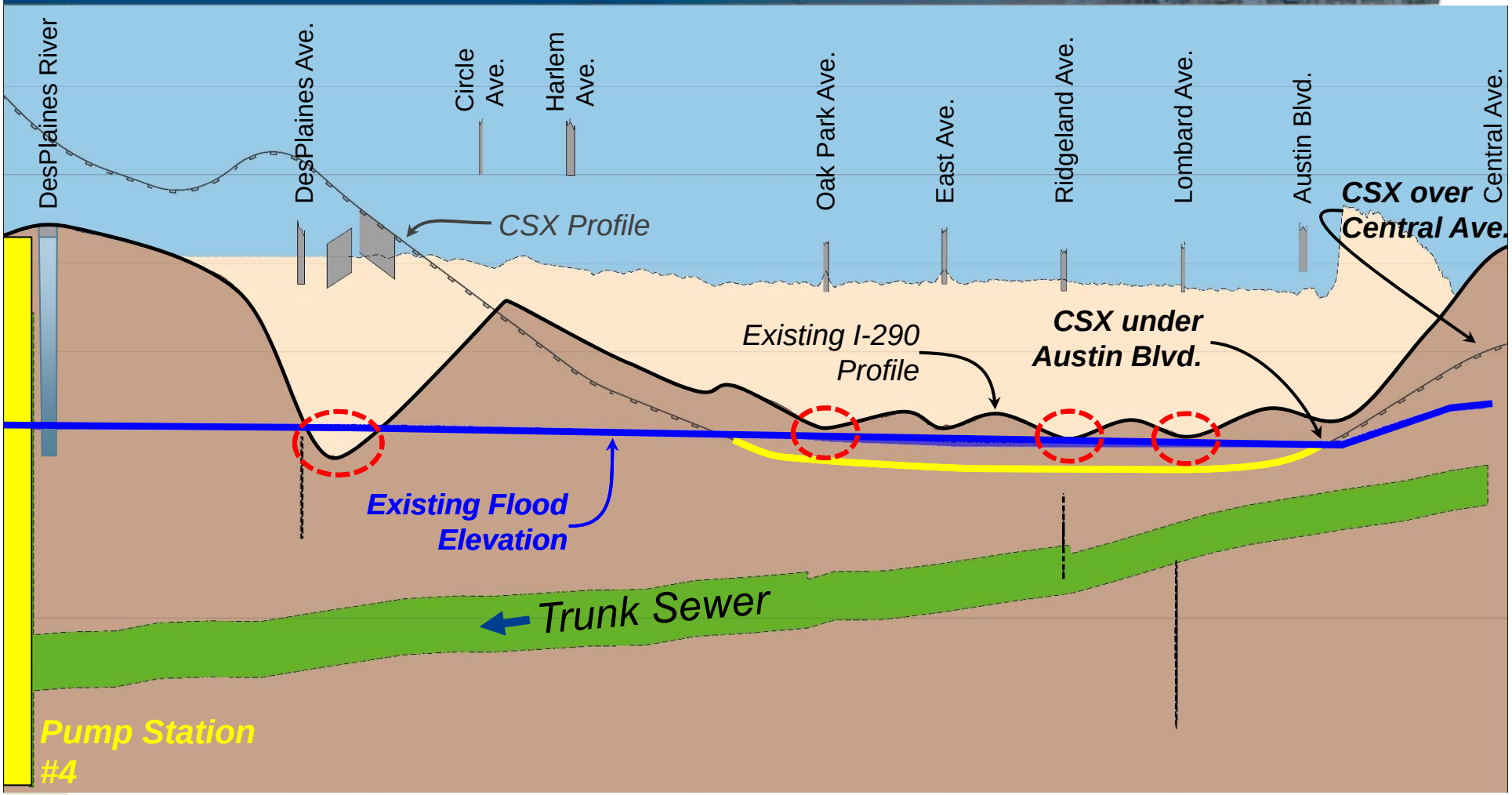
EXISTING DRAINAGE SYSTEM IN OAK PARK

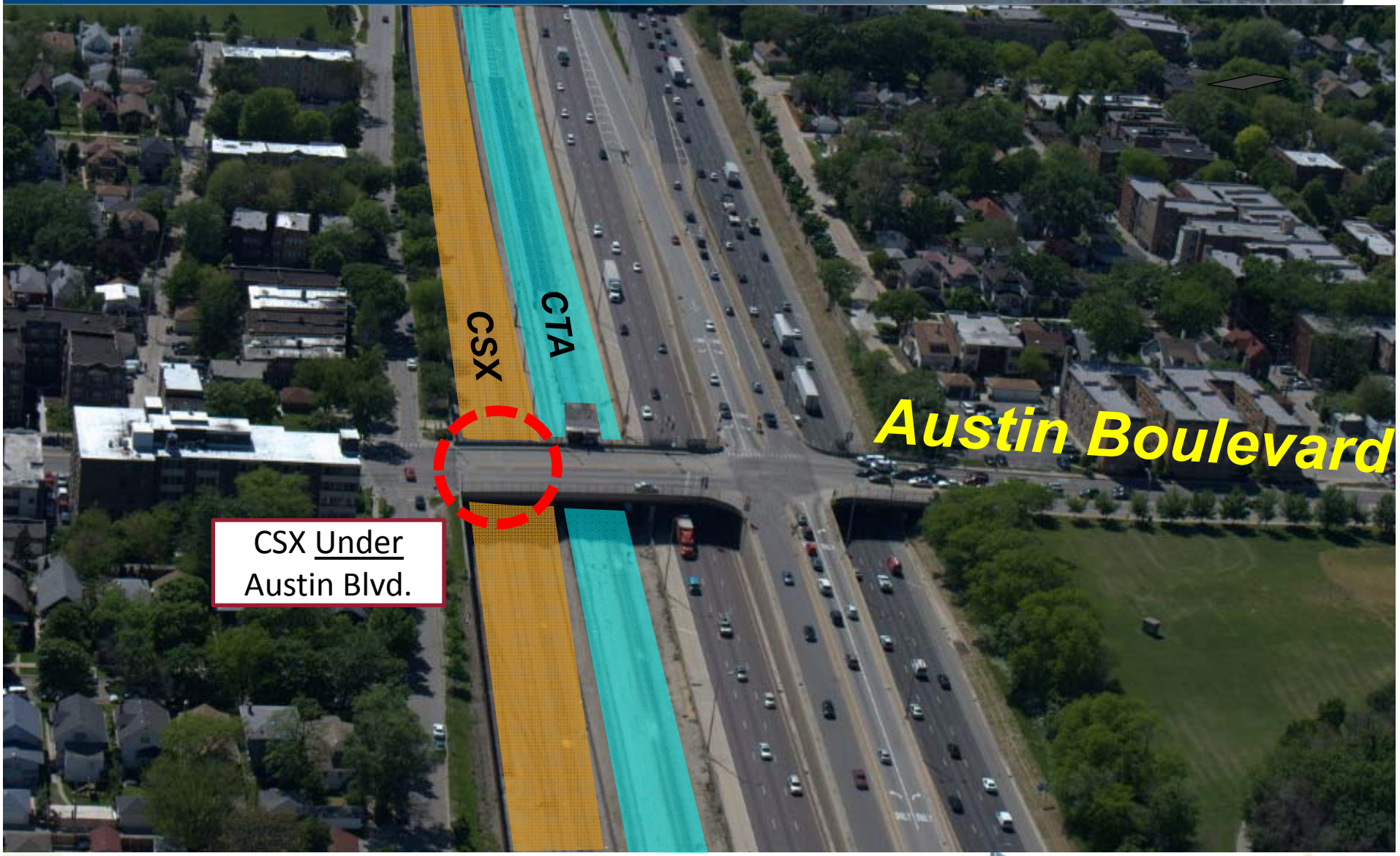
- I-290 trunk sewer begins at Central Avenue
- Drains west to Pump Station #4 @ DesPlaines River
- Drains I-290, CTA and CSX in this area

EXISTING DRAINAGE SYSTEM IS UNDERSIZED & RESULTS IN EXPRESSWAY AND RAIL FLOODING

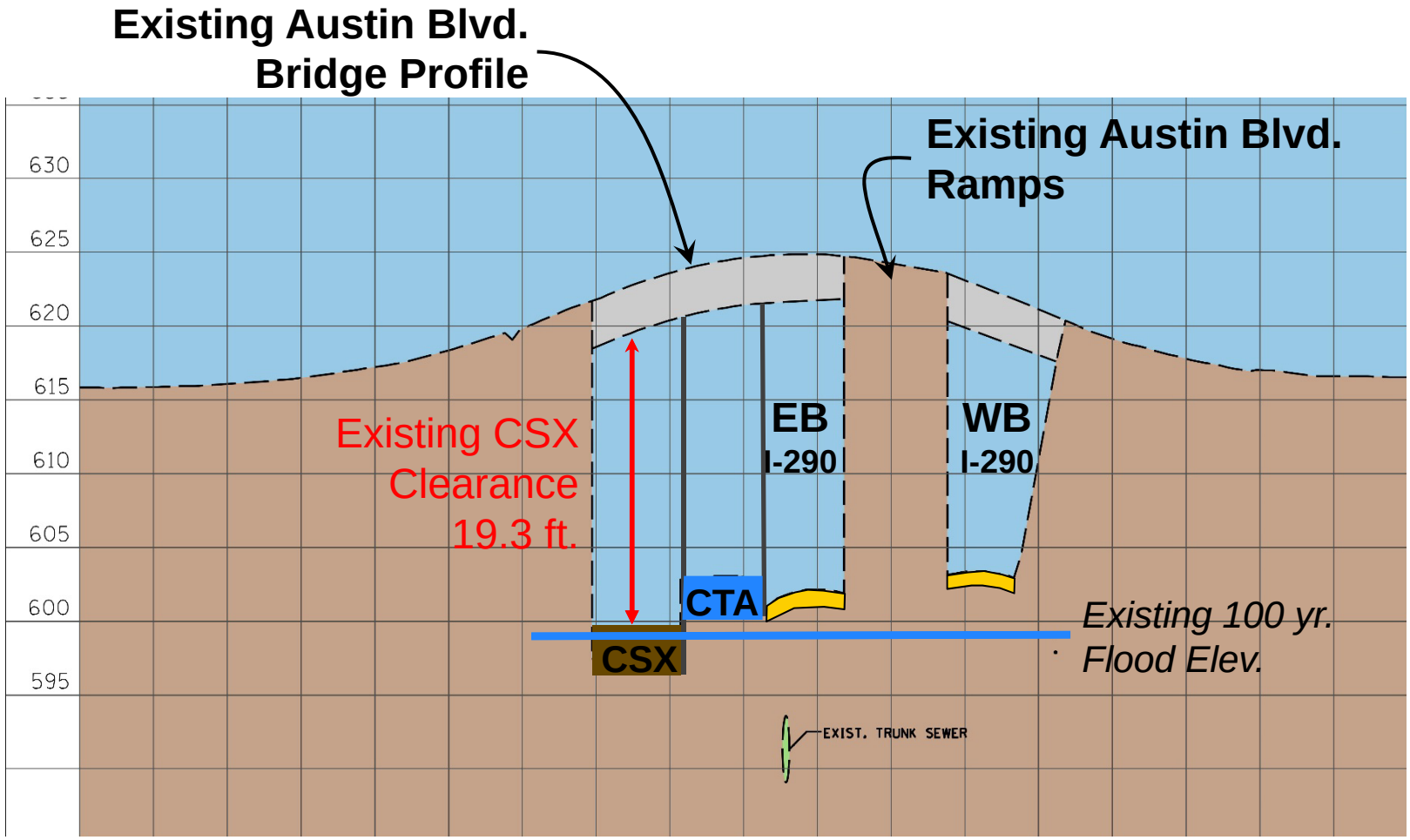


- Existing system cannot adequately convey storm water during heavy storms
- Existing expressway system designed for 10-year storm
- I-290, CTA, and CSX are subject to frequent flooding

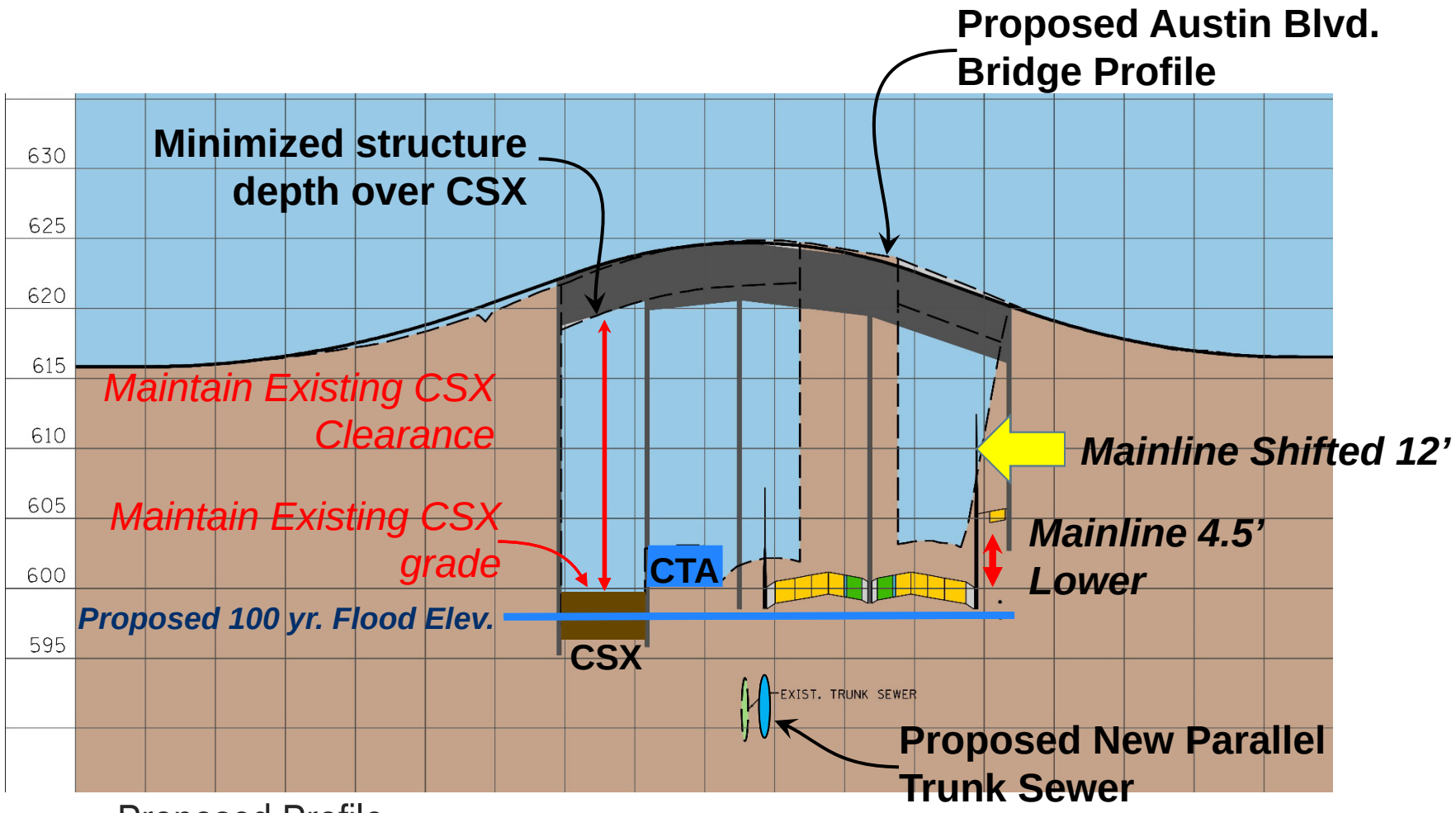
Drainage & CSX Profile Influence Austin Boulevard Design



Drainage Requirements and CSX Rail are Design Constraints at Austin Boulevard



Proposed Austin Boulevard Profile Lowers Mainline & Meets Drainage Requirements



- Proposed Profile
  - Lowers mainline around Austin Boulevard
  - No profile impacts to CTA or CSX
  - Meets expressway drainage freeboard requirements

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Air Quality Effects

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CARBON MONOXIDE INTERSECTION SENSITIVITY ANALYSIS

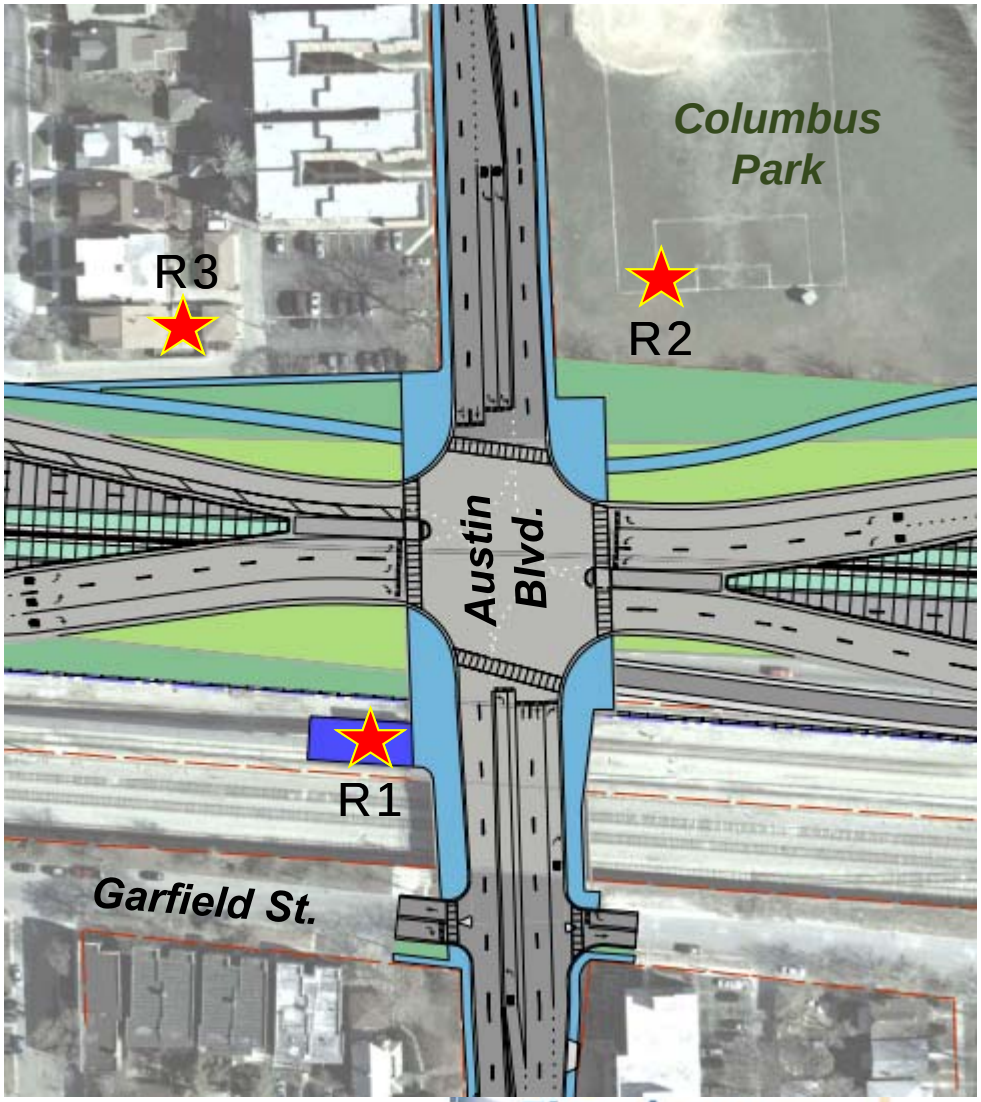
- Criteria:
  - 62,500 ADT highest design ***1-way*** volume
  - Austin Blvd. ***2-way*** ADT 20,900 - 22,000
- Used as sensitivity analysis
- CO concentration measured in parts per million (ppm)
  - 70 ppm – some health concern
  - 150 - 200 ppm – serious heath concern
- Greatest exposure – ***inside a car***
- Pass/Fail standard for transportation projects:
  - Established to protect vulnerable populations (children, elderly, etc.)
  - 9 ppm - 8 hour average
  - 35 ppm - 1 hour average

AUSTIN BOULEVARD RAMPS CO ANALYSIS

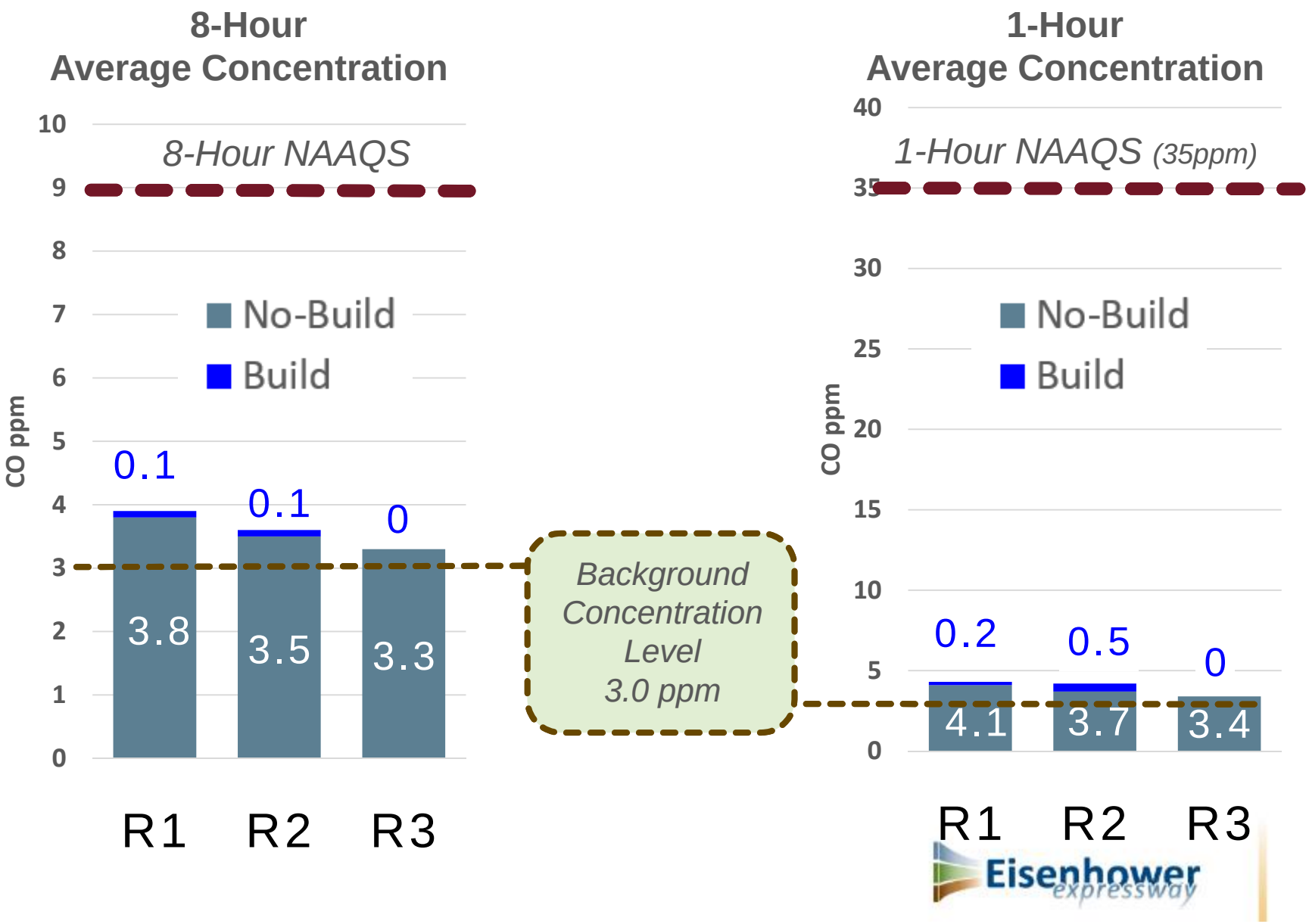
- CO Factors
  - Background CO
    - 3 ppm assumed
    - 2 ppm measured in field
  - Traffic volume
  - Proximity/location of receptors

AUSTIN BOULEVARD RAMPS CO ANALYSIS

- Closest receptor locations:
  - R1 – CTA Blue Line Station entrance
  - R2 – Columbus Park field
  - R3 – Residence

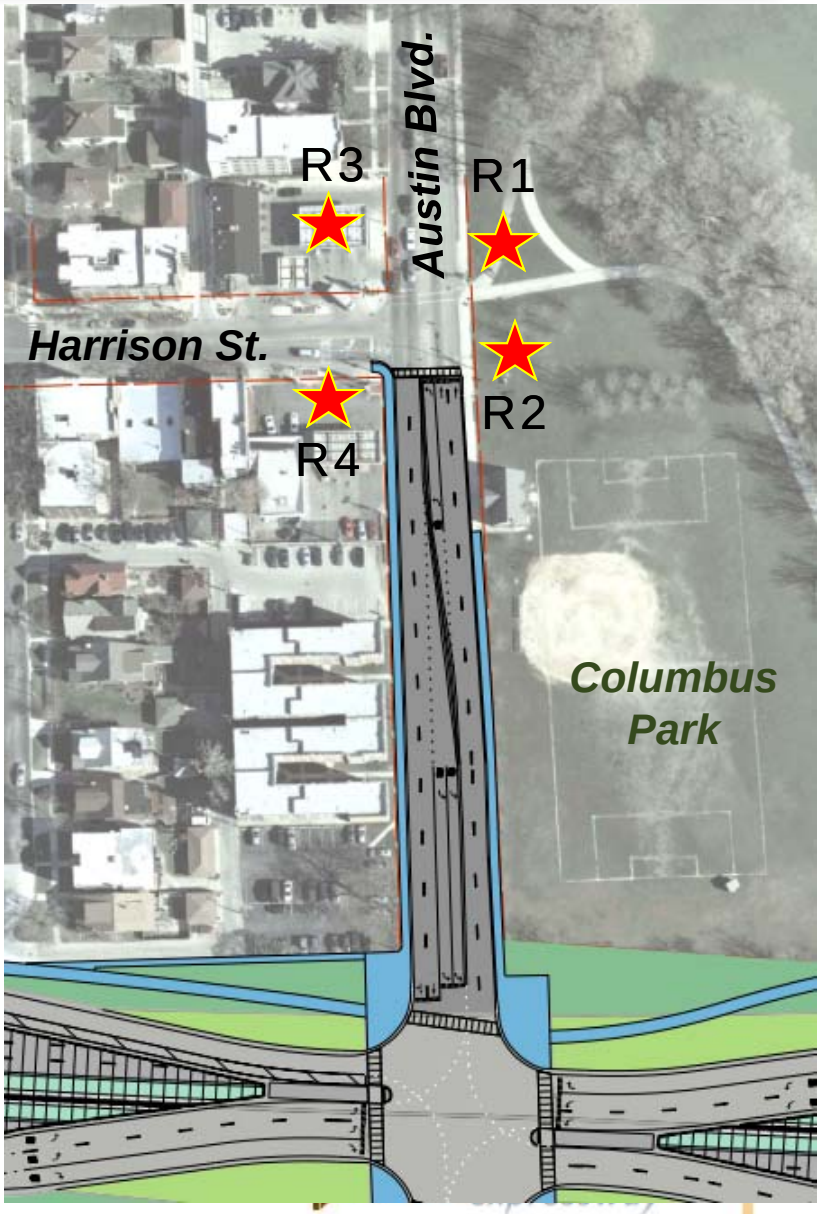


AUSTIN BLVD. RAMPS CO SENSITIVITY ANALYSIS

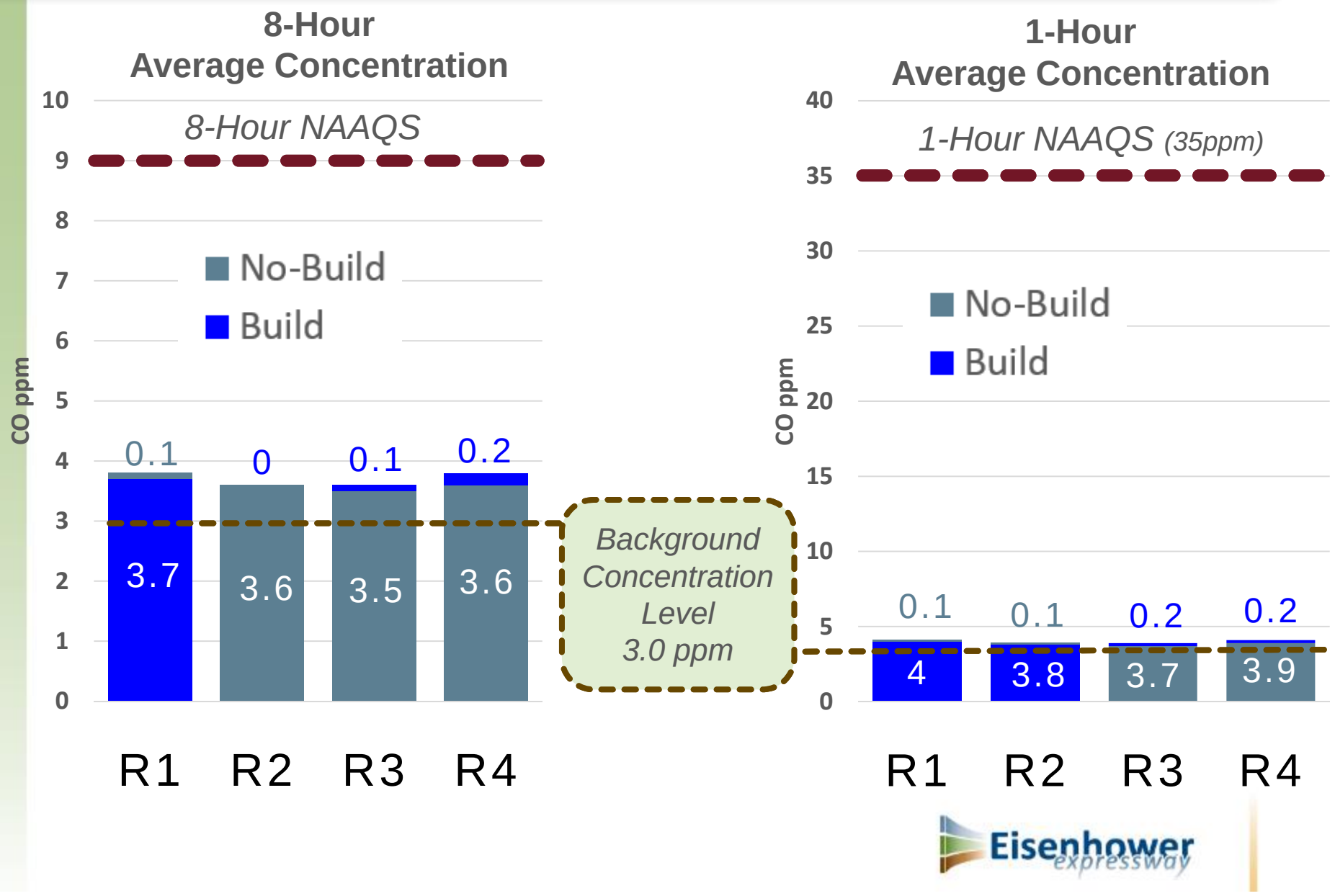


AUSTIN BOULEVARD & HARRISON ST. CO ANALYSIS

- Closest receptor locations:
  - R1 – Columbus Park Trail
  - R2 – Columbus Park Trail
  - R3 – Gas Station NW Corner
  - R4 – Gas Station SW Corner

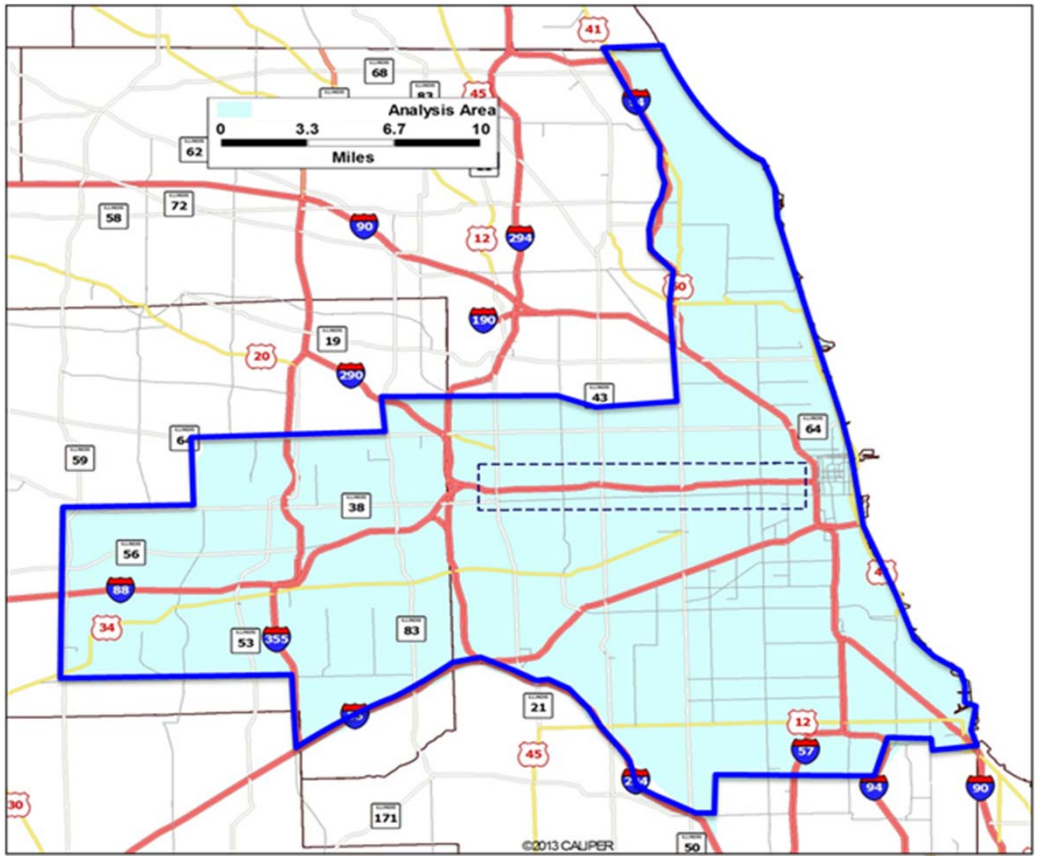


AUSTIN BLVD. & HARRISON ST. CO SENSITIVITY ANALYSIS



Mobile Source Air Toxics (MSAT)

- Transportation related MSATs are caused by incomplete engine combustion
- USEPA's MOVES2014 was used to calculate the most common transportation related MSATs based on:
  - traffic volumes and speeds
  - meteorological data
  - vehicle and fleet mix
- The MSAT Analysis Area was identified based on comparisons between the No Build and proposed build alternatives highway network link volumes



Mobil Source Air Toxins (MSAT) Analysis

Pollutant	Burden (lbs)	% Change from No Build			
	No Build	GP Lane	HOV 2+	HOT 3+	HOT 3+ & TOLL
Acrolein	6.39	-0.08%	-0.07%	-0.17%	-0.62%
Benzene	90.41	0.30%	-0.04%	-0.08%	0.05%
1,3 Butadiene	0.40	-0.20%	-0.08%	-0.20%	-0.83%
Diesel PM	274.54	0.10%	-0.13%	-0.16%	-1.11%
Formaldehyde	141.55	-0.07%	-0.07%	-0.17%	-0.60%
Naphthalene	11.94	-0.02%	-0.06%	-0.16%	-0.53%

- No standards for MSAT established by USEPA
- No significant change from no-build
- No significant change between alternatives

Air Quality Sensitivity Analysis Summary

- Stakeholder Air Quality concerns: conduct sensitivity analyses
  - COSIM: *well below standard*
  - Air Quality Sensitivity: *major transportation-related pollutants, including PM and ozone show no significant change. Positive trends (lower pollutant levels than No Build) for managed lanes alternatives*
  - MSAT: *no significant change, positive trends for managed lane alternatives*

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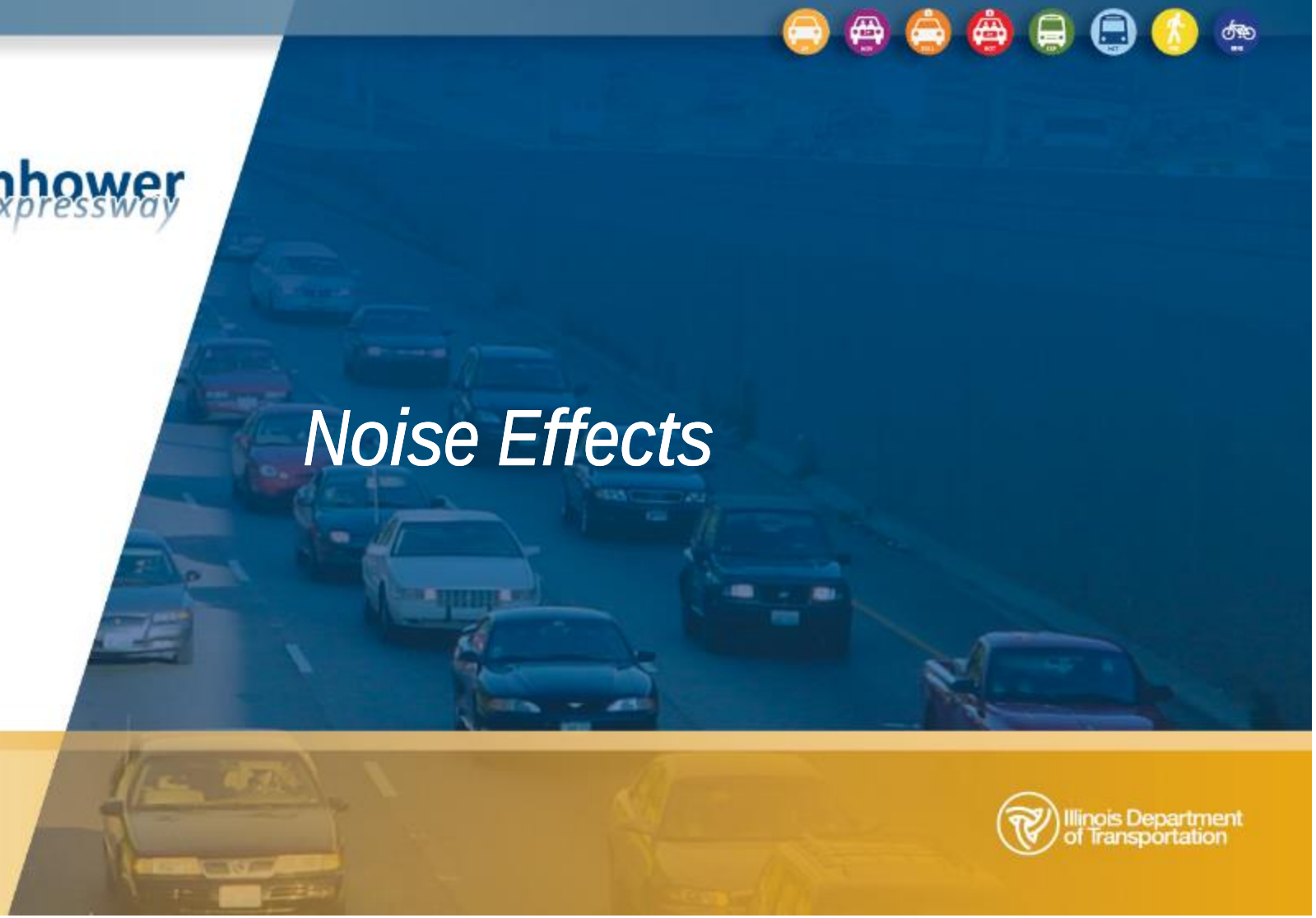
Noise Effects



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Austin Blvd. Ramp Geometry Noise Sensitivity Analysis

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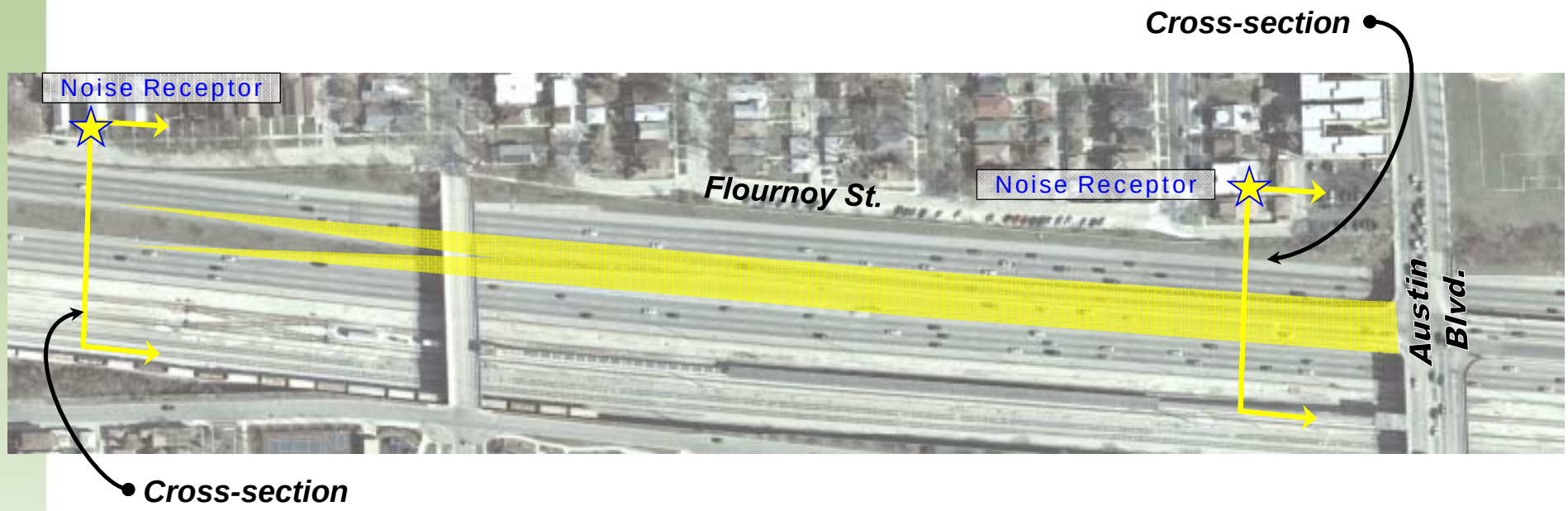
2 Noise Receptor Locations in Oak Park:

- Just east of Austin Boulevard
- At proposed WB on-ramp entrance location



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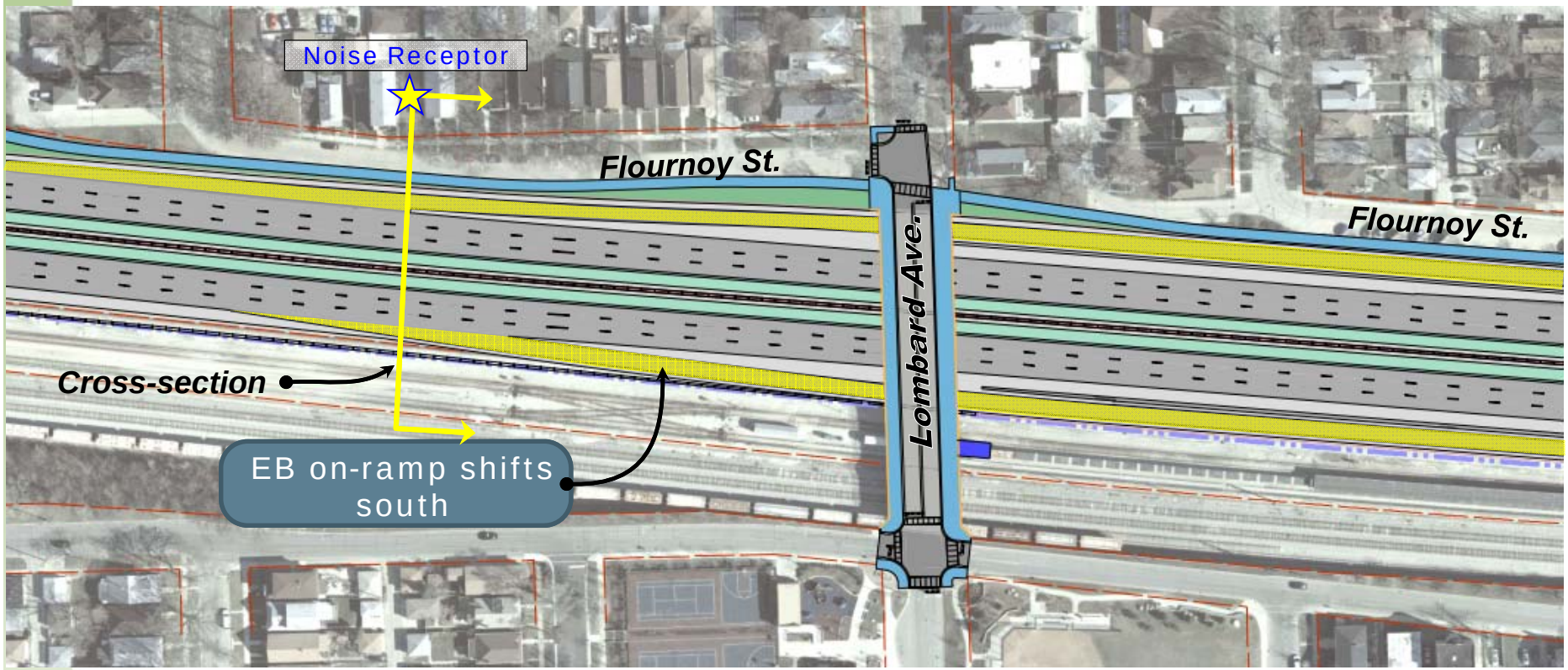
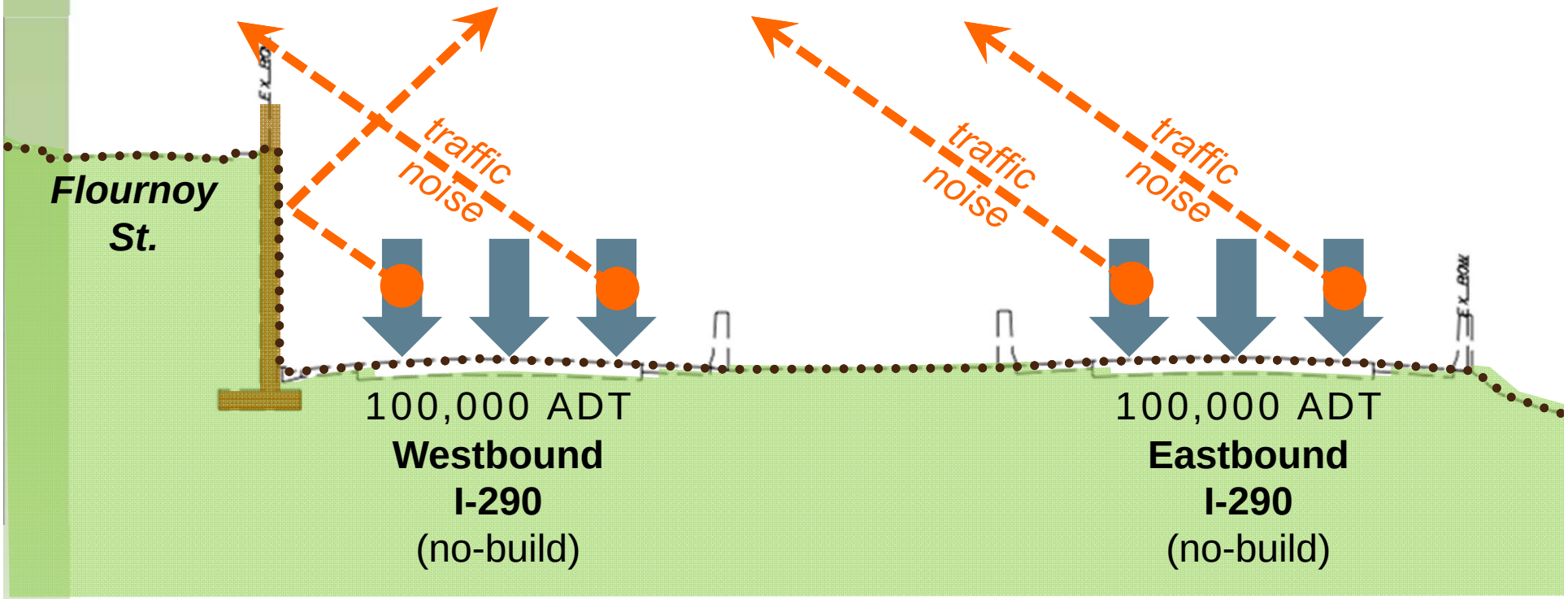
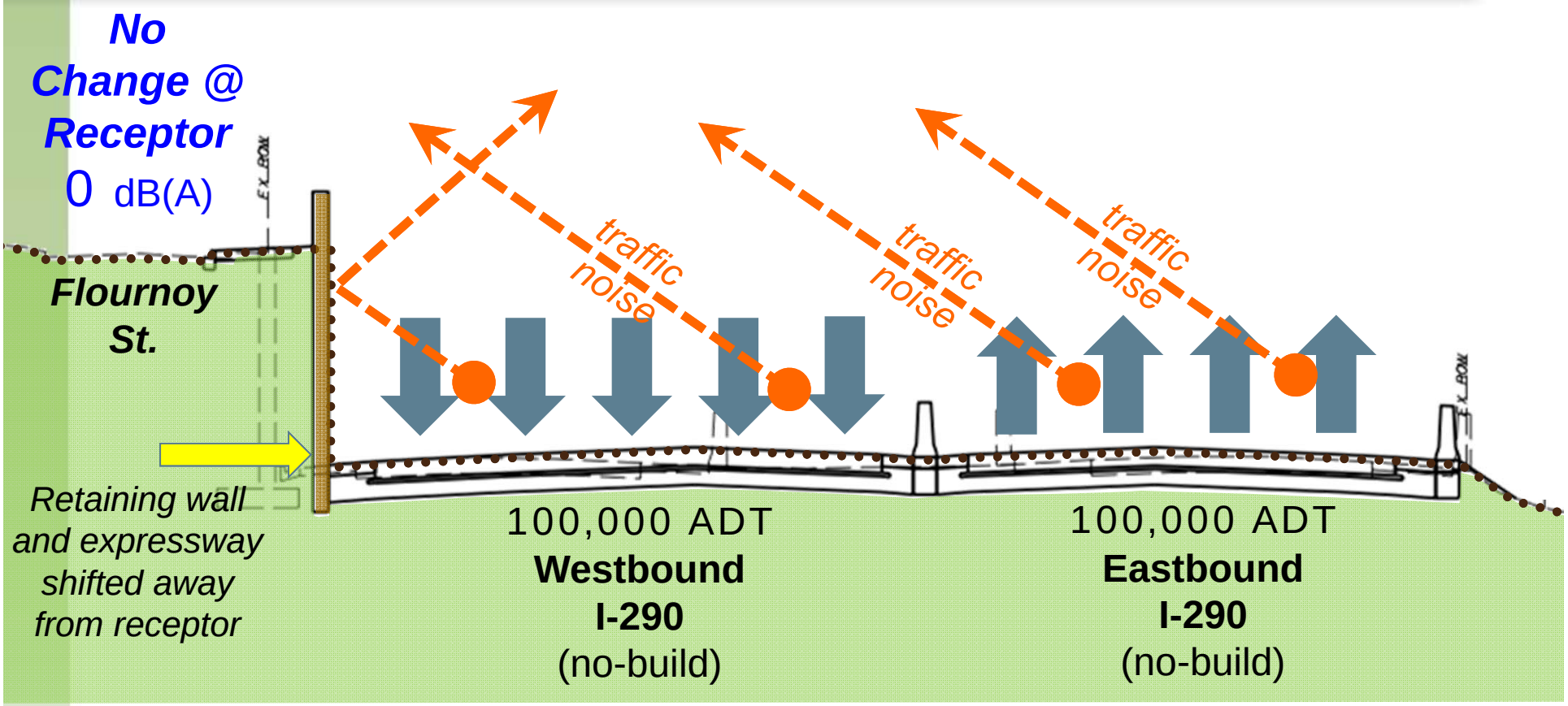
Noise Sensitivity at Proposed Ramp Terminal



Existing Cross-Section at Proposed Ramp Terminal



Proposed Cross-Section at Proposed Ramp Terminal



Key findings:

- No change in noise level at on-ramp terminal
- Mainline traffic shifted away from Flournoy Street

Proposed Ramps at Austin Boulevard

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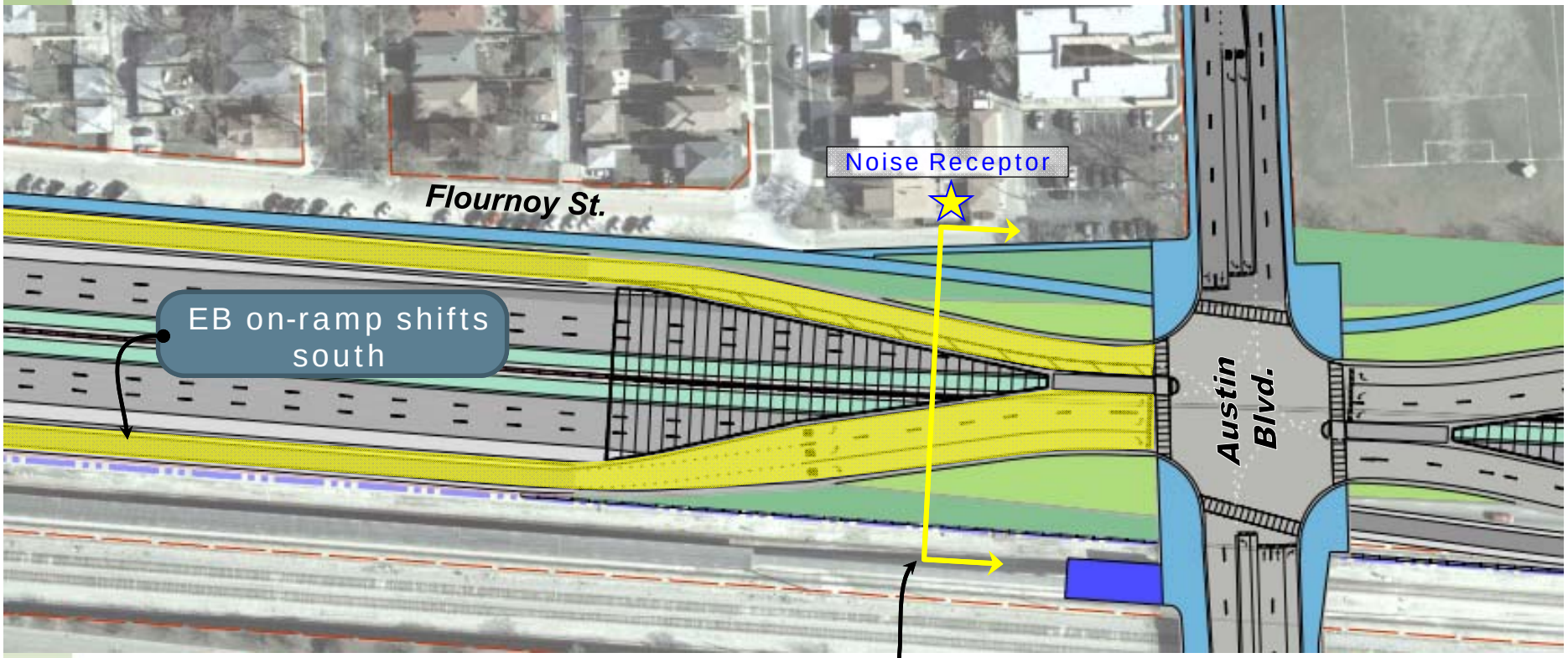
Receptor Location & Proposed Ramps



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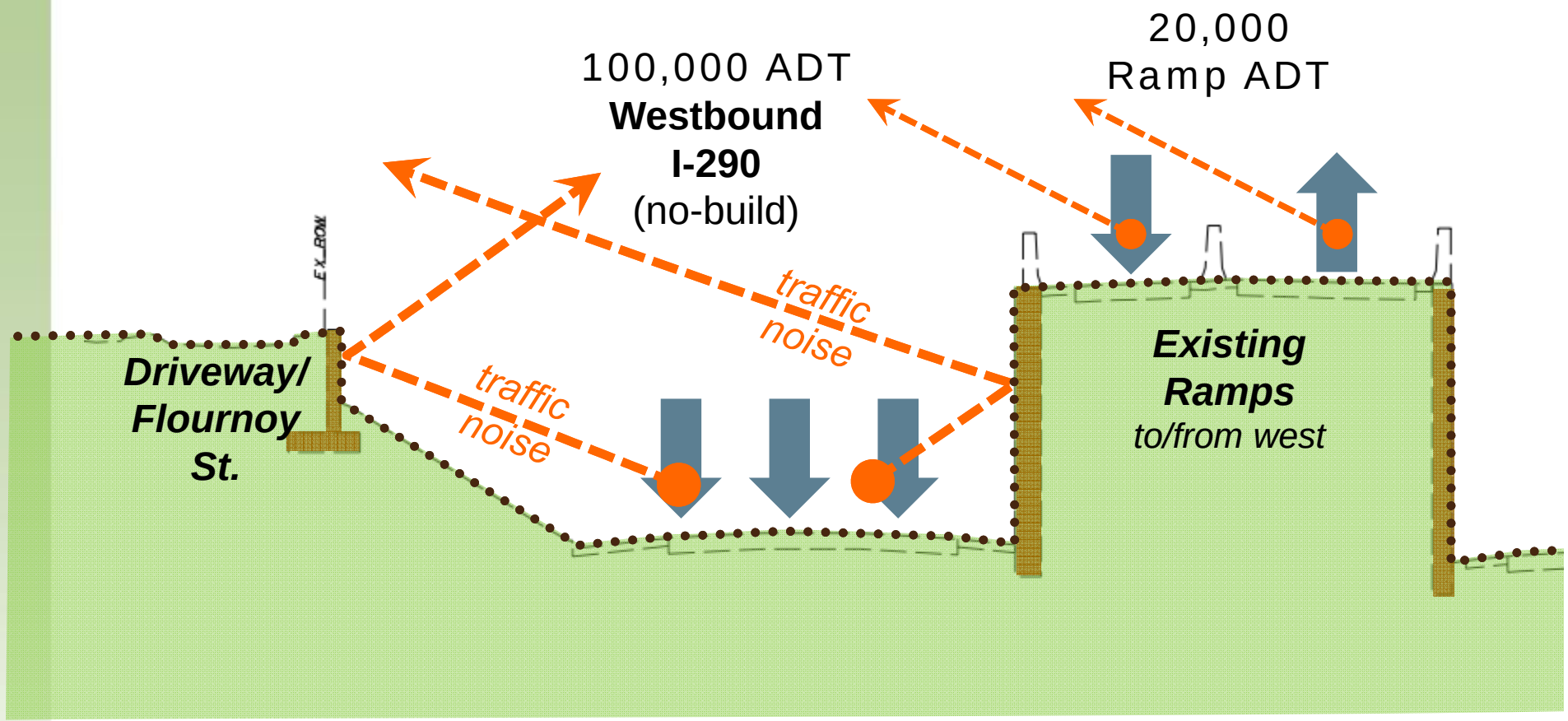

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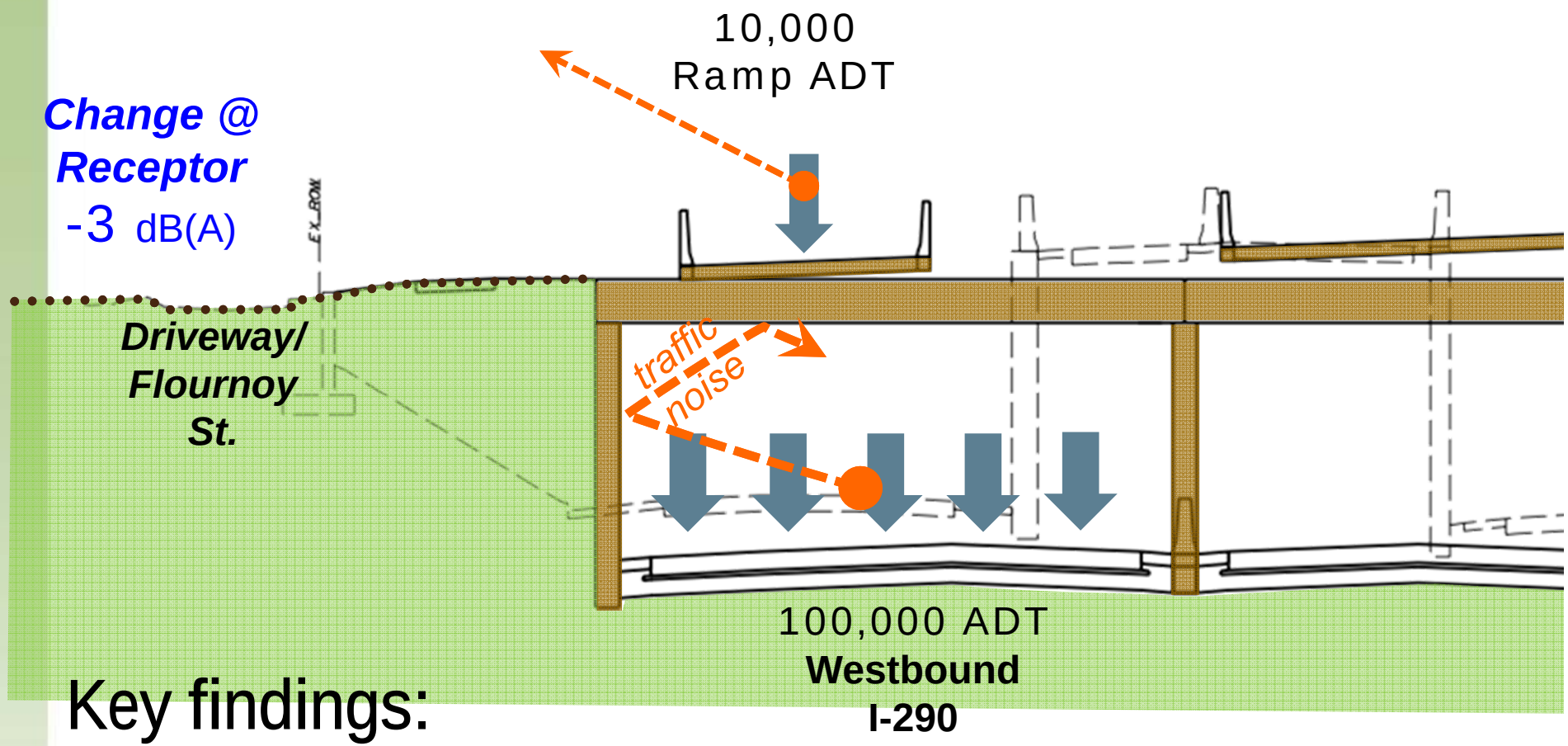

Key findings:

- Mainline is the predominant noise source
- Ramp location does not significantly affect overall noise levels

Noise Sensitivity Analysis

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Findings

- Mainline I-290 is primary traffic noise generator
  - Mainline I-290 shifted south, away from park/community
  - Mainline I-290 elevation lowered
- Retaining wall & ramp configuration improves shielding
- Overall noise levels reduced (-1 to -3 dB(A))
  - Change in noise due to geometry not perceptible to barely perceptible

Full noise wall analysis is in progress

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Aesthetics & Visualizations

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VISUALIZATIONS

- 3D Model
- Before & After Photo Simulations

PROPOSED DESIGN FEATURES OFFER BALANCE AND BENEFITS

- Expressway lowered by 4.5 ft. & shifted by 12 ft.
- Proposed design features
  - Ramps split – Half existing ramp volume shifted south
  - Traffic volume tradeoff
    - 10,000 ramp ADT *instead of* 100,000 WB I-290 ADT
- Design offers built-in noise reductions – up to 3 dB(A)
- Ramp design does not influence air quality
- Improved bike & pedestrian environment
- Aesthetic opportunities

NOISE WALL FORUMS

- Tentatively set for October 27, 28 & 29
  - IDOT will invite properties that would benefit.
  - Others can attend as well

- After public forums, owners and residents of designated properties asked to vote for or against a noise wall.
  - Vote outcome will determine if a noise wall will be constructed in the future.