West Oakland Environmental Indicators Project

Prescott Greening

May 7th, 2025

Content

1 Welcome + Intros

2 WOCAP recap

3 2025 Calendar

4 Prescott Greening - Hyphae

5 Reflection & wrap-up

Share who you are

April Recap

Progress So Far

- Measuring Black Carbon at 8 locations; all started up during winter-spring 2024 and will continue through spring 2025
- Measuring dust and metals at 7 locations all started up during winter-spring 2024 and will continue through spring 2025
- Deployed 20 Purple Air sensors in the community
- Measuring road silt at 8 locations in West Oakland before and after street sweeping occurs
- Education: Buy in from West Oakland Schools for an after-school implementation. Identified teachers from neighboring school districts to participate as well.

West Oakland Environmental Indicators Project

Road Silt Sampling and Analysis

- Road dust is collected using an adaptation of EPA Method AP-42 and Das and Wiseman et al [1]
- Collection uses broom and vacuum to collect road dust
- Samples are weighed and sent to the lab
- The laboratory determines the silt fraction (portion of total mass that has size <75 µm [<200 mesh]) using sieve analysis
- The silt can be further fractionated to PM_{10} and $PM_{2.5}$ using resuspension and dichotomous sampling[2]
- PM10 and PM2.5 fractions can be analyzed using X-ray fluorescence

Image of sampling area in West Oakland

1. Das, Sourav, and Clare LS Wiseman. "Examining the effectiveness of municipal street sweeping in removing road-deposited particles and metal (loid) s of respiratory health concern." *Environment International* 187 (2024): 108697.
2. Sarver, R. H. (1996). Aerosolization as a means of sample preparation of geological materials for XRF analysis and its validity compared to EPA method 3050a digestion. *Journal of the Air & Waste Management Association*, *46*(3), 234-240.

Tracking progress in disadvantaged communities over time
Connecting lines of evidence to understand **what's working**

Models are critical for **planning and evaluation of policies**.

Long-term **measurements**: **see what's really happening**.

What *if* ?

What *is* ?

"Observing system"
Combine models & measurements to put it all together.

WOCAP Strategies (2025 Focus)

- Optimizing the Port's appointment system (Strategy #FSM-6)

- Call for the Port of Oakland to study the truck traffic and public health impacts from larger container ships, (Strategy #43)

- Continue the work of "greening" the shipping industry (Strategy #63)

Looking at 2025

Which months would you like as a working session?

June

July

August

September

October

November

Which months should we break?

June

July

August

September

October

November

What should we steer for June?

Q1			Q2			Q3			Q4		
Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
No Mtg - Winter Break	***No Mtg - Internal Planning***	**Strategy Tracking**	**Enforcement Report and Discussion**	**Policy/ Project Deep Dive**	**Internal / External Evaluation**	***Skip - Summer Break***	**Strategy Tracking**	**Enforcement Report and Discussion**	**Policy/ Project Deep Dive**	**Town Hall**	**Internal / External Evaluation** **Year End Progress Report**

Prescott Greening

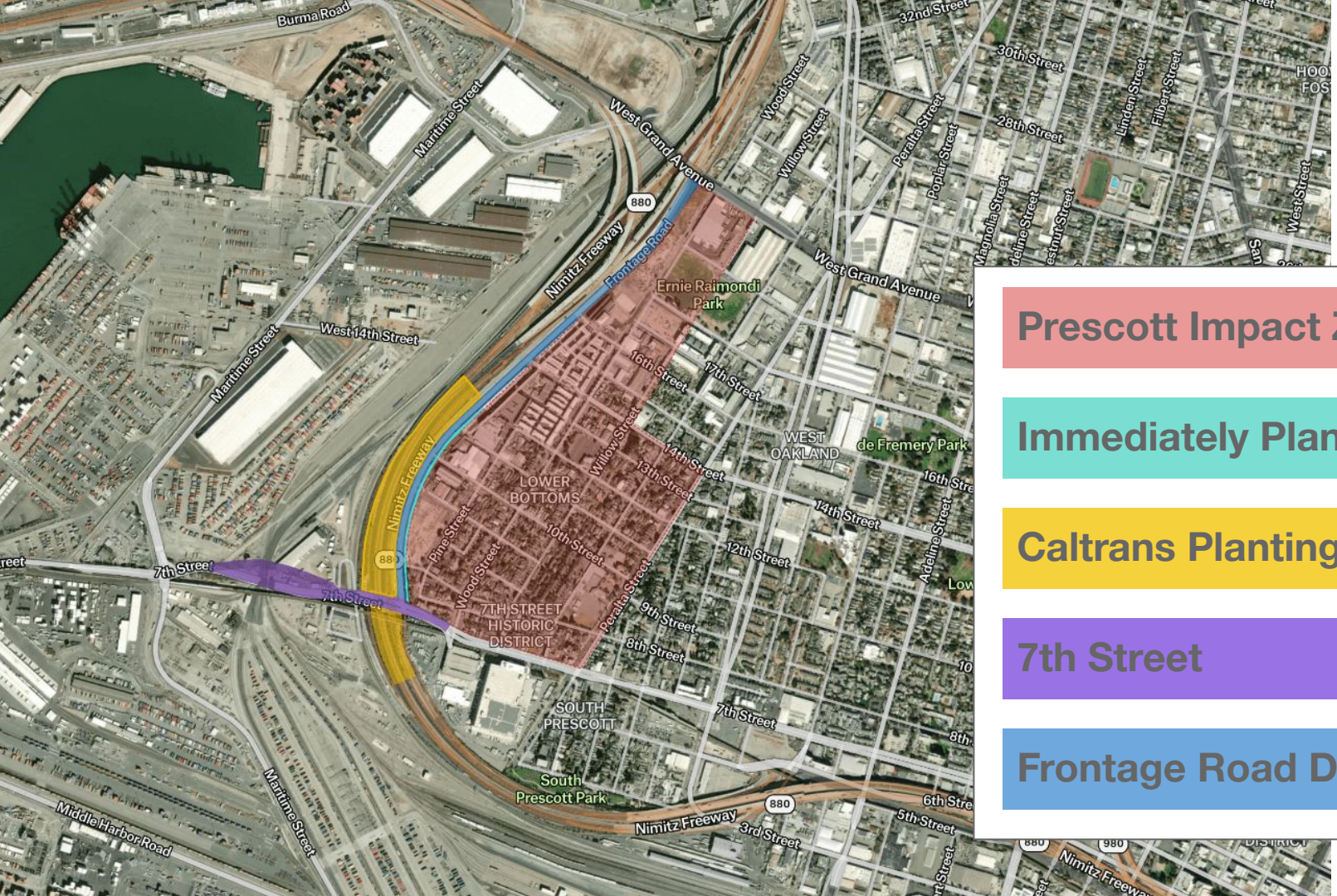
West Oakland Environmental Indicators Project

WOCAP Steering Committee

5.7.25

Agenda

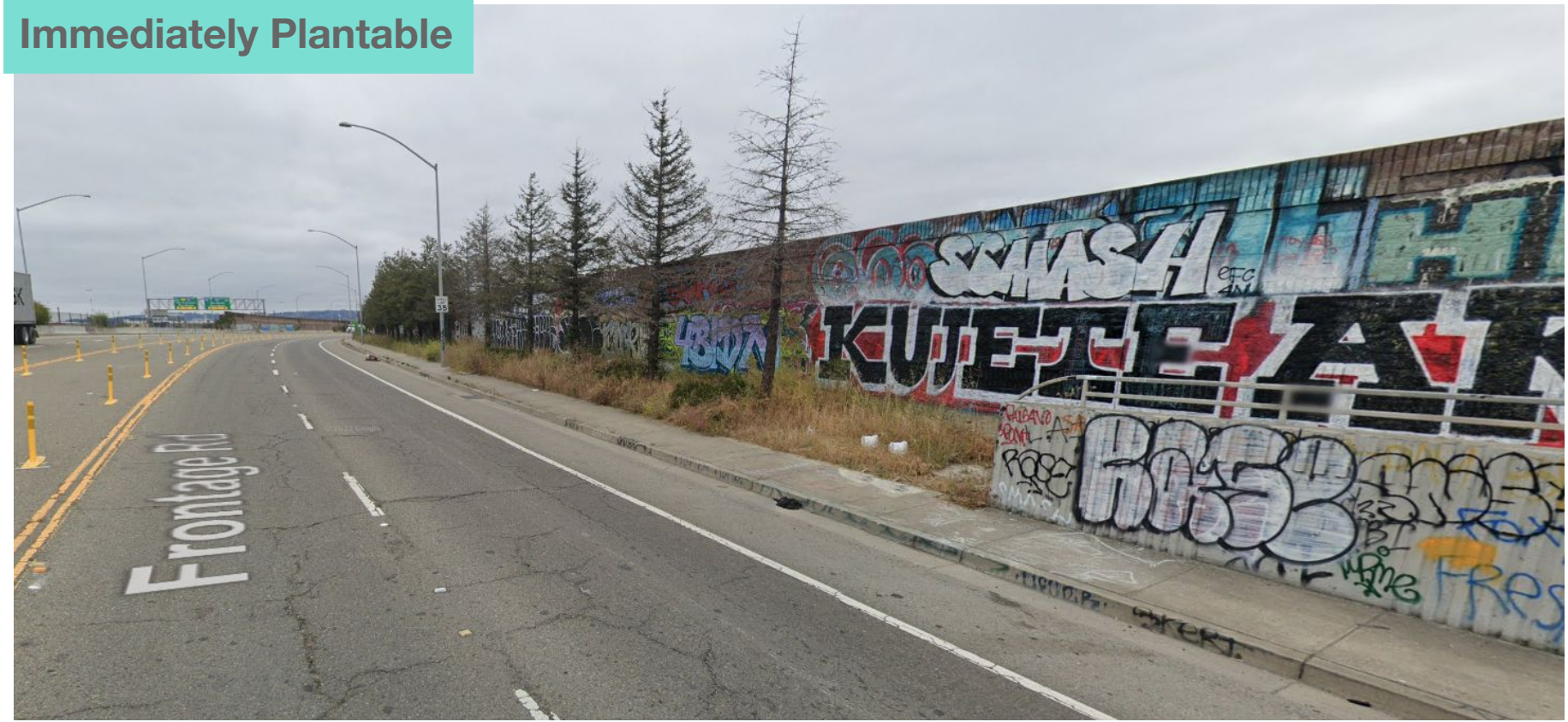
- Recap & Review
  - Overview of Project Area
  - Key Takeaways from Previous presentations
- Road Diet
  - Simulation updates
  - Design Progress
- Immediately Plantable Area


Prescott Impact Zone
Immediately Plantable
Caltrans Planting
7th Street
Frontage Road Diet
Burma Road
Maritime Street
West Grand Avenue
Nimitz Freeway
Frontage Road
880
Ernie Raimondi Park
West 14th Street
16th Street
17th Street
Willow Street
LOWER BOTTOMS
WEST OAKLAND
de Fremery Park
14th Street
13th Street
10th Street
12th Street
Pine Street
Wood Street
Peralta Street
7TH STREET HISTORIC DISTRICT
9th Street
8th Street
7th Street
SOUTH PRESCOTT
South Prescott Park
Middle Harbor Road
3rd Street
5th Street
6th Street
32nd Street
30th Street
28th Street
Linden Street
Filbert Street
Poplar Street
Magnolia Street
Adeline Street
West Street


Immediately Plantable
Caltrans Planting
7th Street
Frontage Road Diet

Immediately Plantable

Immediately Plantable



Some areas we can fill in where the trees are thin or dying to create a better buffer

880 Freeway - Caltrans Land

7th Street


Immediately Plantable
Caltrans Planting
7th Street
Frontage Road Diet

Frontage Road Diet

7th Street

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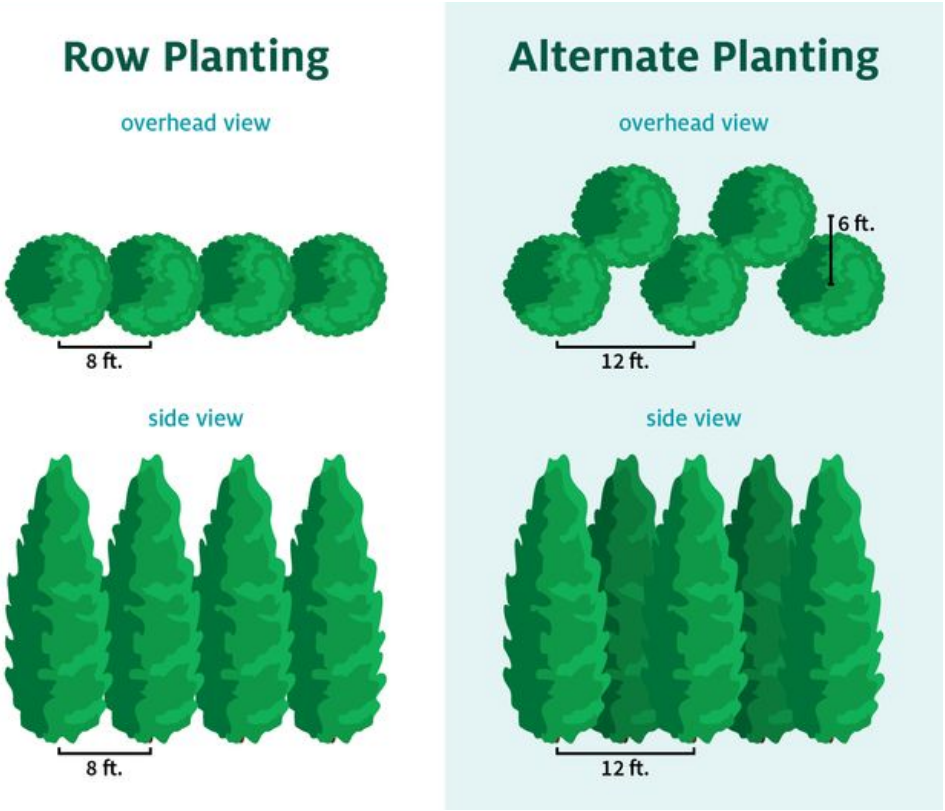
Vegetated Buffers: Using trees as technology



Vegetated air barriers optimized for mitigating air pollution must be planted close together without any gaps, otherwise the pollution can squeeze through!

According to the EPA, these are the important factors to roadside vegetation design:

Barrier Length
Extend at least 50 meters past area of concern to limit downwind concentrations

Height
At least 4 meters of height will prevent downwind spread

Porosity
High porosity leads to pollution stagnation, low porosity is similar to a wall

Coverage
No gaps between or below trees is ideal. Bushes can be used to block low gaps

Thickness
5-10 meters recommended, but effectiveness impacted by porosity of barrier

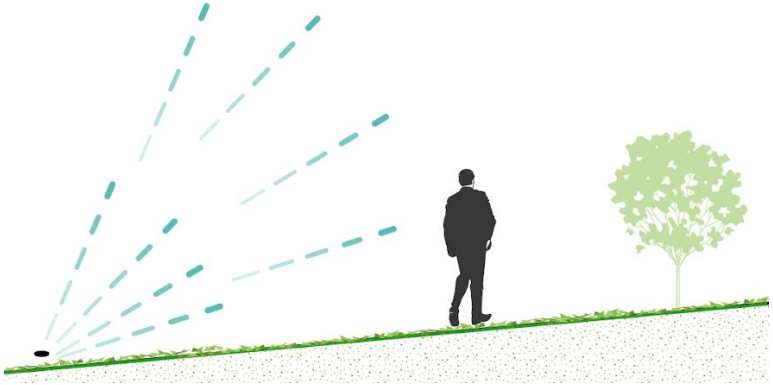
Effective Barrier

Ineffective Barrier

Source: Roadside Vegetation Design to Improve Local, Near-Road Air Quality. Transp Res D Transp Environ. 2017 May 4; 52(11): 354–361. doi: 10.1016/j.trd.2017.03.013

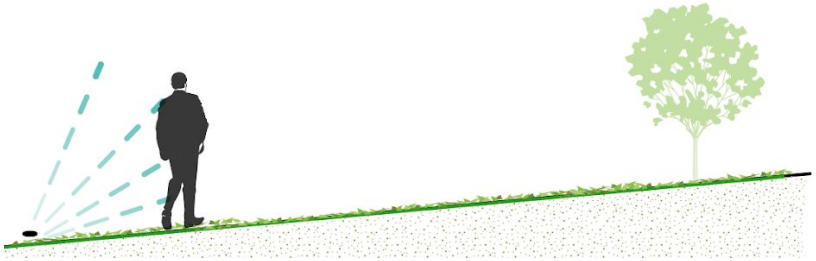
Planting a vegetated buffer closer to the source of pollution is more effective at blocking that pollution

Less effective at blocking



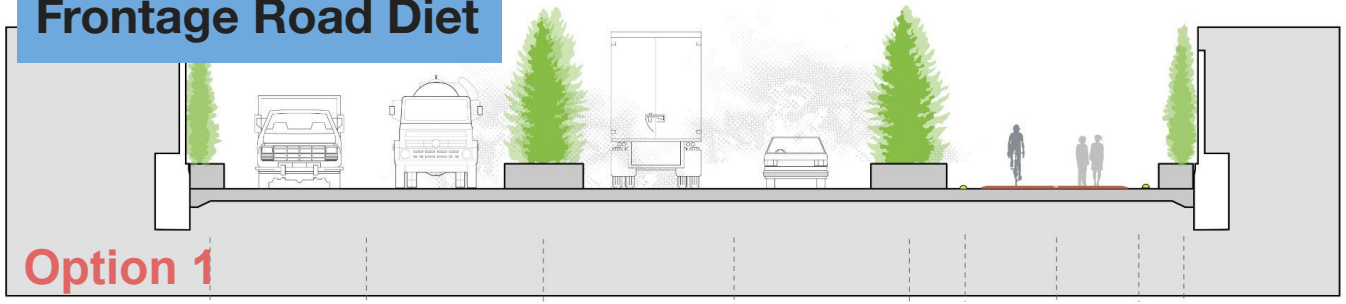
Less effective at blocking

More effective at blocking



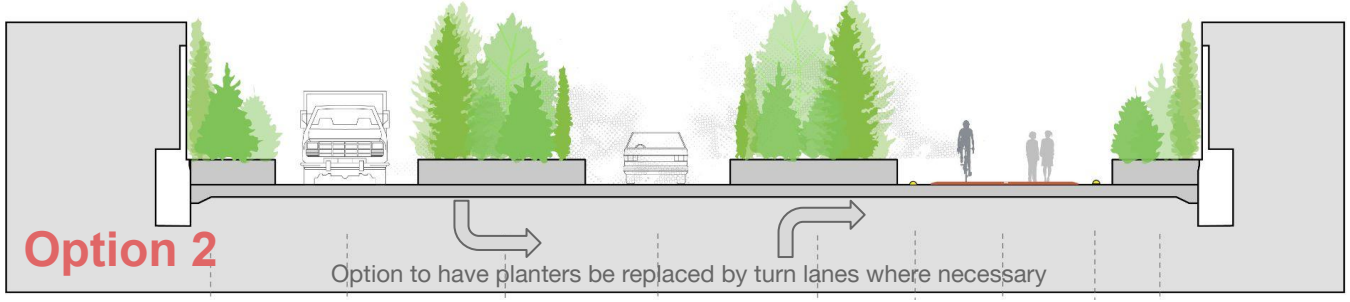
More effective at blocking

Frontage Road Diet



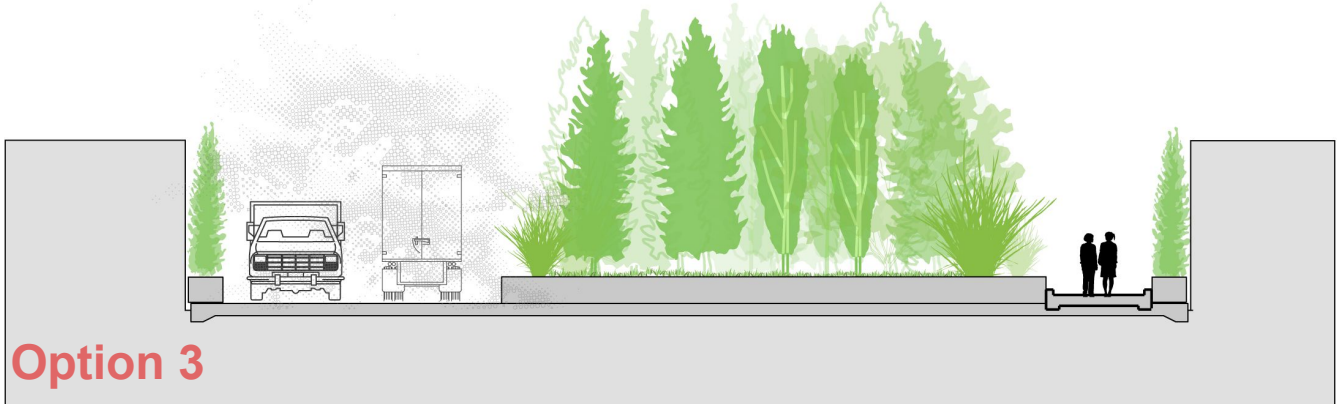
Option 1

7.5’ planter
Multi-use path
Maintains 2 lanes



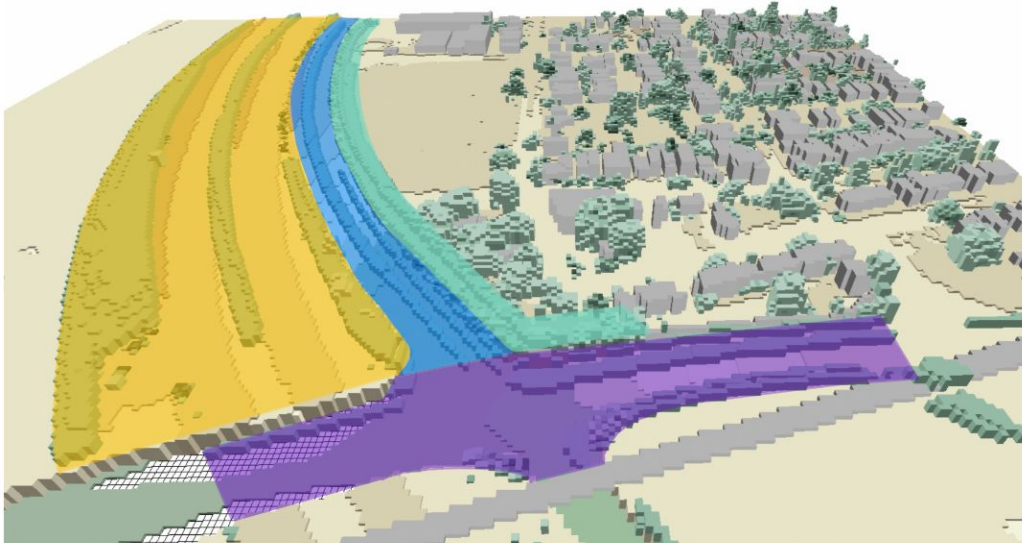
Option 2

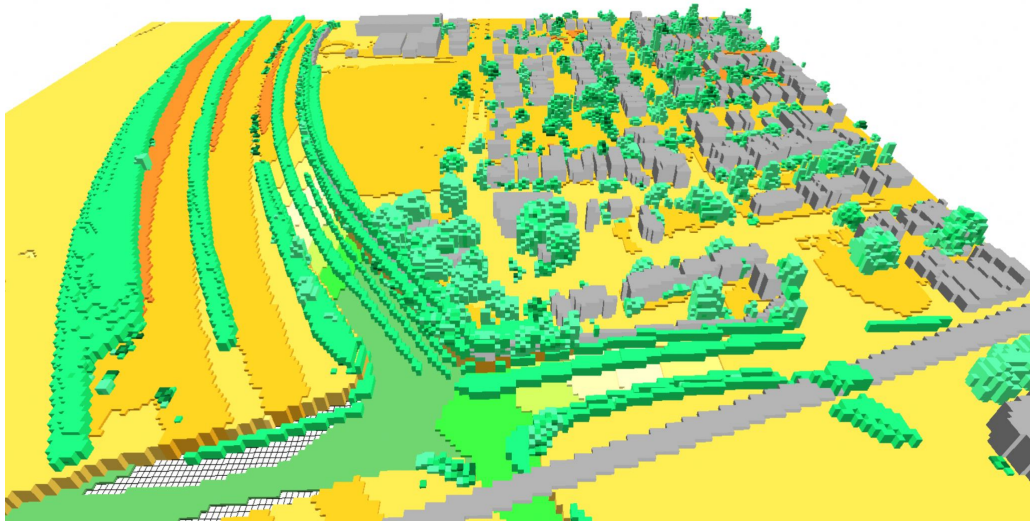
10-14’ planter.
Multi-use path
Reduces lanes to 1 going each direction



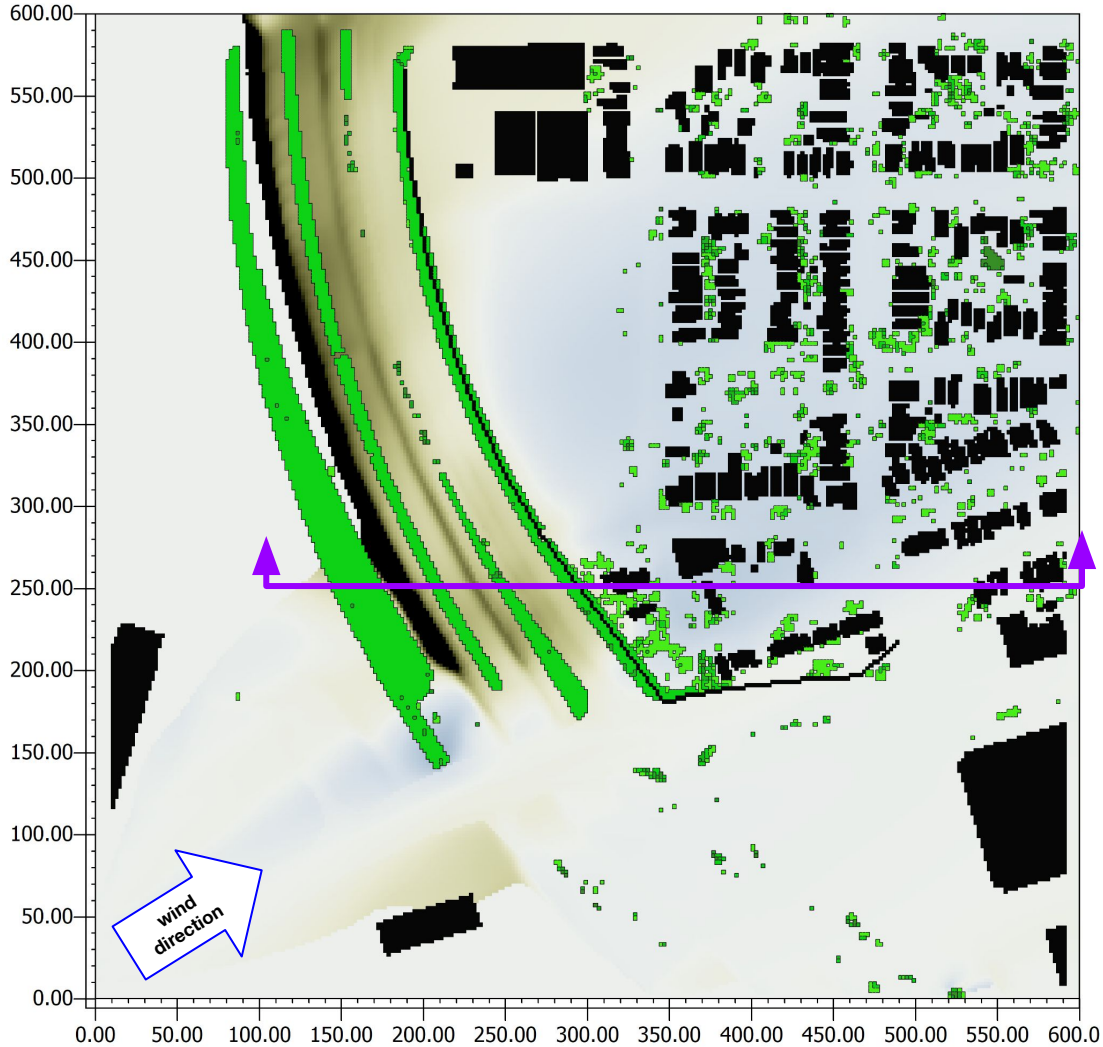
Option 3

Very large buffer
Smaller path.
1-2 lanes going each direction.





A) Caltrans + Immediately Plantable



relative difference PM0.015 Concentration

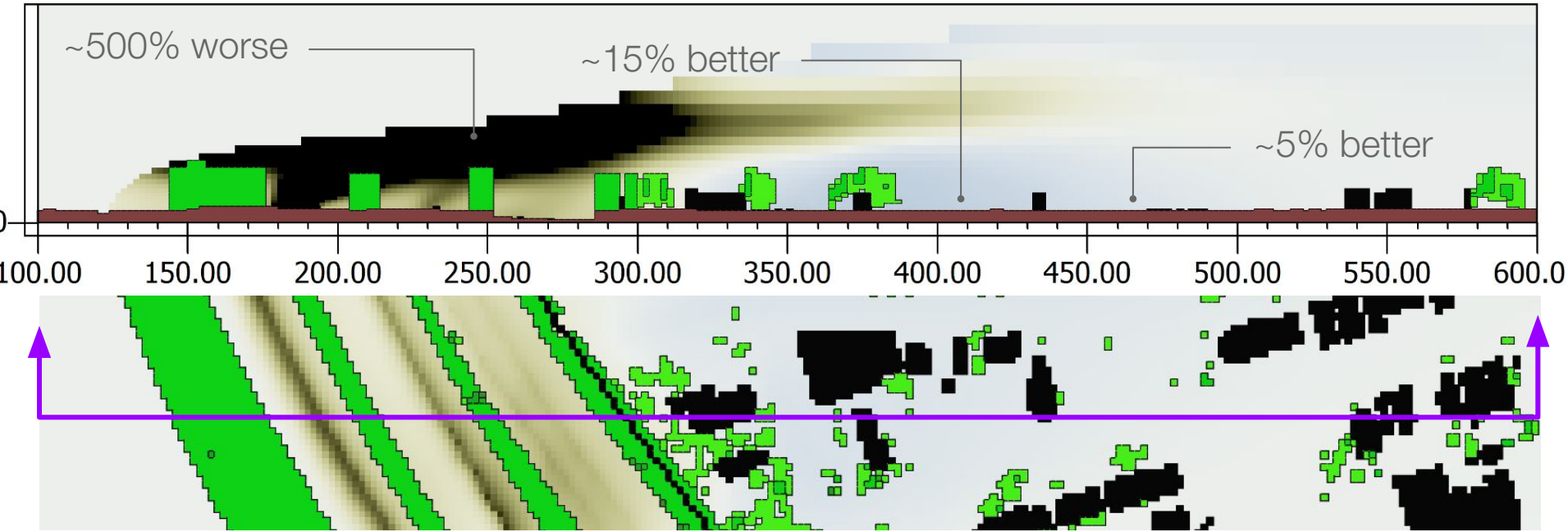
- < -30.0 %
- -20.0 %
- -10.0 %
- 0.0 %
- 10.0 %
- 20.0 %
- 30.0 %
- 40.0 %
- 50.0 %
- 60.0 %
- 70.0 %
- 80.0 %
- 90.0 %
- > 100.0 %

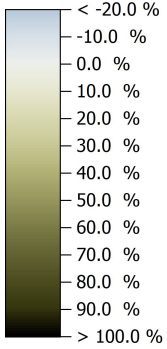
Min: -25.3 %
Max: 2717.2 %

98%-Percentile 63.9 %

Bluer areas are where the pollution is better than existing

Darker areas are where pollution is worse





A) Caltrans + Immediately Plantable

Comparing our top 3 scenarios

sim #	Name	Immediately Plantable Area (IPA)	Caltrans	Road Diet	Goss St. @ Marcus Garvey	Near Pine South of 9th
1	No Veg	-	-	-		
2	Existing Vegetation	-	-	-	-	-
3	CalTrans + IPA	x	x	-	-11.45%	-13.33%
4	CalTrans + Road Diet (opt 1)	-	x	x	*-6.56%*	-3.70%
5	Road Diet (opt 1) Only	-	-	x	9.41%	2.86%
6	IPA Only	x	-	-	-6.25%	-8.30%
7	Caltrans Only	-	x	-	-5.88%	-2.59%
8	Caltrans + IPA + Road Diet (Opt 2)	x	x	x	-11.52%	-16.49%

2nd place

3rd place

1st place

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Next Round of Simulations

1. Improve our modeling methods
2. Add road dust emissions into our simulations
3. Test improved road diet concept designs

1. Improve our modeling methods

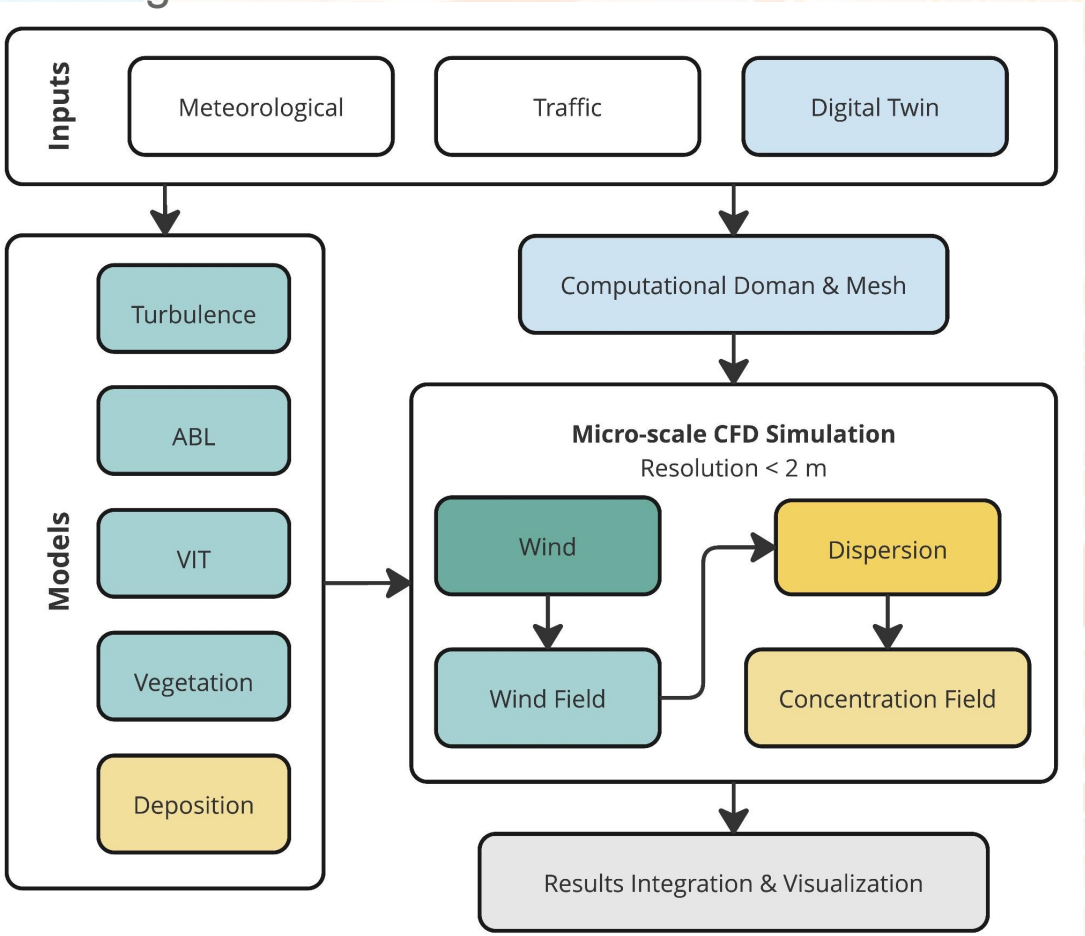
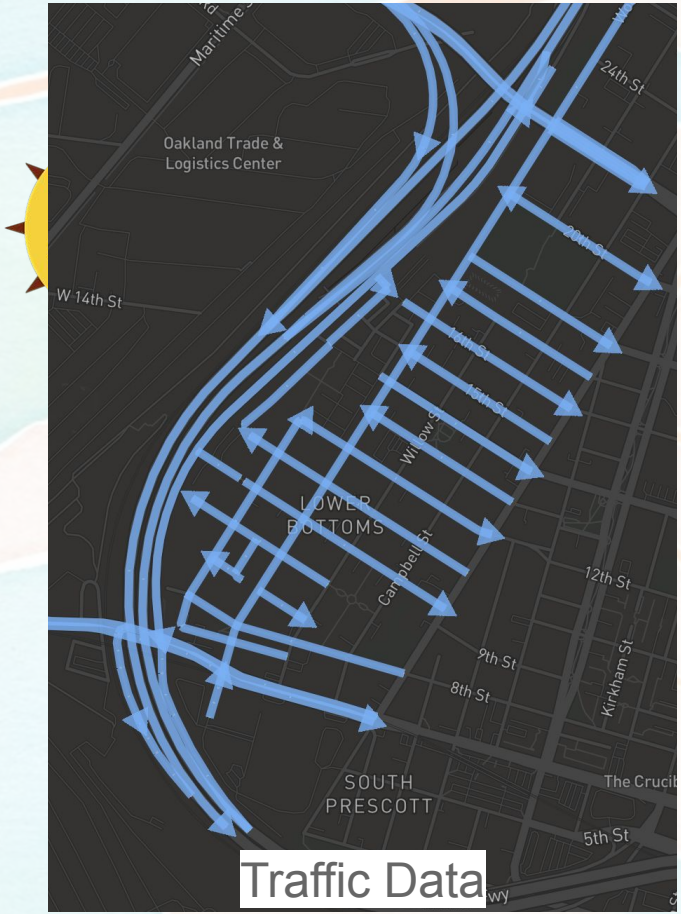
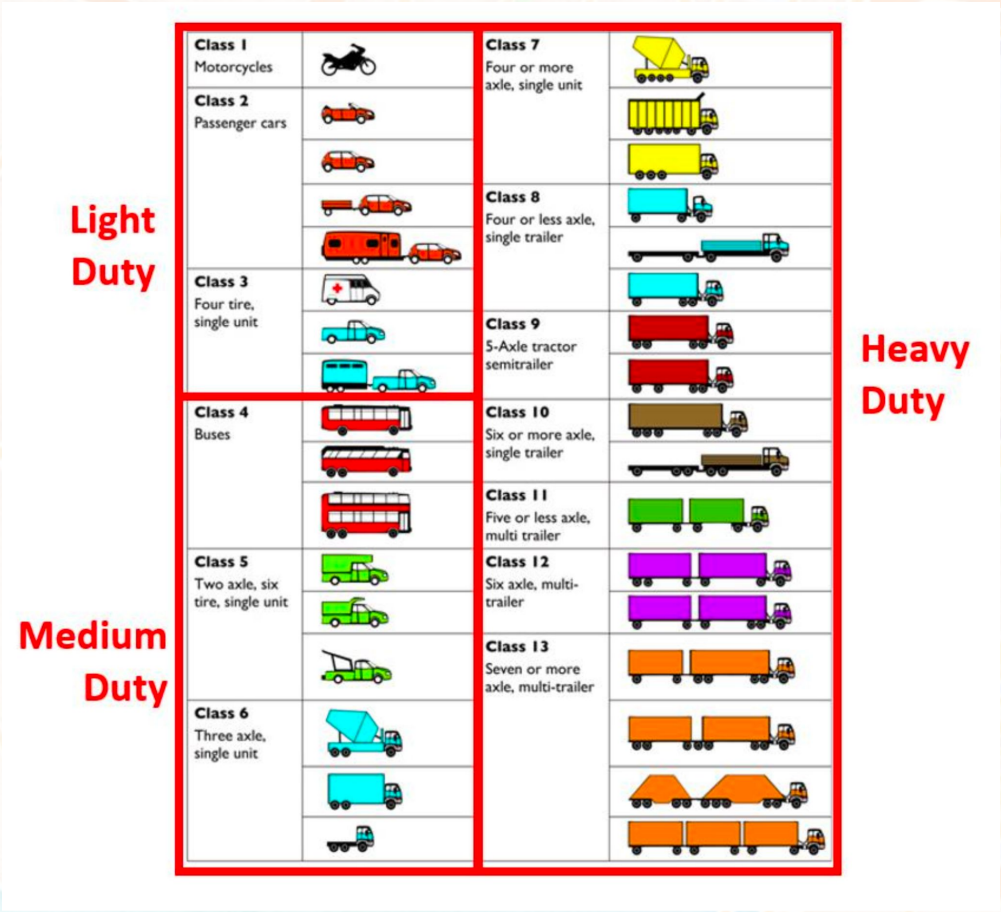


Figure. Schematic of proposed framework and models for urban CFD simulations.

1. Improve our modeling methods





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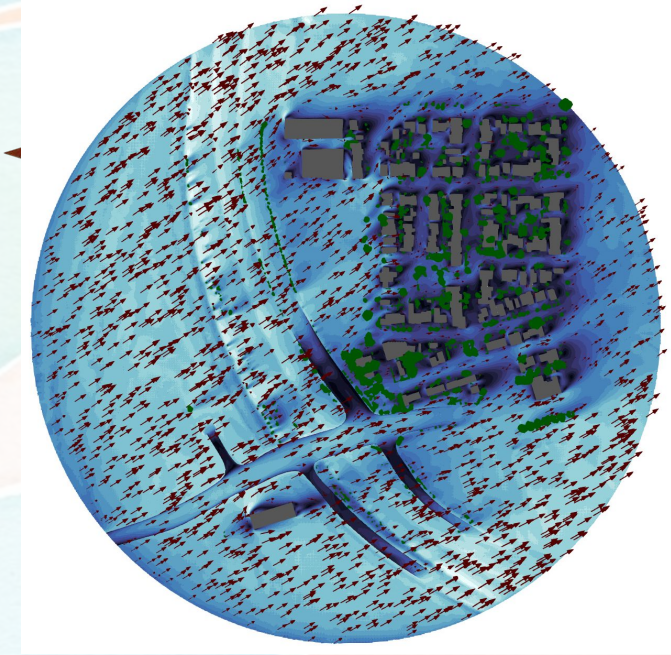
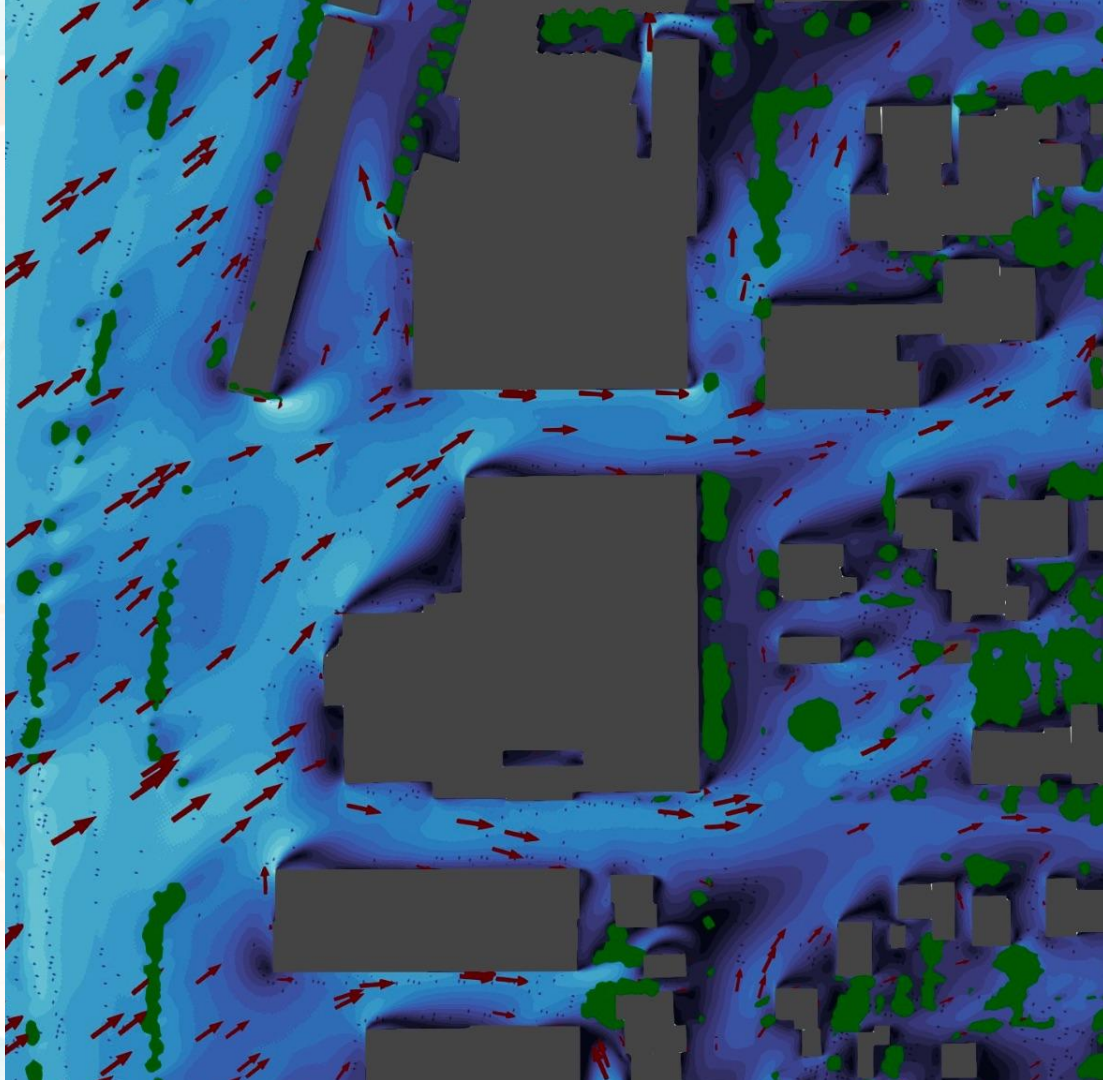
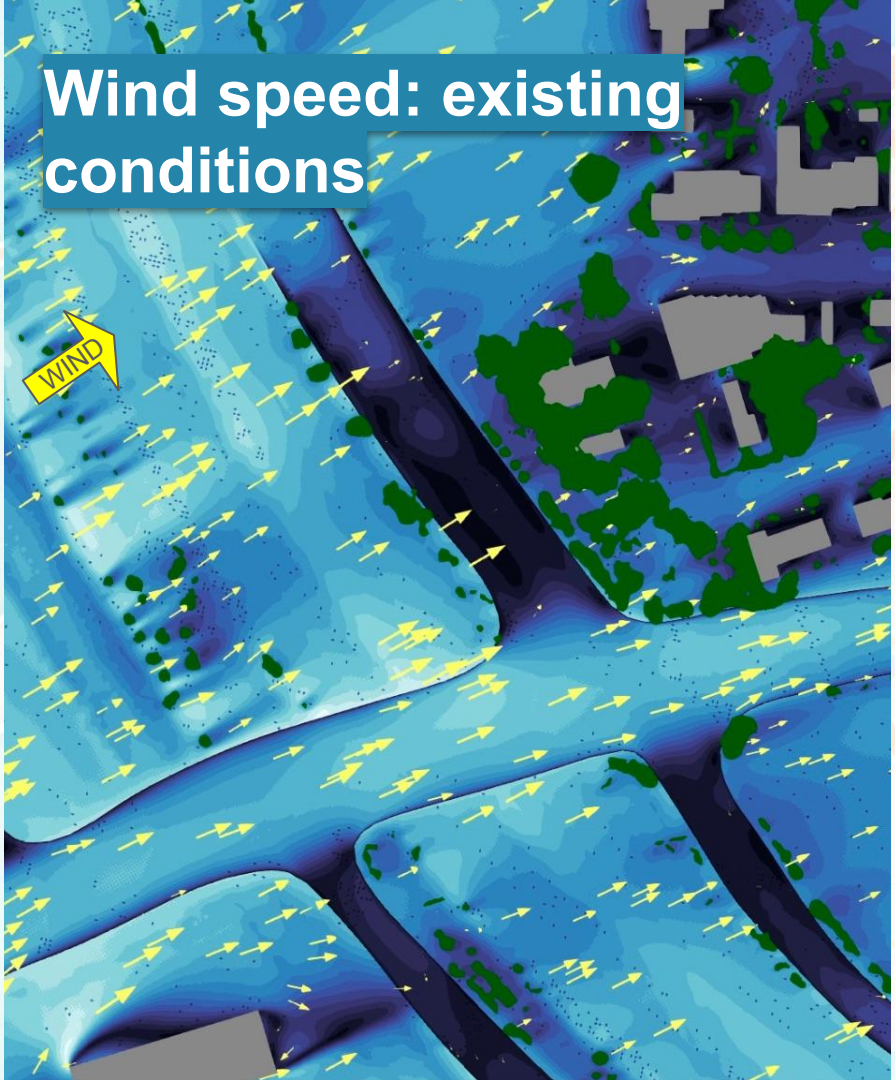
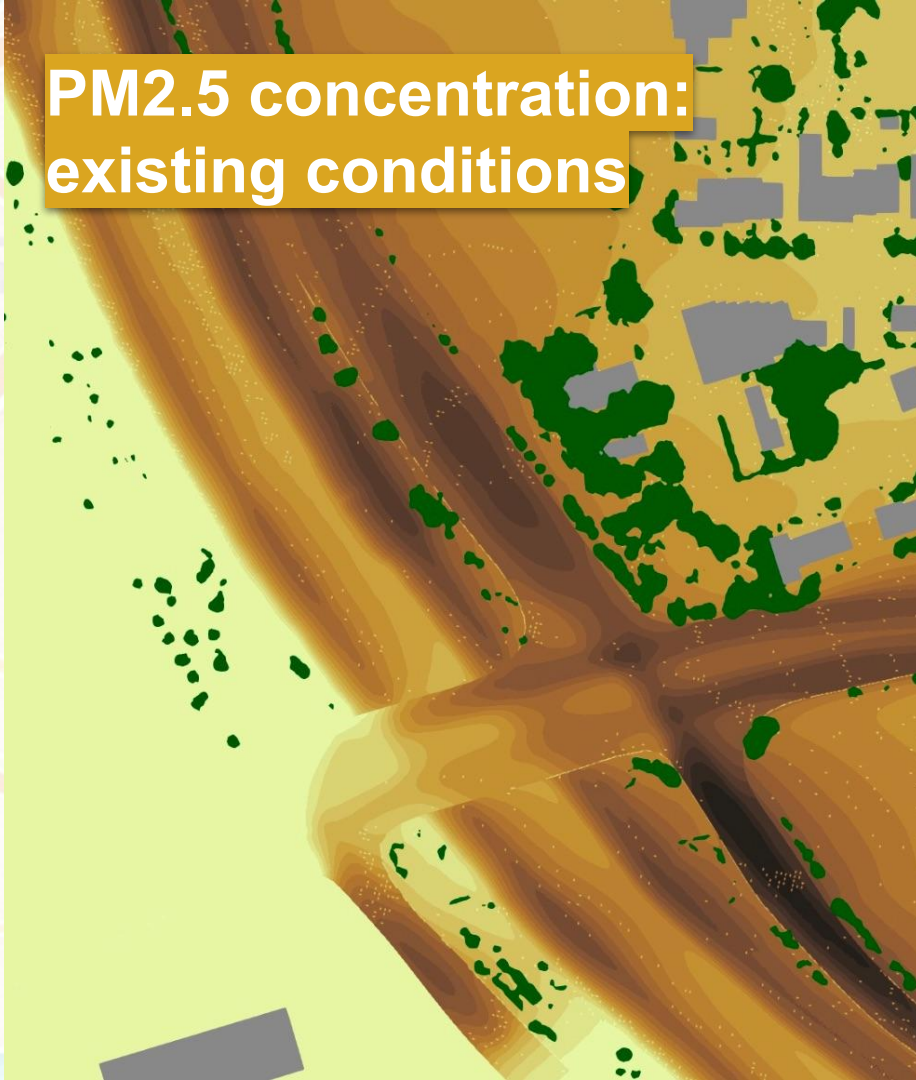





Wind speed: existing conditions
WIND


PM2.5 concentration: existing conditions

Next Round of Simulations

1. Improve our modeling methods
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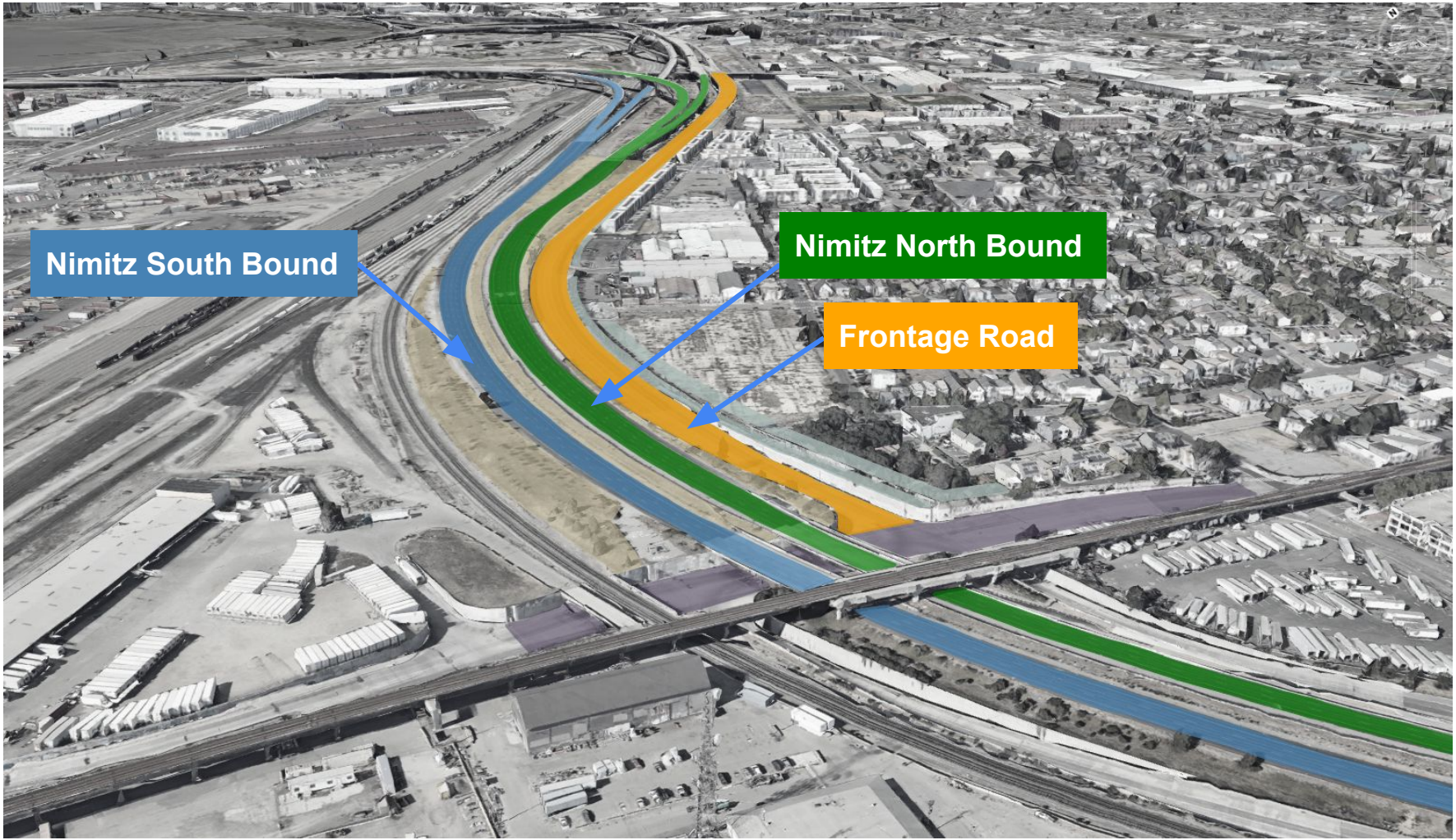
3. Test improved road diet concept designs

Key Takeaways:

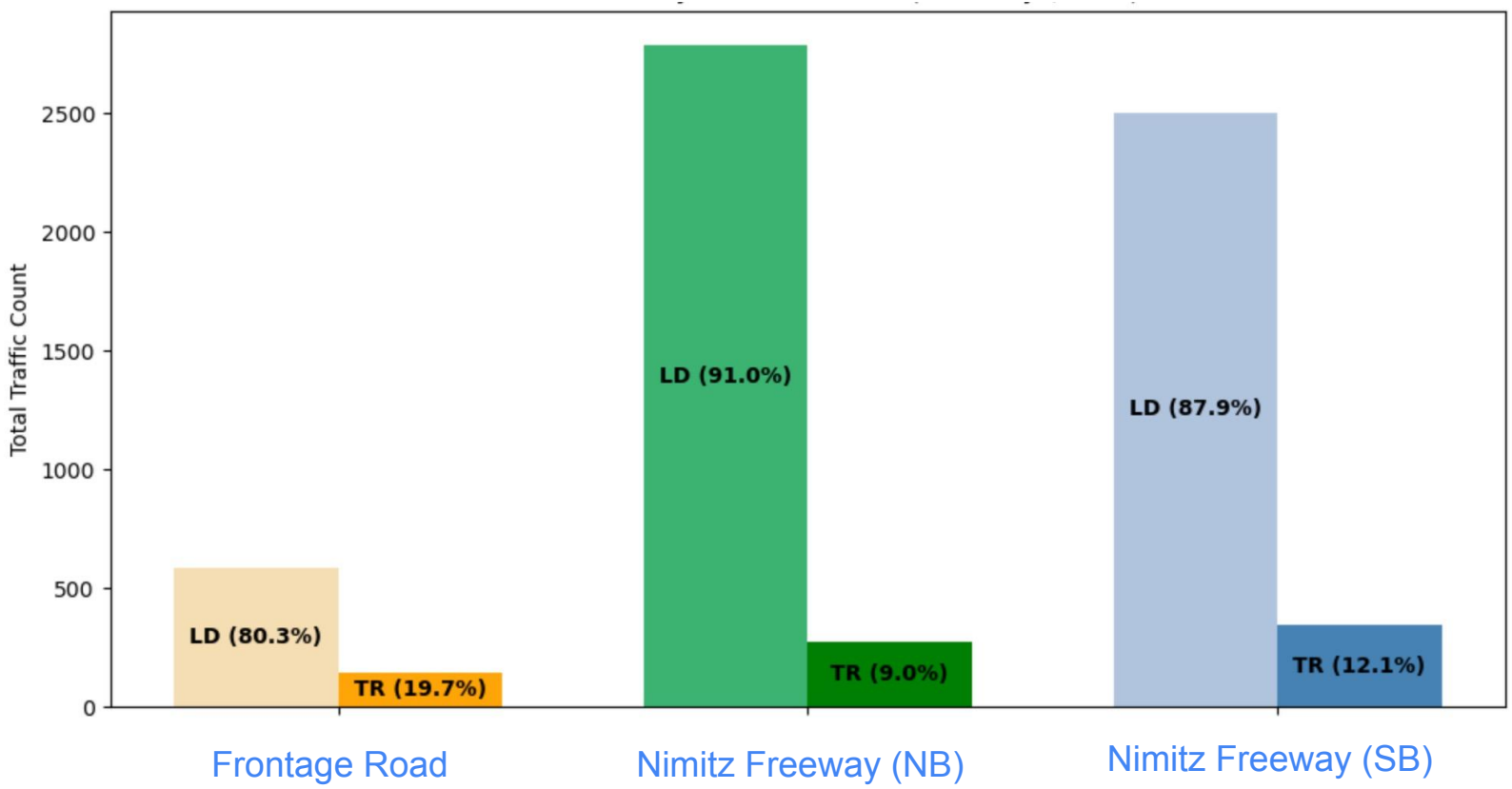
1. The majority of pollution is coming from the freeway rather than frontage road
    - Emissions from the freeway are being primarily produced by light-duty (passenger) vehicles.
    - Emissions from frontage road are predominantly from trucks

2. Brake and Tire wear is the highest contributors of PM 2.5 for operational emissions for both light-duty (passenger) and heavy-duty (trucks) vehicles.
    - If all light-duty (passenger) vehicles were suddenly electric, only ~10% of the PM2.5 concentration is removed.


Immediately Plantable
Caltrans Planting
7th Street
Frontage Road Diet

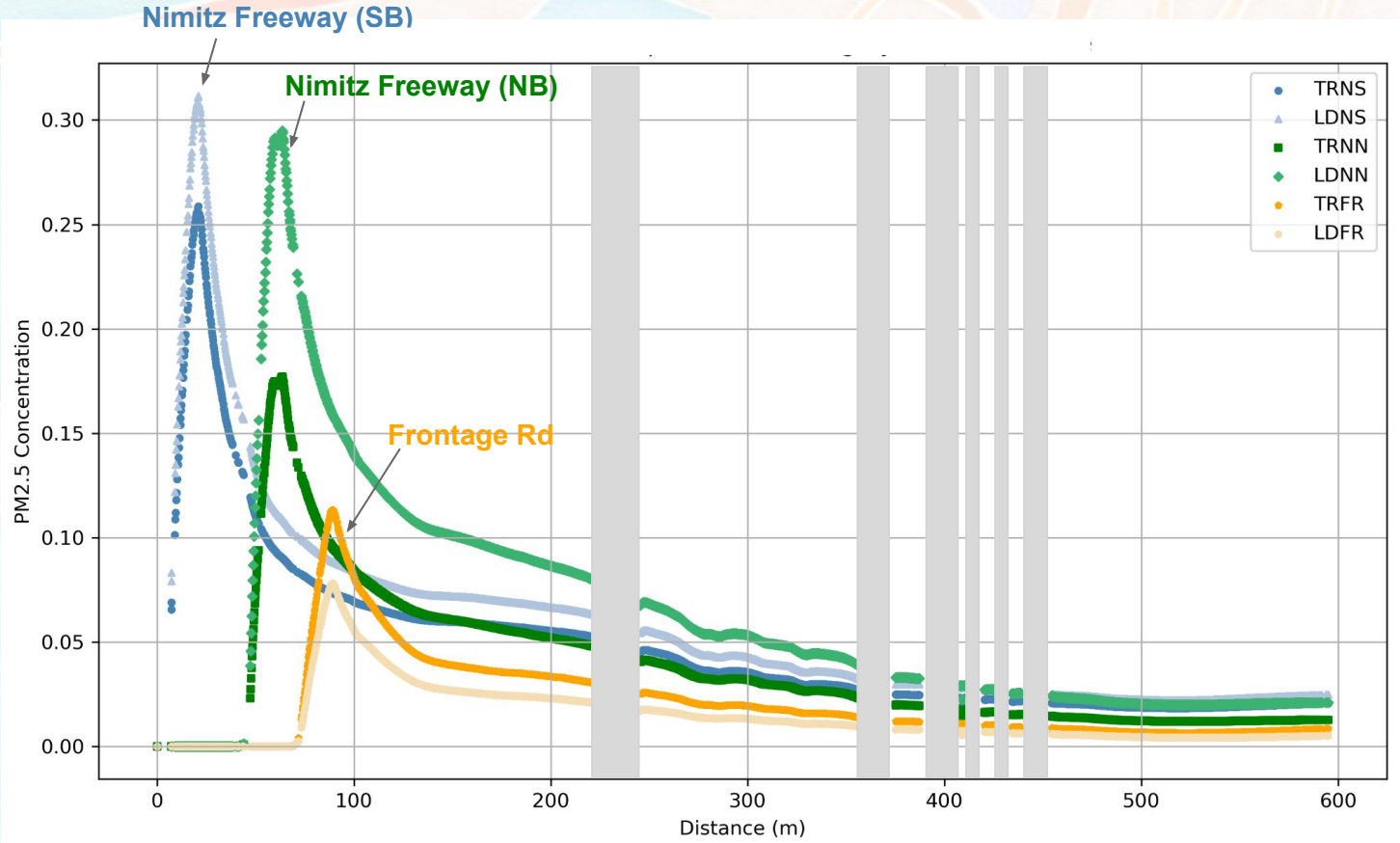

Nimitz South Bound
Nimitz North Bound
Frontage Road

Total traffic count on main road segments



LD = Light-duty (passenger cars) TR = trucks

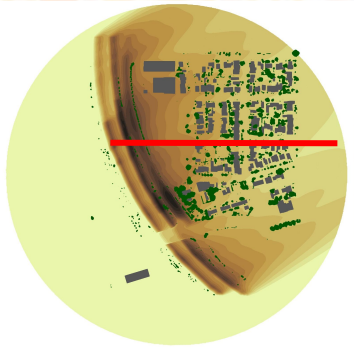
PM2.5 concentration **(Light-duty & Truck)** @ 1.5 m above ground



TRNS: Truck Nimitz (SB)
LDNS: Light-duty Nimitz (SB)

TRNN: Truck Nimitz (NB)
LDNN: Light-duty Nimitz (NB)

TRFR: Truck Frontage Rd
LDFR: Light-duty Frontage Rd



Building

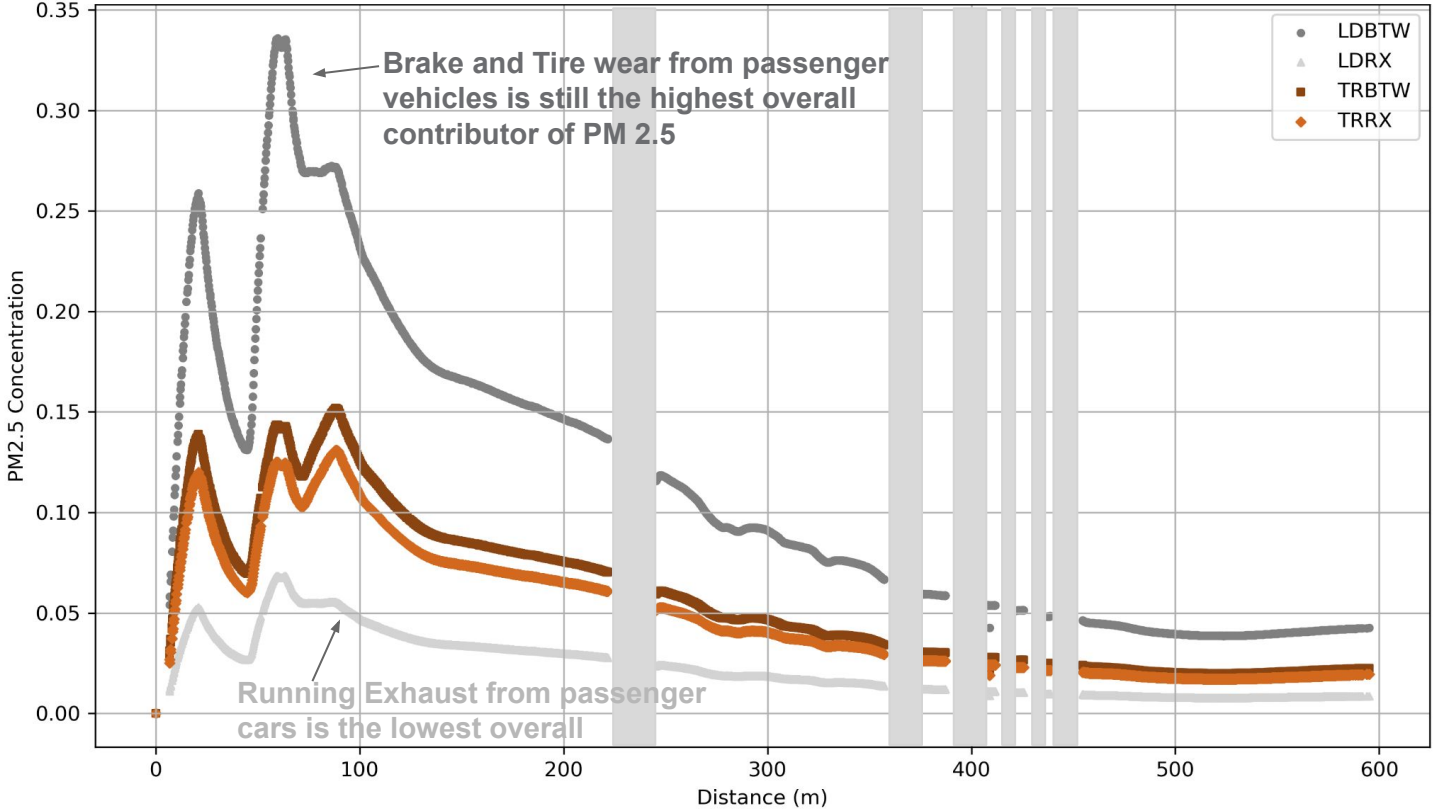
Emission Factors

EMFAC

Vehicle Category	Fuel Type	Total	Exhaust	Tire Wear	Brake Wear
Light-duty (passenger)	Gasoline	9.1×10^{-3}	16.9%	24.1%	58.9%
Medium-duty (trucks)	Diesel	5.8×10^{-2}	47.8%	6.8%	45.4%
Heavy-duty (trucks)	Diesel	4.9×10^{-2}	44.1%	11.9%	43.9%

- PM2.5 emitted by the vehicle per distance travelled
- **Exhaust Emissions** come out of the vehicle tailpipe while traveling on the road.
- **Tire Wear Emissions** and **Brake Wear Emissions** originate from tires and brakes as a result of wear.

PM2.5 concentration **per source** on a terrain-following line 1.5 m above ground.

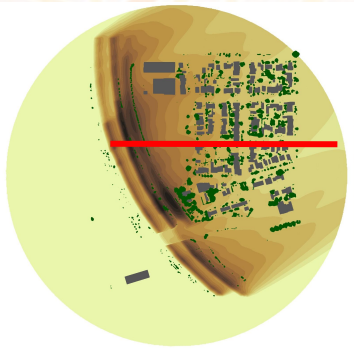


Light-duty Brake and Tire

Light-duty Running Exhaust

Truck Brake and Tire Wear

Truck Running Exhaust



Building

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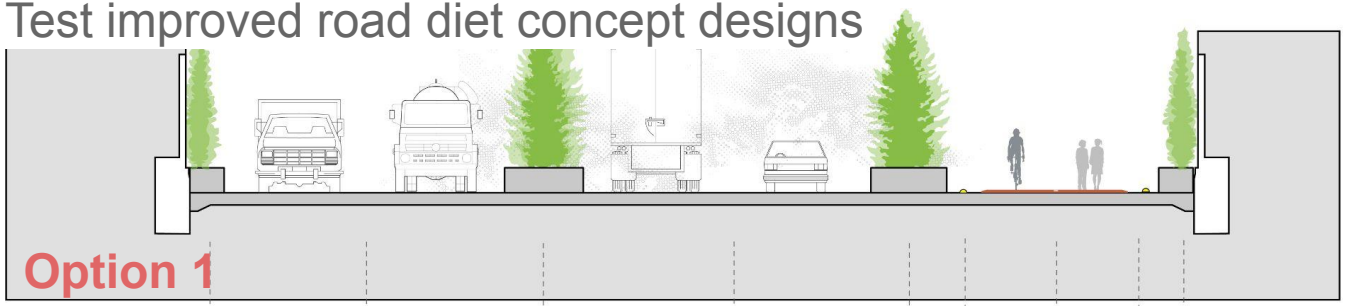
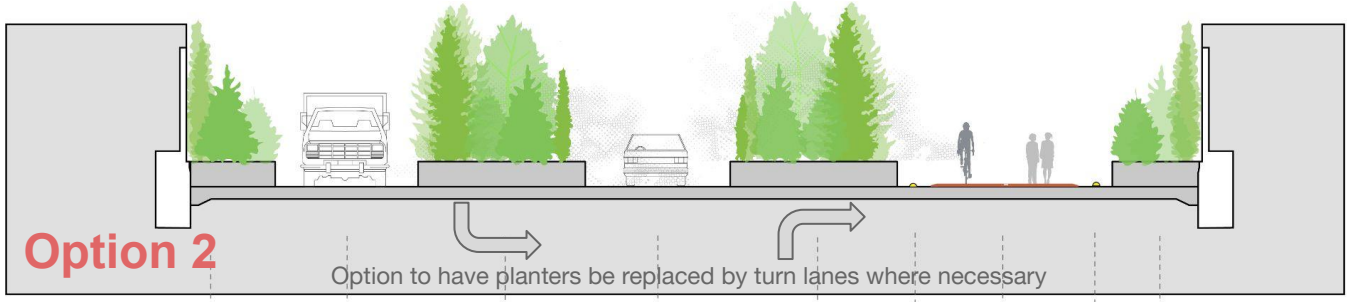
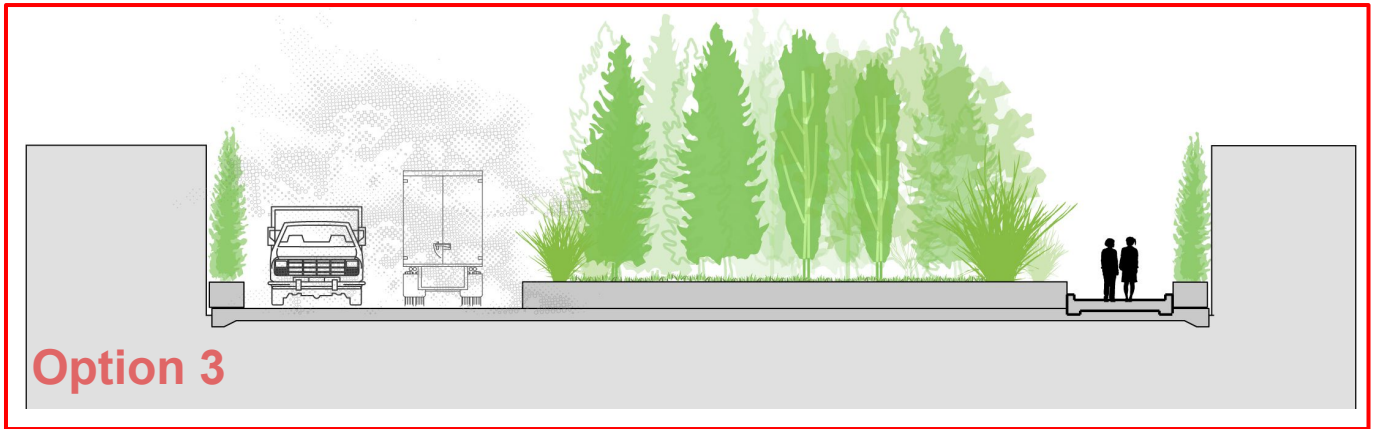
Test improved road diet concept designs



7.5’ planter
Multi-use path
Maintains 2 lanes

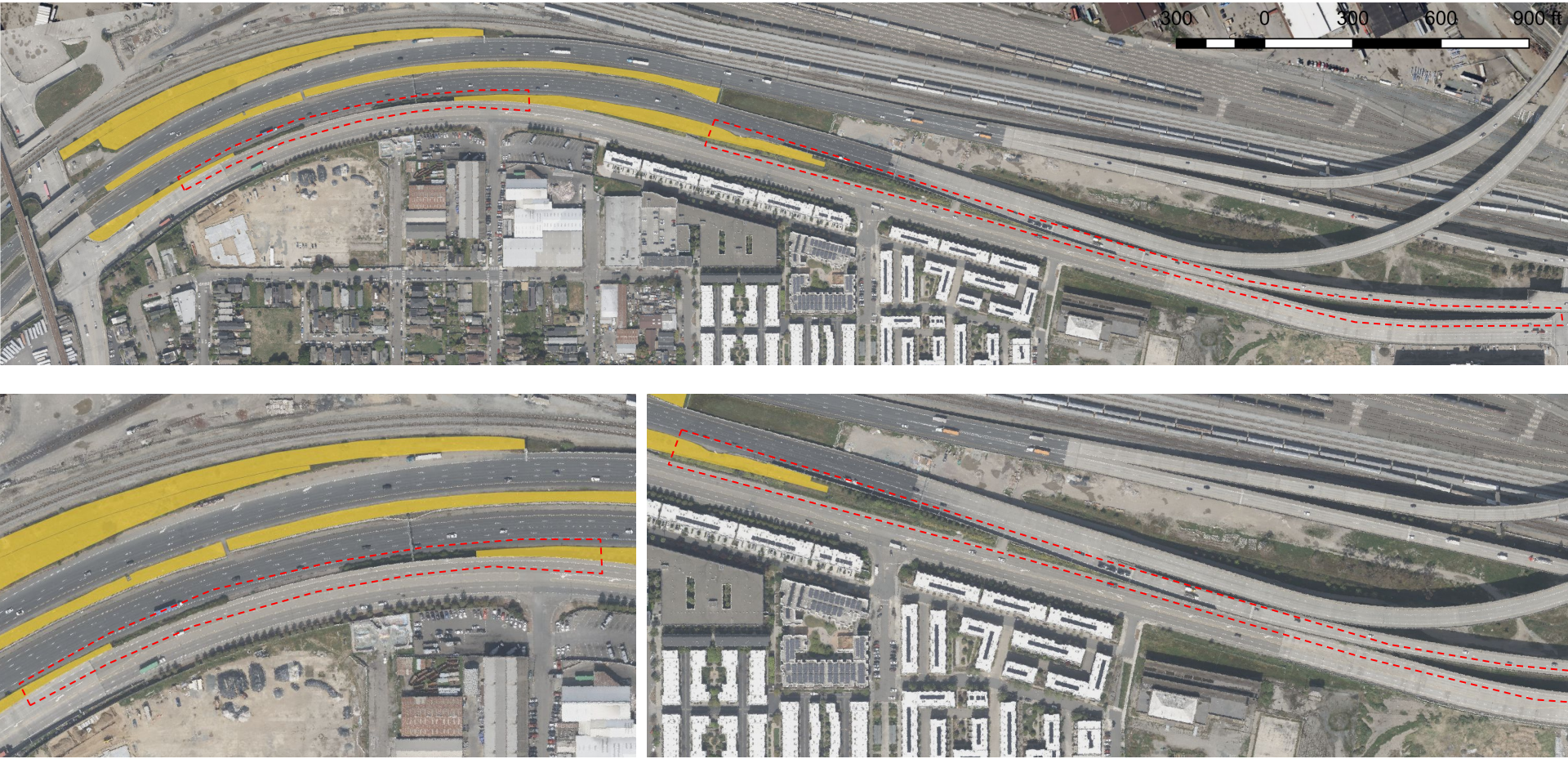


10-14’ planter.
Multi-use path
Reduces lanes to 1 going each direction

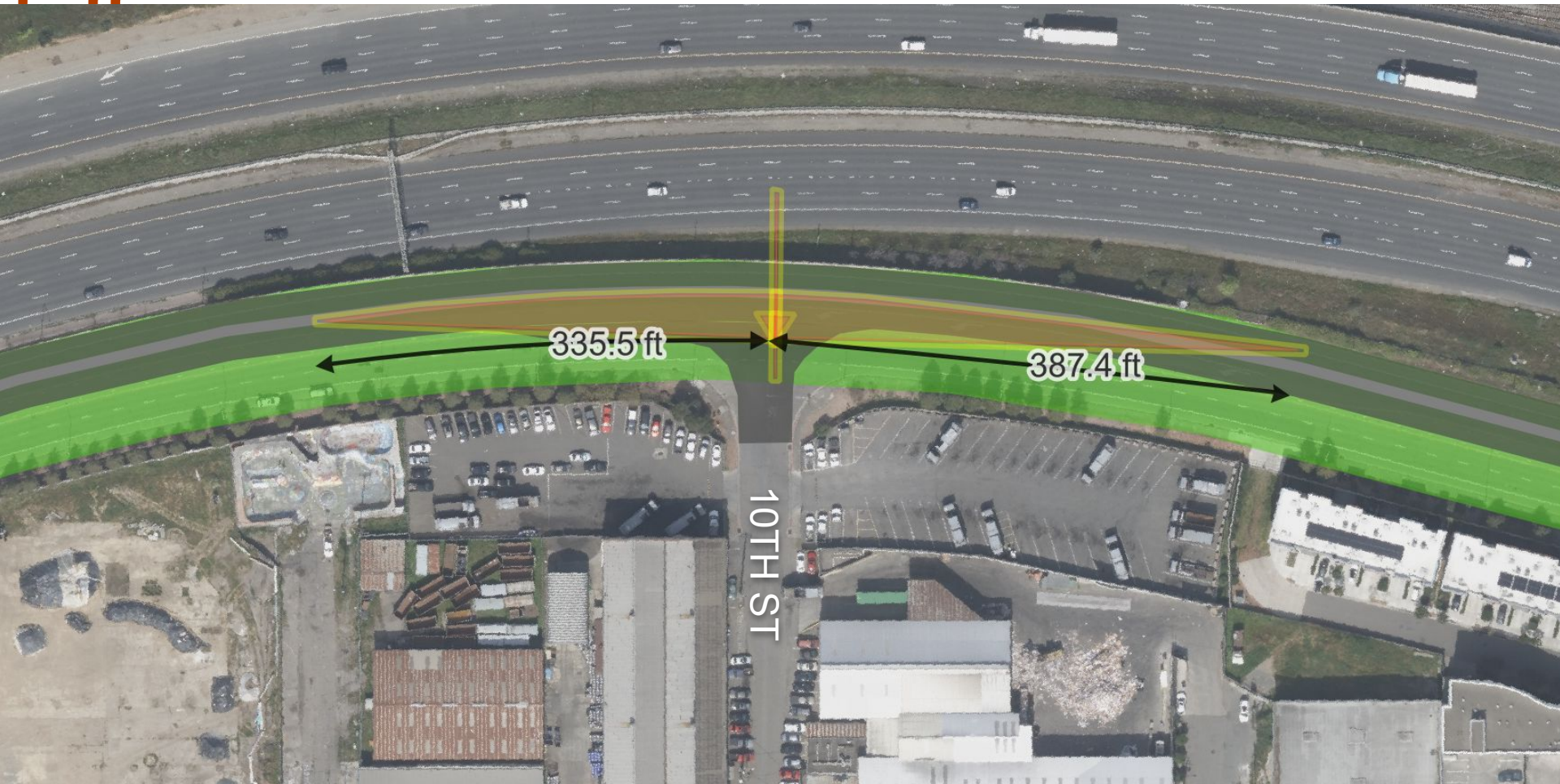


Very large buffer
Smaller path.
1-2 lanes going each direction.

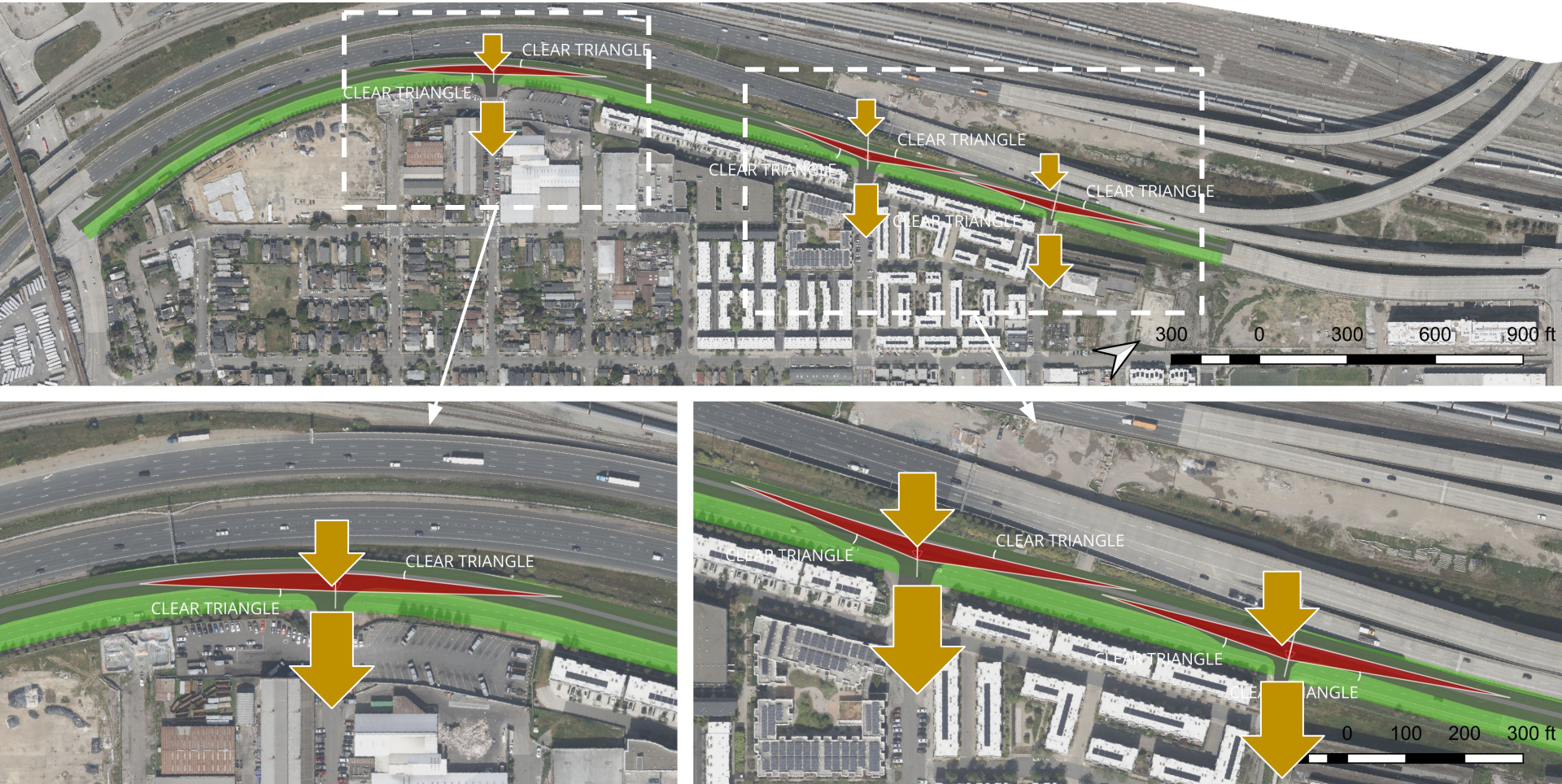
Freeway pollution is bigger overall contributor



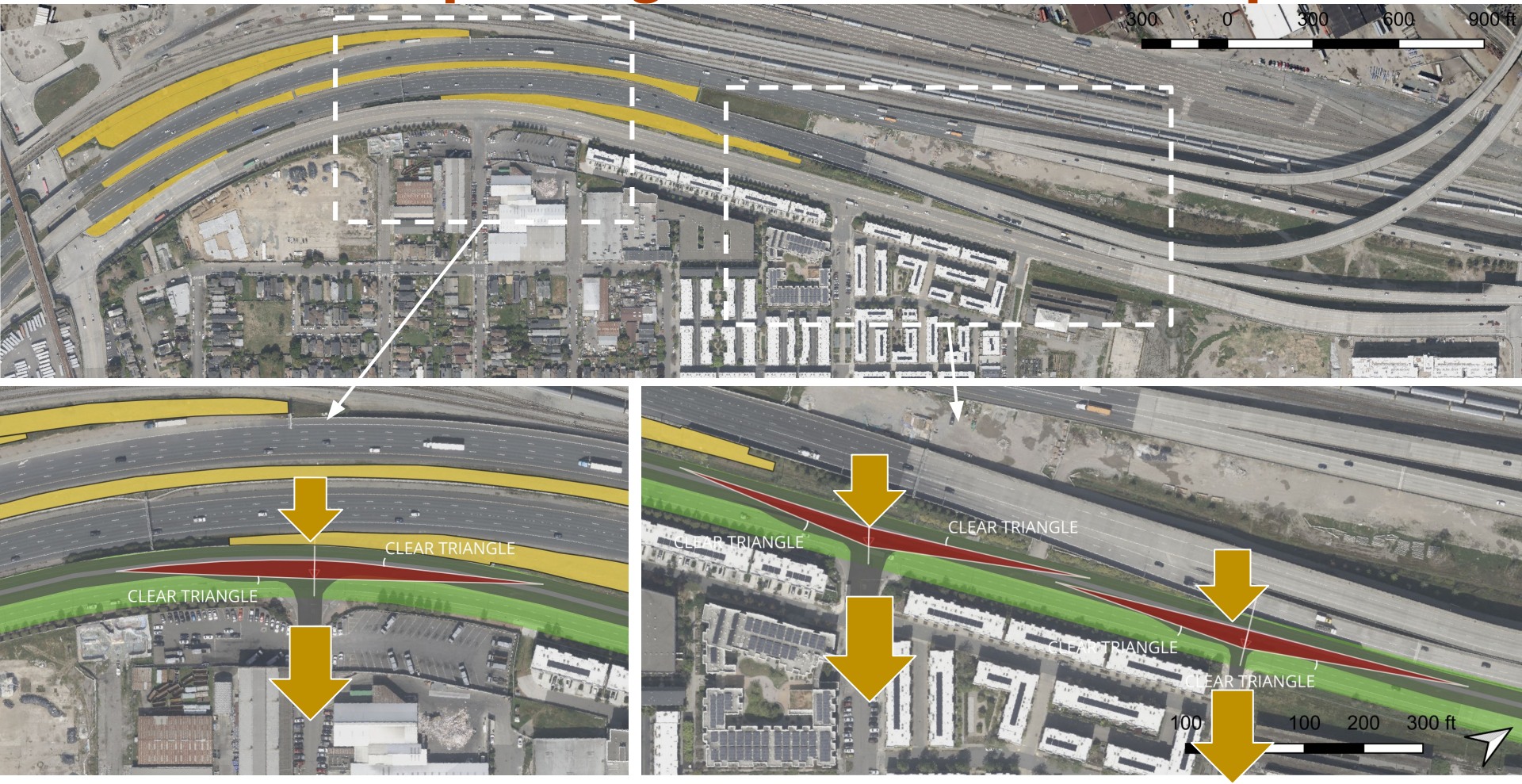
Intersections gap and sightlines compromise our



Intersections and sightlines compromise our buffer



Narrow Caltrans planting in ROW is also little help



Aligning the buffer on the west side of Frontage allows it to be continuous

Although a continuous buffer on the west side would not block frontage it would likely be a more effective intervention for freeway pollution - source of a majority of pollution.

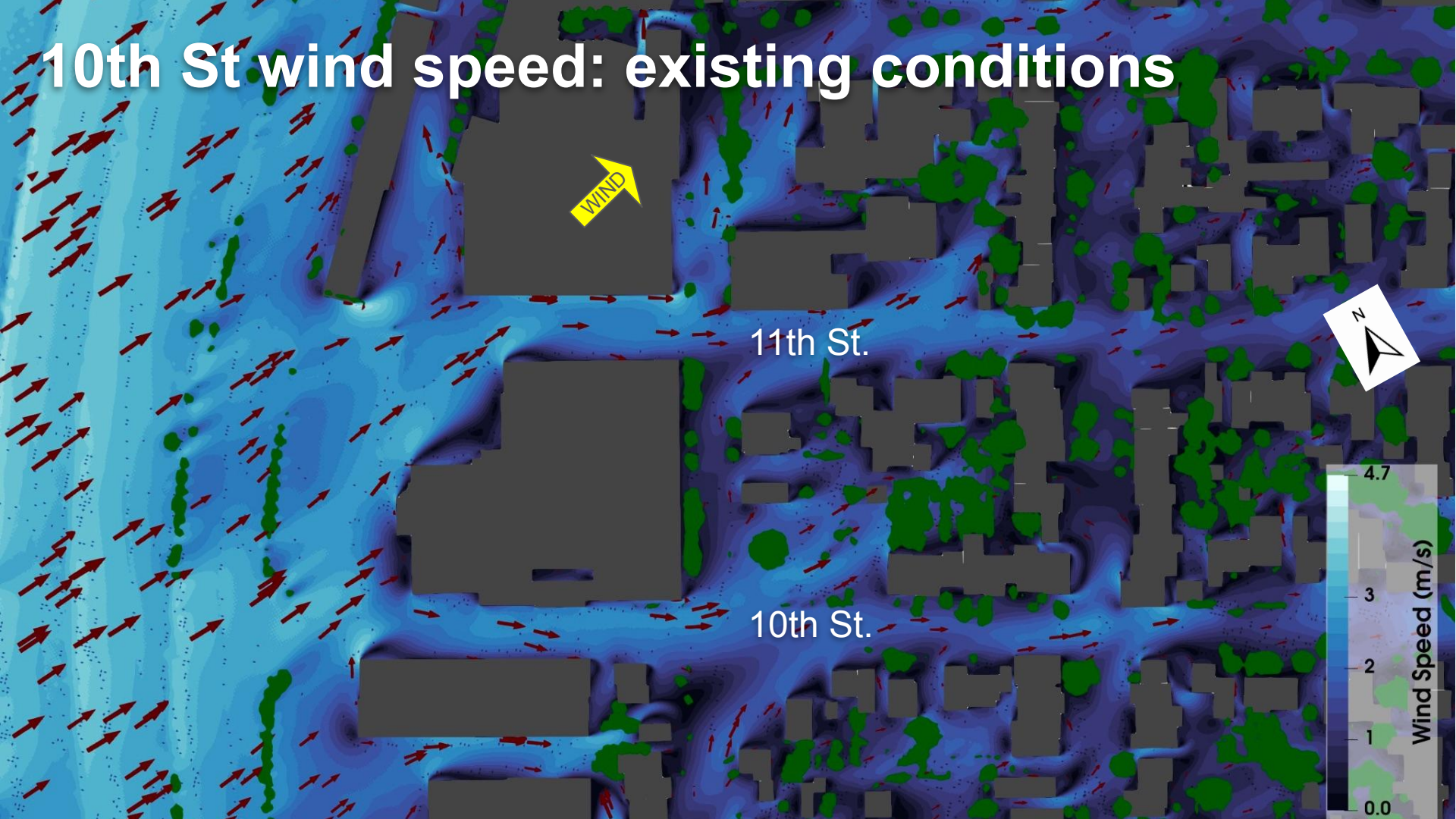
Scenarios + simulation results at 10th St.

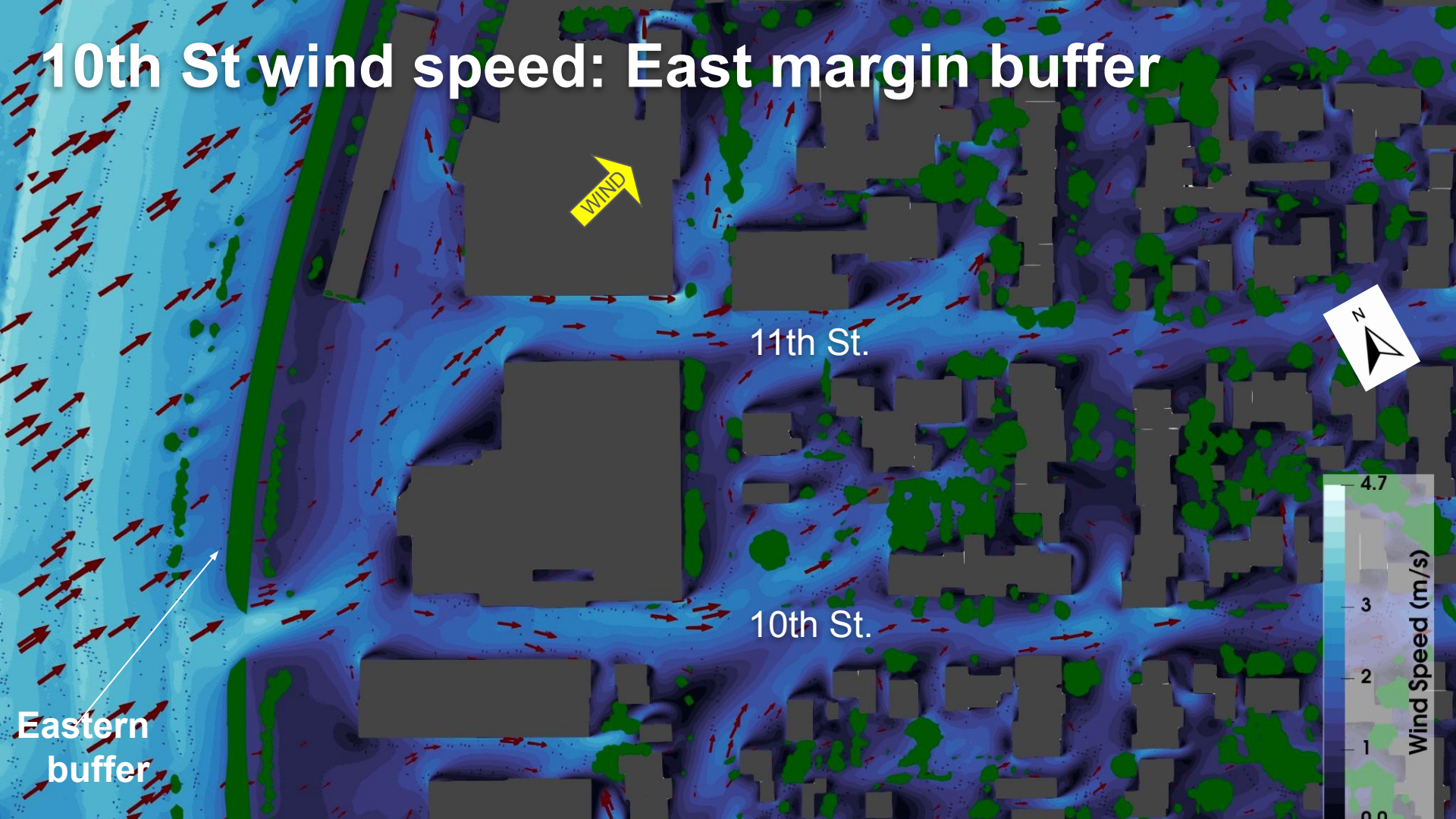

10th St buffer study: East
11th St.
CLEAR TRIANGLE
10th St.
CLEAR TRIANGLE

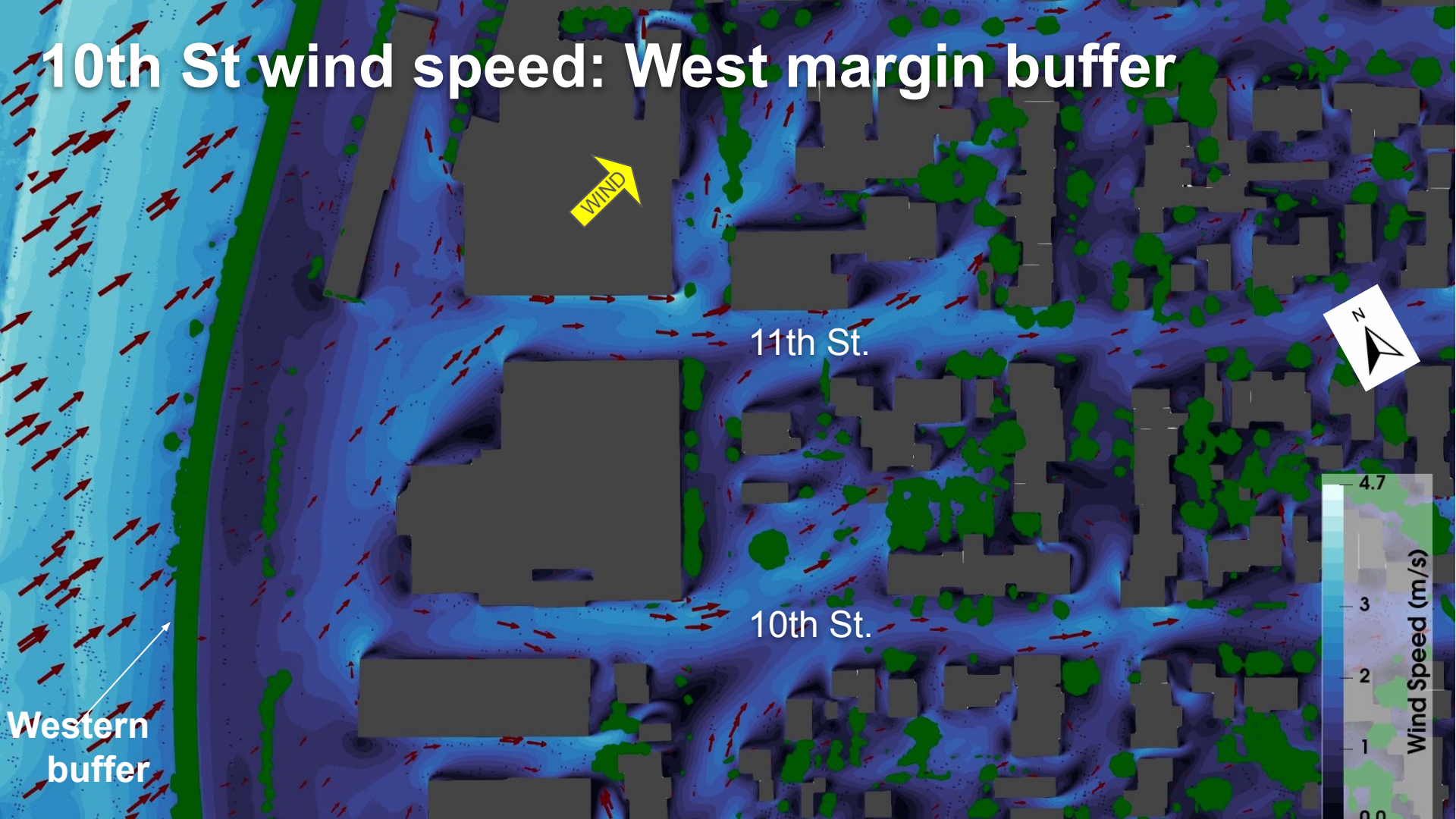

10th St buffer study: West
11th St.
10th St.

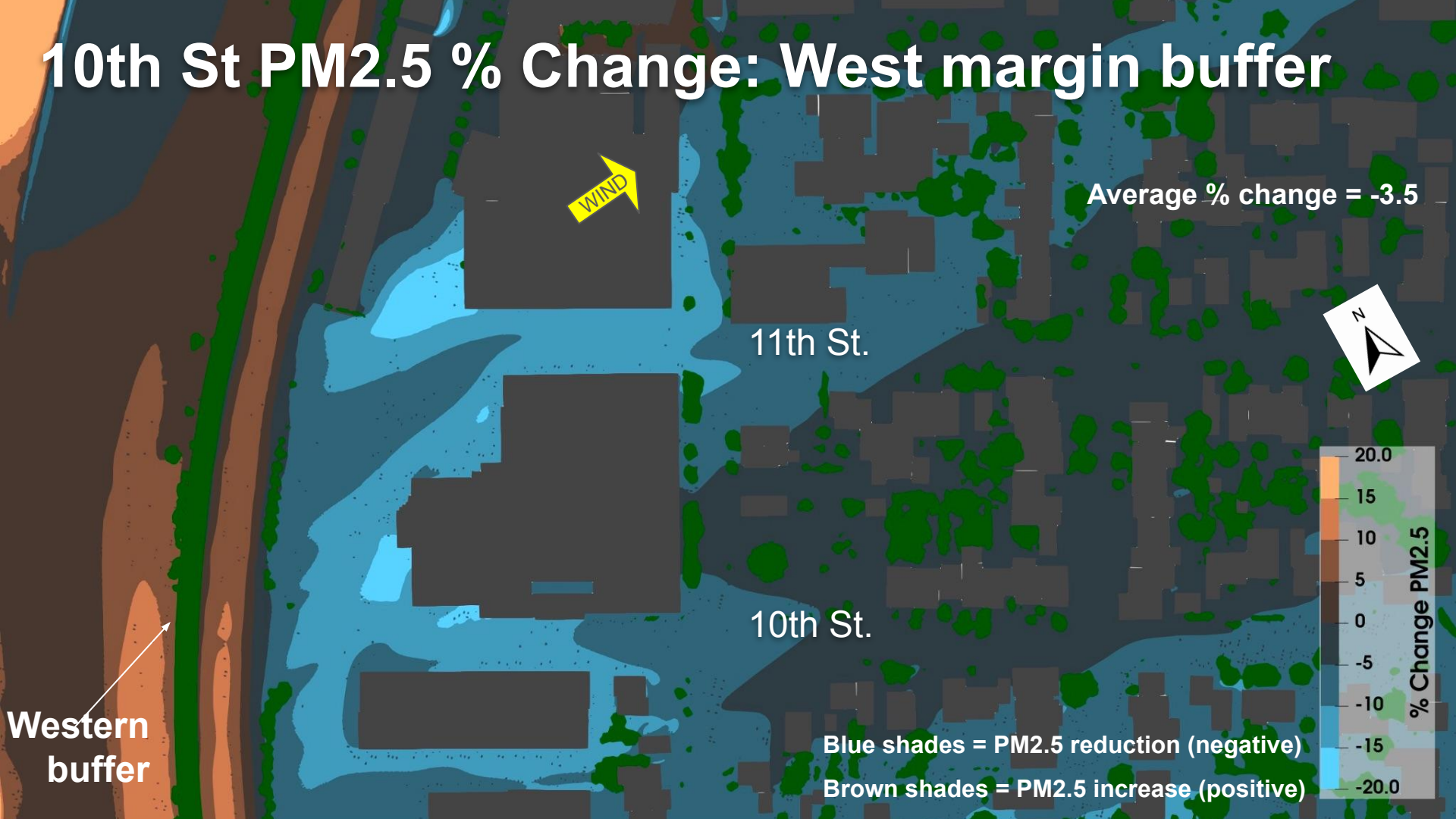
10th St buffer study: East margin buffer

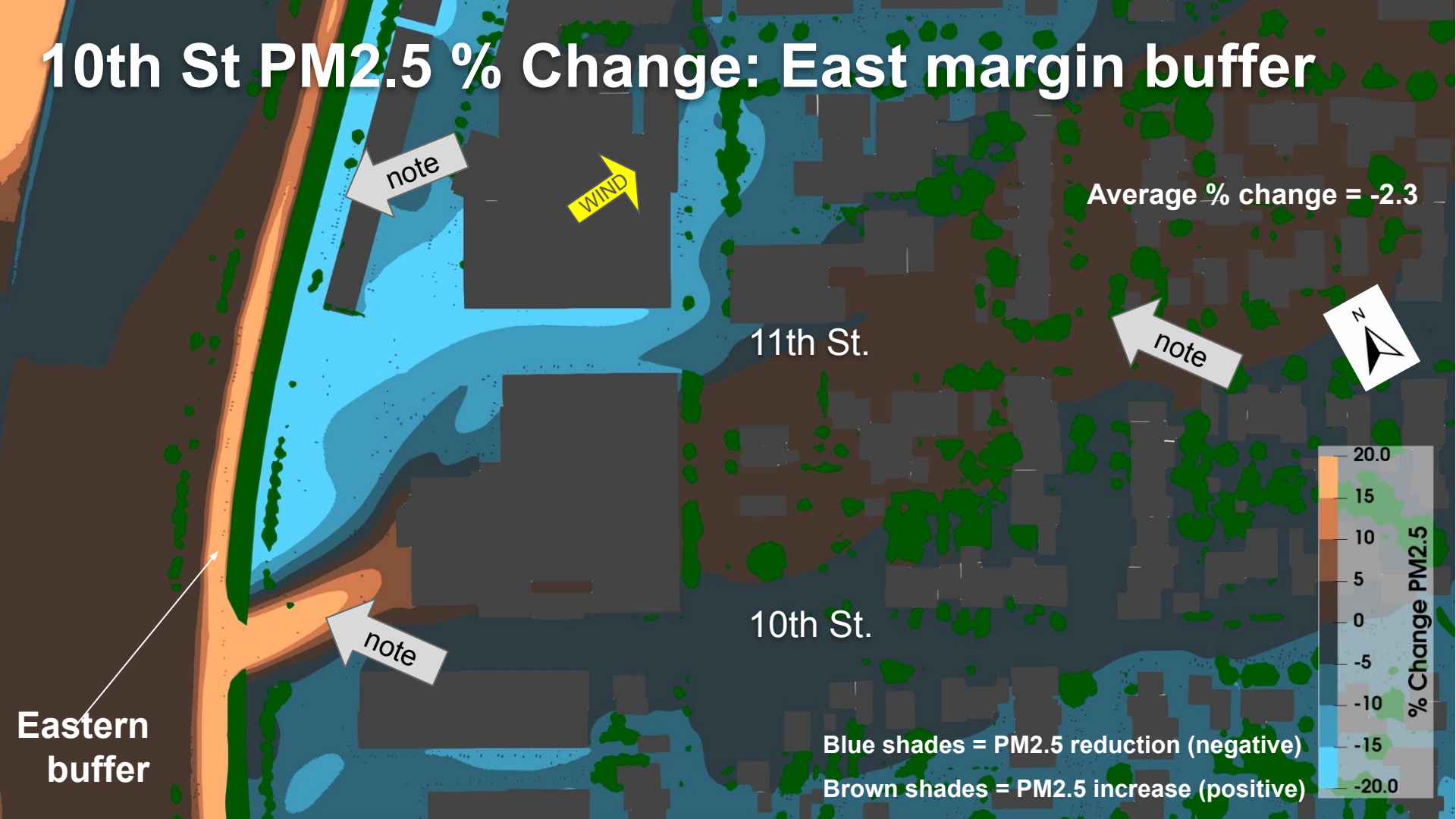
10th St buffer study: West margin buffer

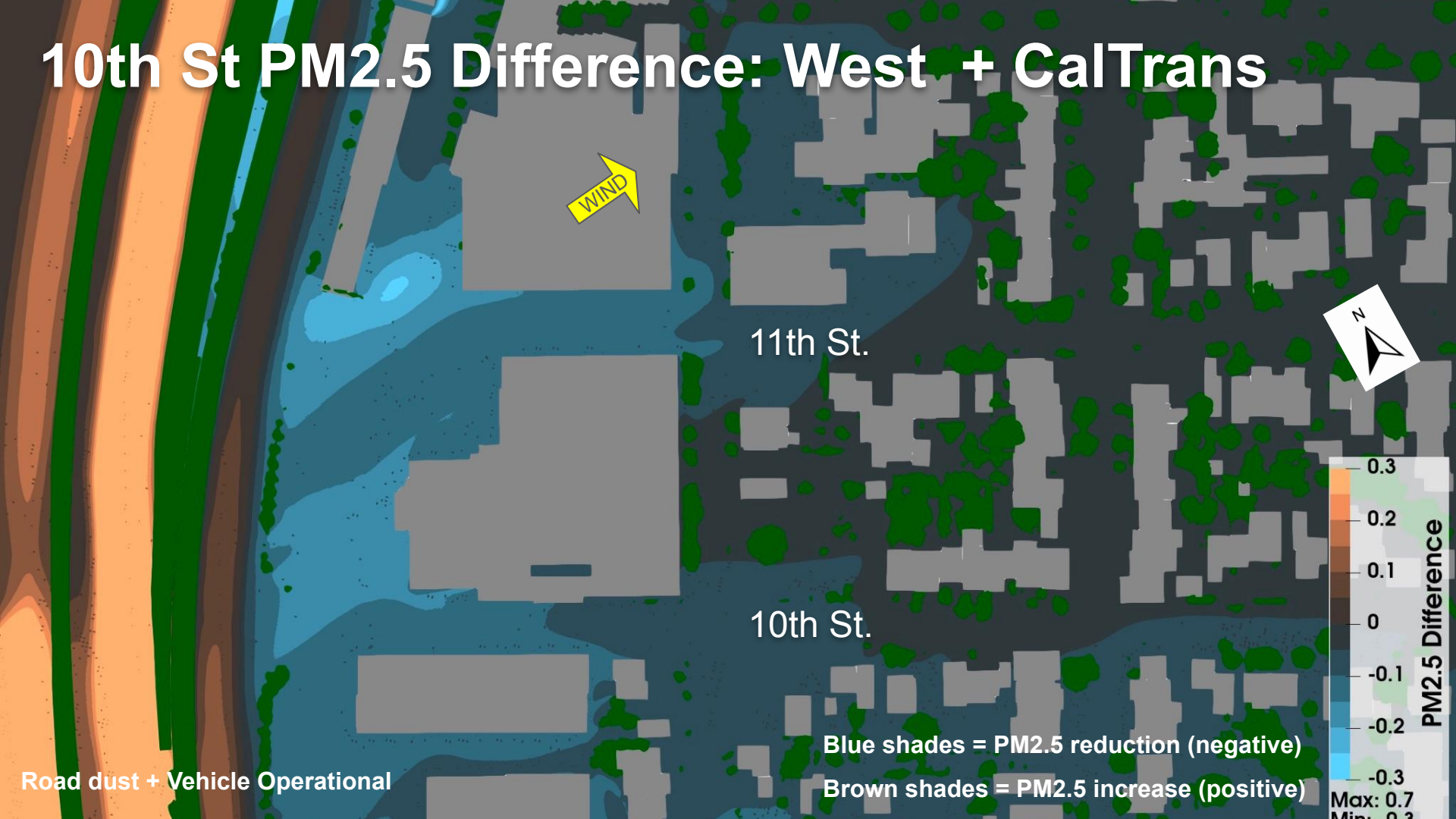

10th St wind speed: existing conditions
WIND
11th St.
10th St.
N
4.7
3
2
1
0.0
Wind Speed (m/s)

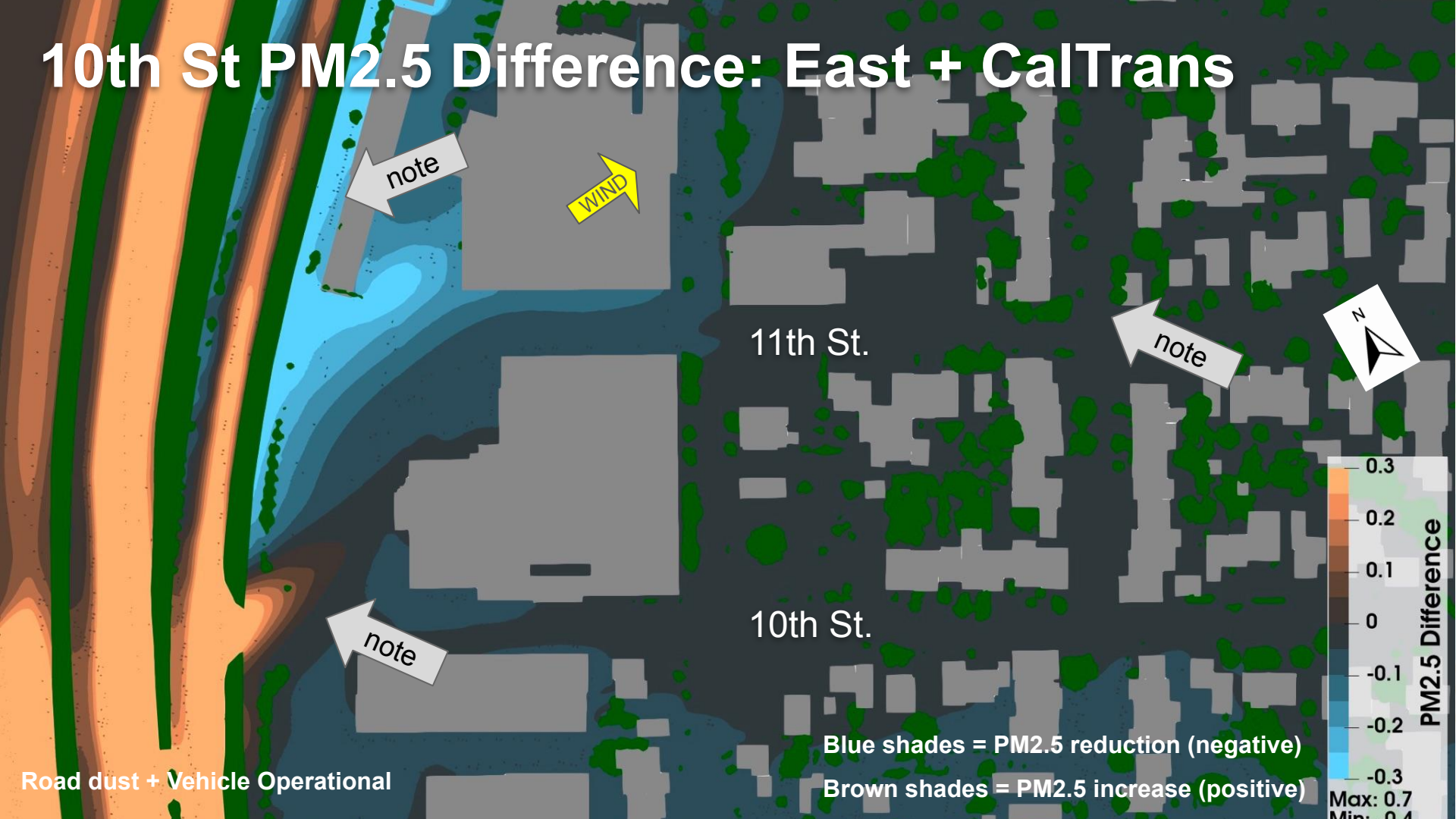

10th St wind speed: East margin buffer
WIND
11th St.
10th St.
N
4.7
3
2
1
0.0
Wind Speed (m/s)
Eastern buffer


10th St wind speed: West margin buffer
WIND
11th St.
10th St.
N
4.7
3
2
1
0.0
Wind Speed (m/s)
Western buffer


10th St PM2.5 % Change: West margin buffer
WIND
Average % change = -3.5
11th St.
10th St.
N
20.0
15
10
5
0
-5
-10
-15
-20.0
% Change PM2.5
Western buffer
Blue shades = PM2.5 reduction (negative)
Brown shades = PM2.5 increase (positive)


10th St PM2.5 % Change: East margin buffer
note
WIND
Average % change = -2.3
11th St.
note
N
10th St.
note
20.0
15
10
5
0
-5
-10
-15
-20.0
% Change PM2.5
Eastern buffer
Blue shades = PM2.5 reduction (negative)
Brown shades = PM2.5 increase (positive)


10th St PM2.5 Difference: West + CalTrans
WIND
11th St.
10th St.
N
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
PM2.5 Difference
Max: 0.7
Blue shades = PM2.5 reduction (negative)
Brown shades = PM2.5 increase (positive)
Road dust + Vehicle Operational


10th St PM2.5 Difference: East + CalTrans
note
WIND
11th St.
note
N
10th St.
note
Blue shades = PM2.5 reduction (negative)
Brown shades = PM2.5 increase (positive)
Road dust + Vehicle Operational
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
PM2.5 Difference
Max: 0.7

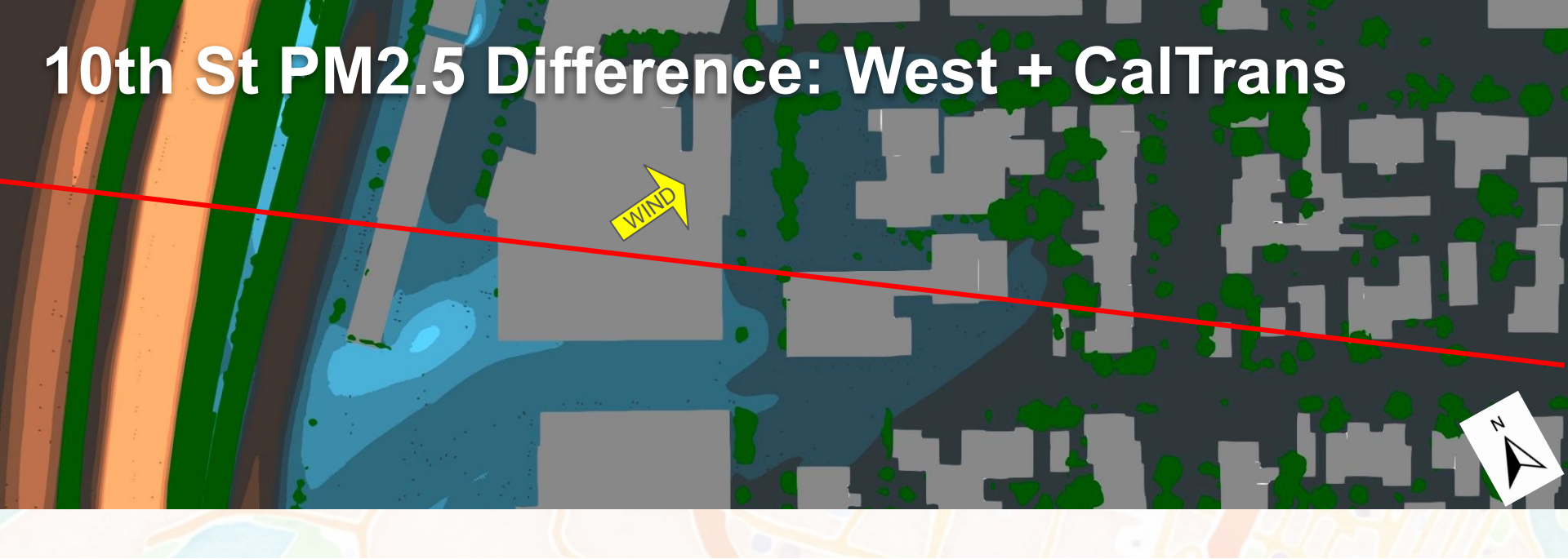
10th St PM2.5 Difference: West margin buffer

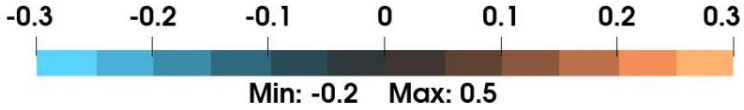
Road dust + Vehicle Operational

Blue shades = PM2.5 reduction (negative sign)

Brown shades = PM2.5 increase (positive sign)

10th St PM2.5 Difference: West + CalTrans





Road dust + Vehicle Operational

Blue shades = PM2.5 reduction (negative sign)

Brown shades = PM2.5 increase (positive sign)

10th St PM2.5 Difference: East margin buffer

Road dust + Vehicle Operational

Blue shades = PM2.5 reduction (negative sign)

Brown shades = PM2.5 increase (positive sign)

10th St PM2.5 Difference: East + CalTrans

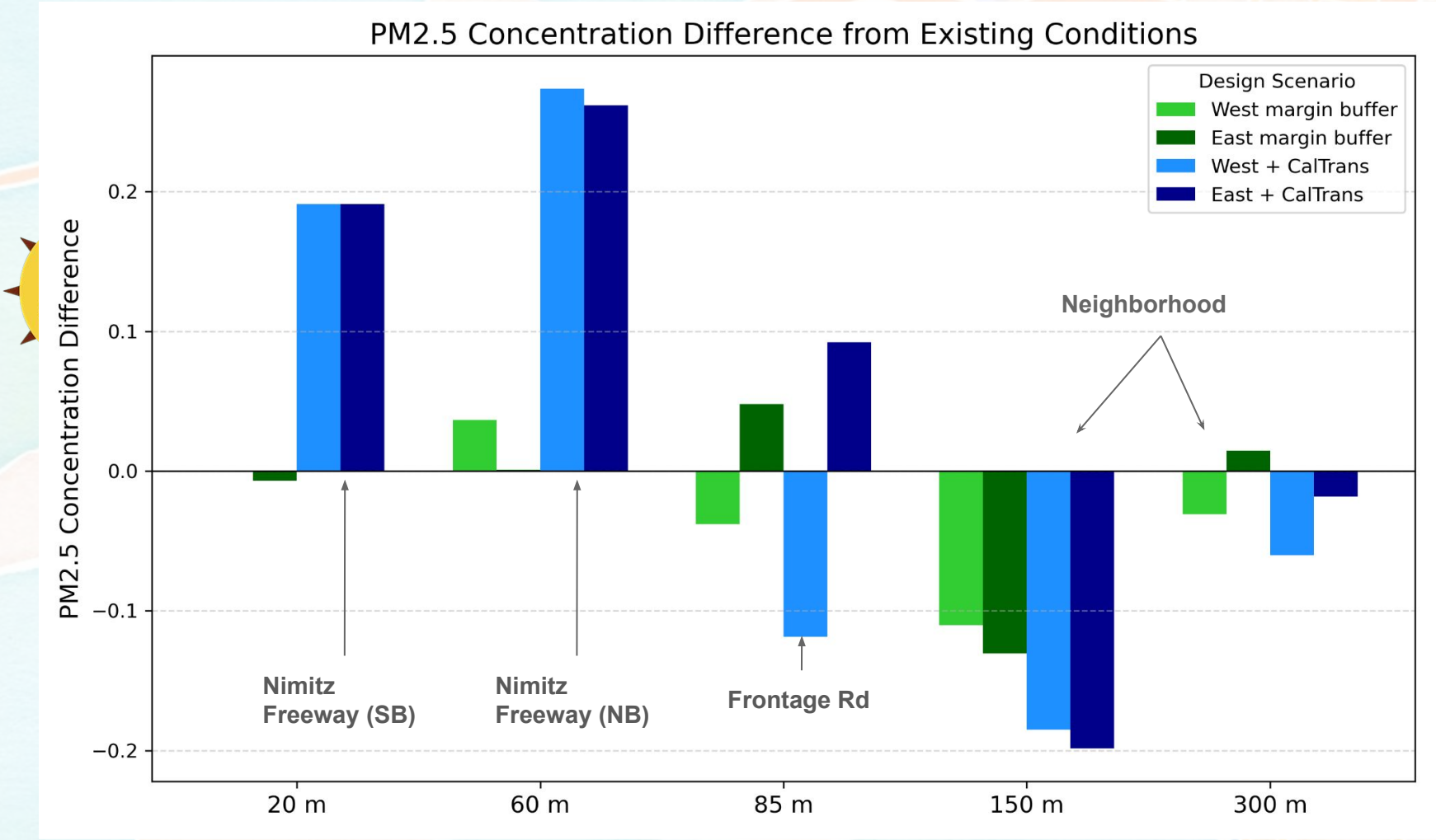
-0.3 -0.2 -0.1 0 0.1 0.2 0.3

Min: -0.4 Max: 0.5

Road dust + Vehicle Operational

Blue shades = PM2.5 reduction (negative sign)

Brown shades = PM2.5 increase (positive sign)


PM2.5 Concentration Difference from Existing Conditions
PM2.5 Concentration Difference
0.2
0.1
0.0
−0.1
−0.2
Design Scenario
West margin buffer
East margin buffer
West + CalTrans
East + CalTrans
Neighborhood
Nimitz Freeway (SB)
Nimitz Freeway (NB)
Frontage Rd
20 m
60 m
85 m
150 m
300 m

A meandering alignment could be best of both worlds…

Road Diet Next Steps

- Signal study at 7th street
- Create renderings to present our concept designs
- Feedback from community
- Begin monitoring

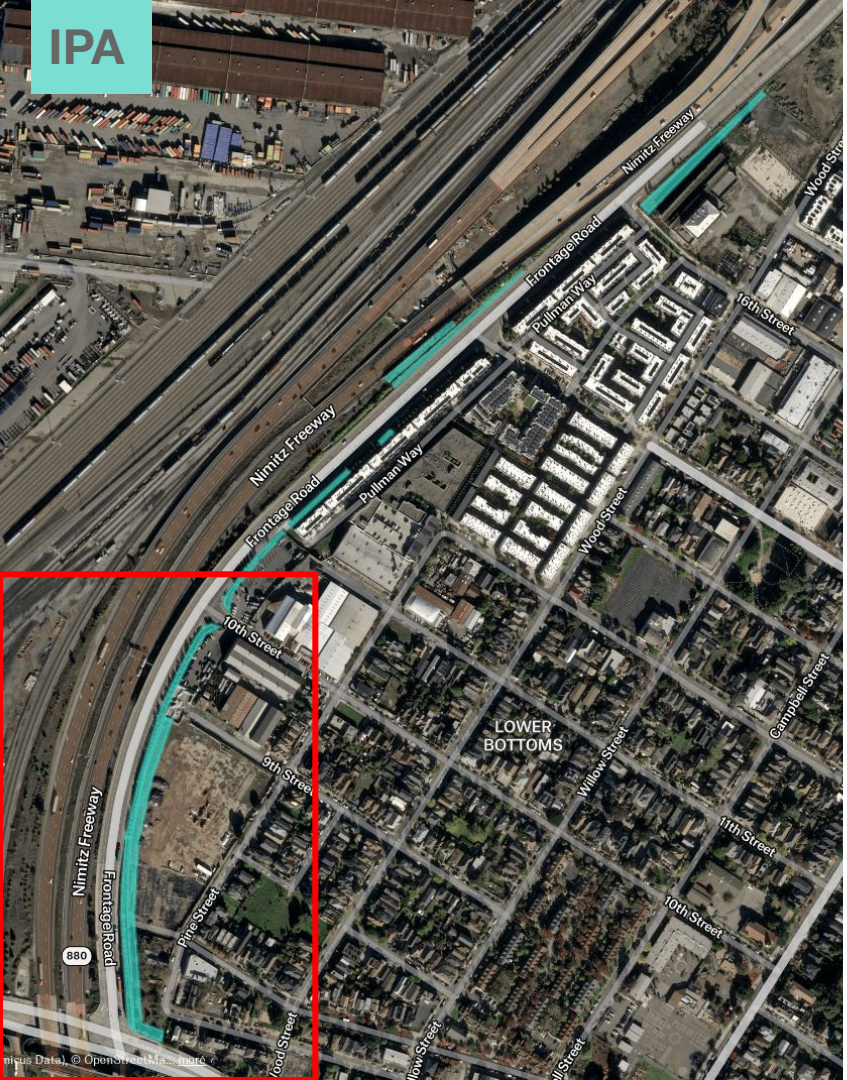
questions

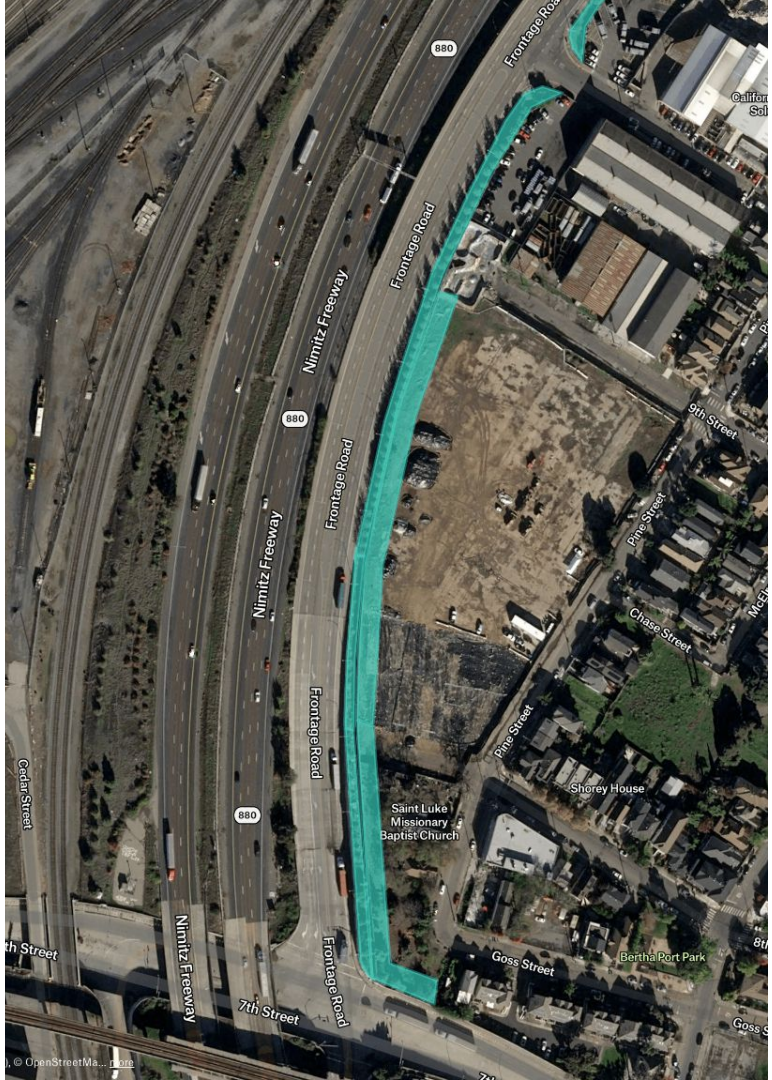
Agenda

- Recap & Review
  - Overview of Project Area
  - Key Takeaways from Previous presentations
- Road Diet
  - Simulation updates
  - Design Progress
- Immediately Plantable Area

Immediately Plantable


IPA
Ernie Raimondi Park
West 14th Street
Nimitz Freeway
Frontage Road
Pullman Way
16th Street
17th Street
15th Street
14th Street
12th Street
11th Street
10th Street
9th Street
7th Street
Wood Street
Campbell Street
Peralta Street
Willow Street
Pine Street
Mandela Parkway
LOWER BOTTOMS
880
CNES, Airbus DS, Planet Observer (cont. Copernicus Data), © OpenStreetMa

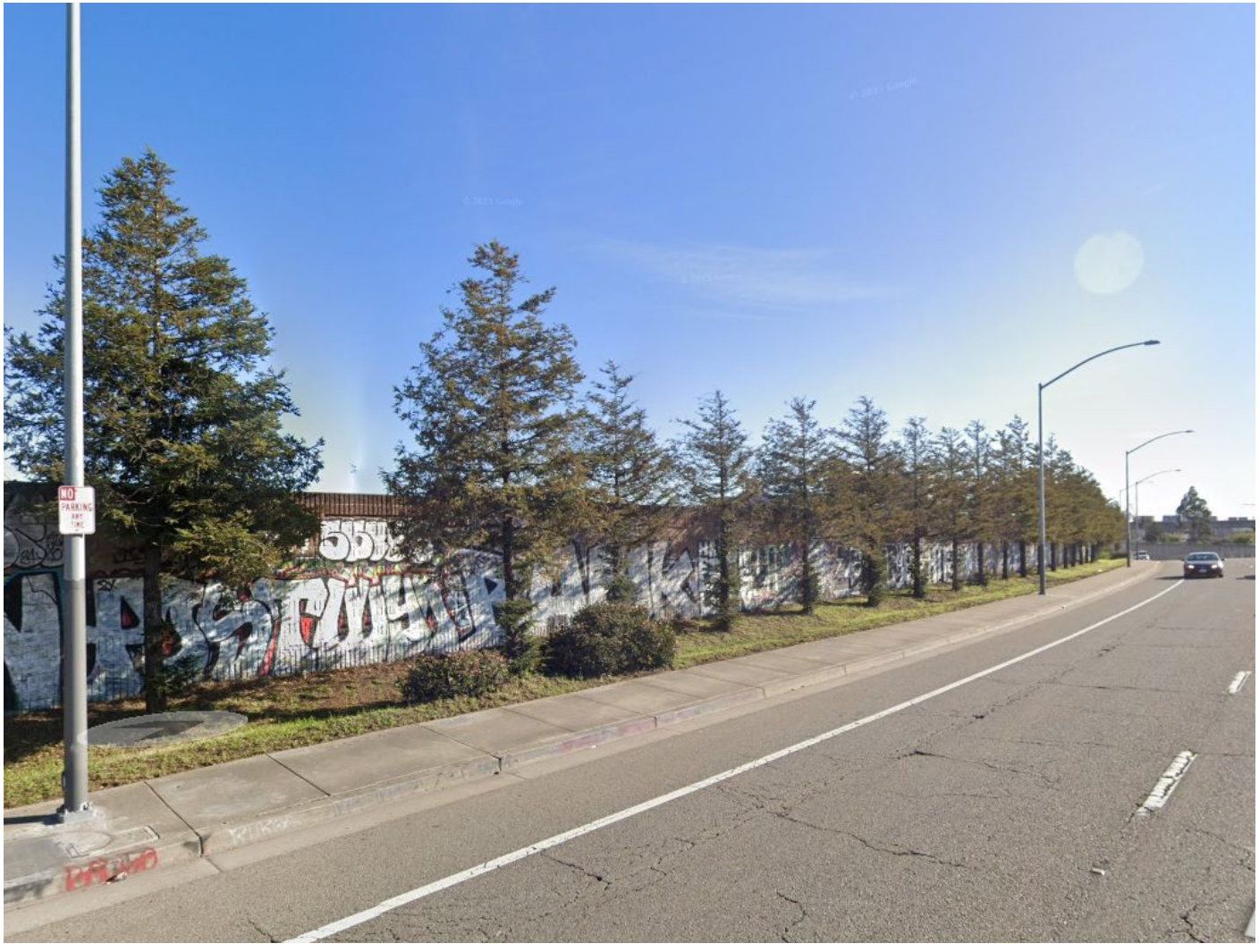

IPA
Nimitz Freeway
Frontage Road
Pullman Way
16th Street
Wood Street
LOWER BOTTOMS
10th Street
9th Street
Willow Street
Campbell Street
11th Street
Pine Street
880


880
Nimitz Freeway
Frontage Road
9th Street
Pine Street
Chase Street
Cedar Street
Saint Luke Missionary Baptist Church
Shorey House
Goss Street
Bertha Port Park
7th Street

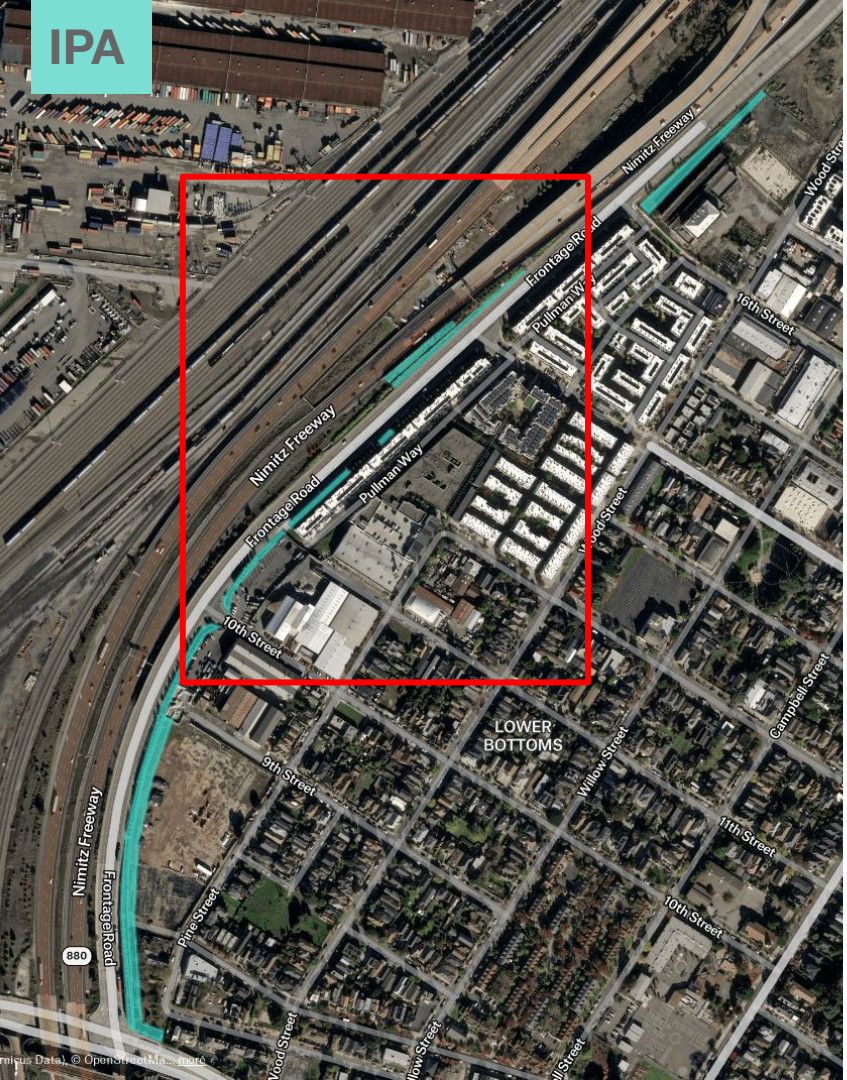
IPA

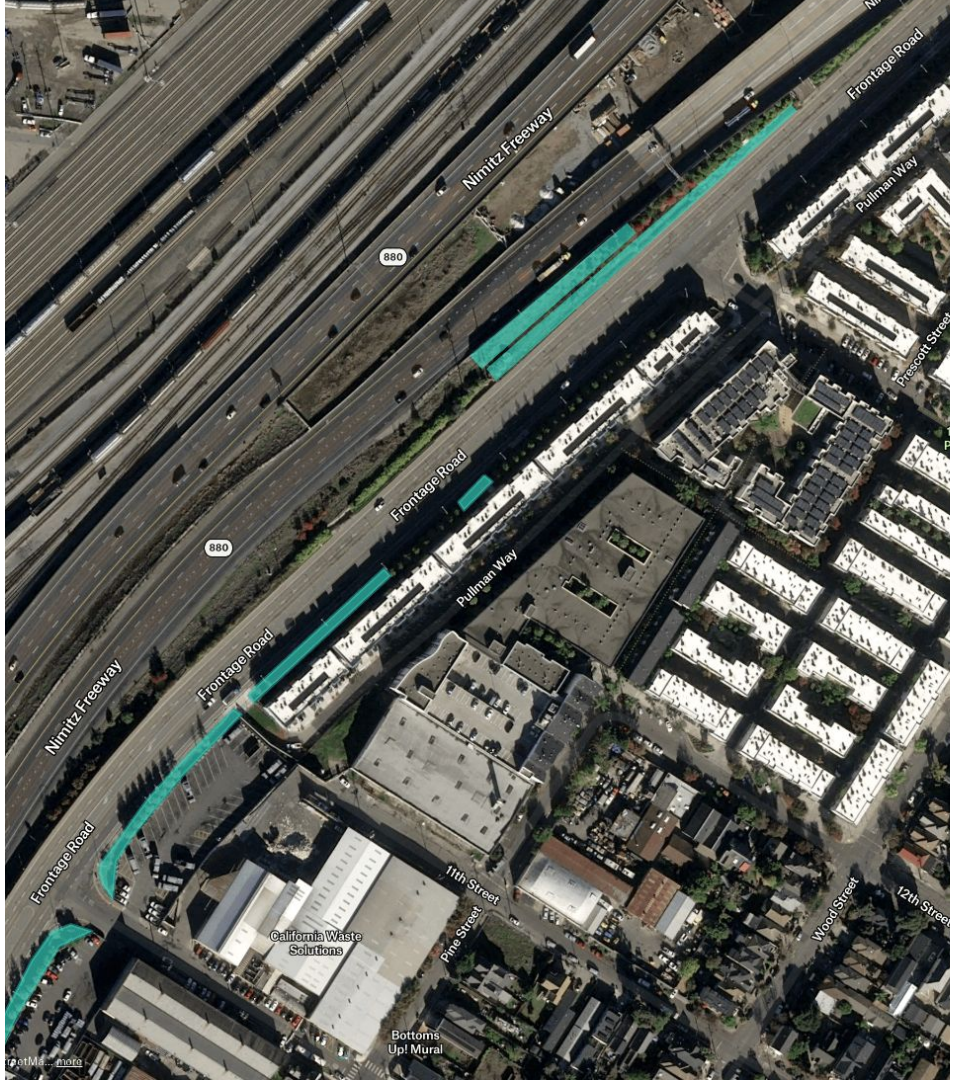
IPA

IPA

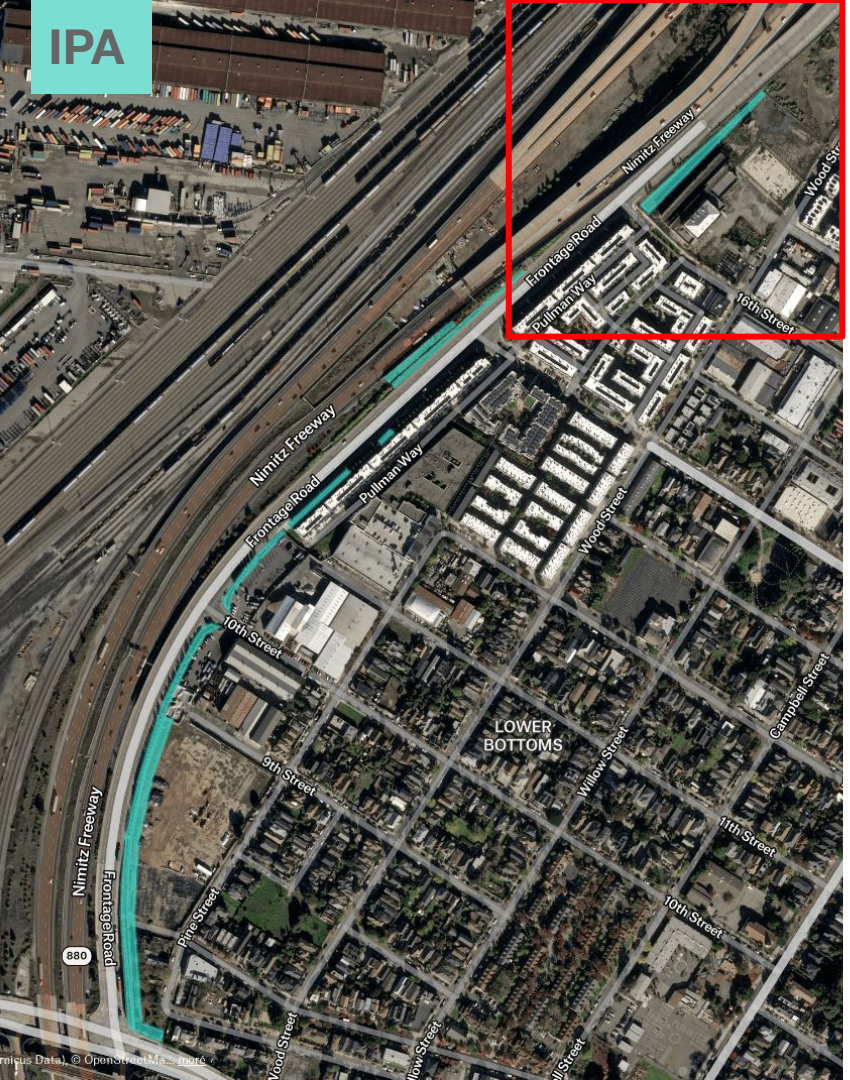


IPA


Nimitz Freeway
Frontage Road
Pullman Way
16th Street
10th Street
LOWER
BOTTOMS
9th Street
Willow Street
Campbell Street
11th Street
10th Street
Pine Street
Wood Street
880


Nimitz Freeway
Frontage Road
Pullman Way
880
Prescott Street
11th Street
California Waste
Solutions
Pine Street
Wood Street
12th Street
Bottoms
Up! Mural

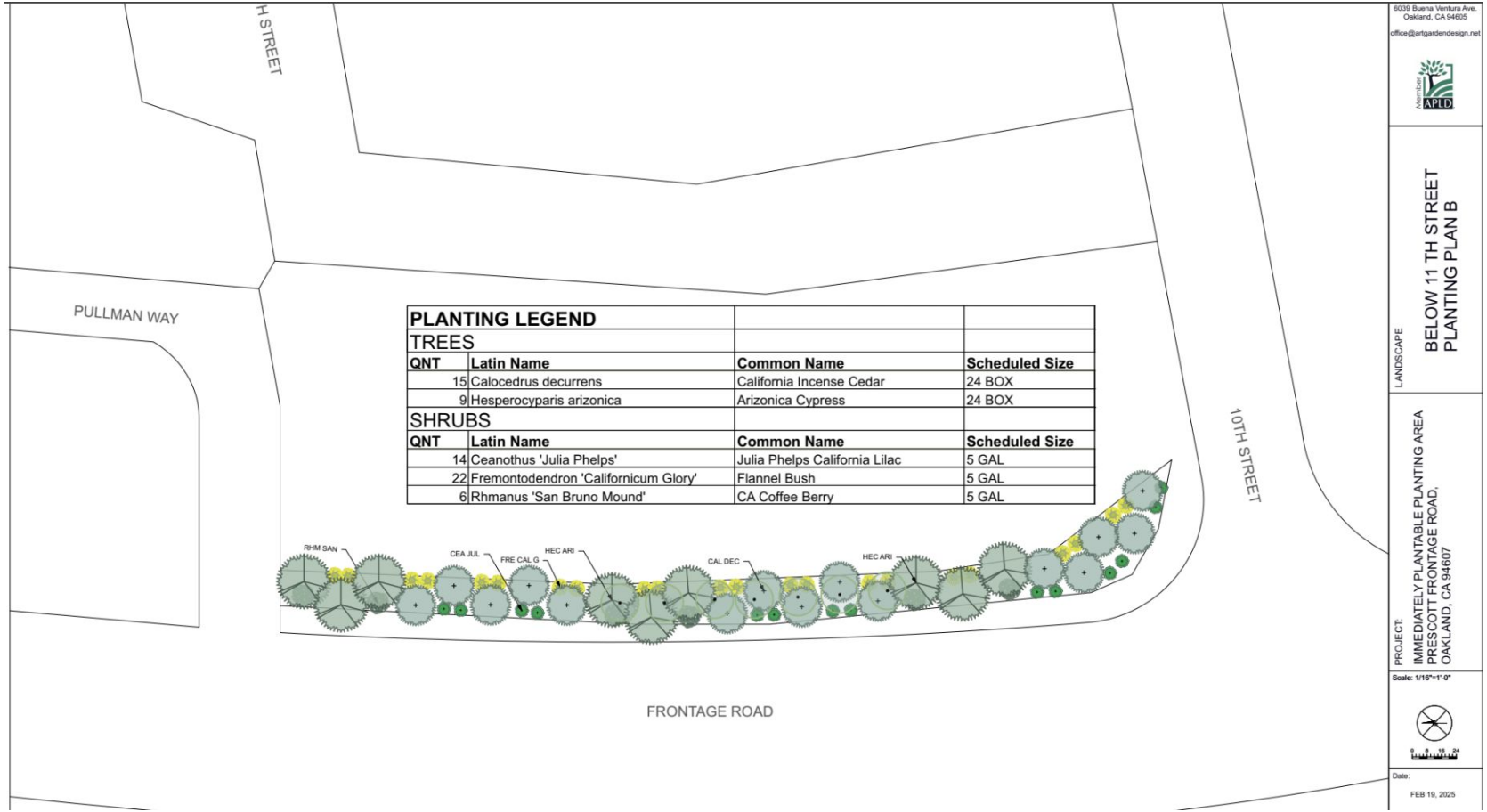

IPA
Frontage Rd


IPA
Nimitz Freeway
Frontage Road
Pullman Way
16th Street
Wood Street
10th Street
LOWER
BOTTOMS
Campbell Street
Willow Street
9th Street
11th Street
Pine Street
880


Nimitz Freeway
Frontage Road
880
Wood Street
16th Street
Old 16th Street
Train Station
Bay Alley
Ironwood Alley
Myrtle Alley
Natchez Alley
Pullman Way
Kramers
Machine Shop
17th Street

IPA

IPA



PLANTING LEGEND			
TREES			
QNT	Latin Name	Common Name	Scheduled Size
15	Calocedrus decurrens	California Incense Cedar	24 BOX
9	Hesperocyparis arizonica	Arizonica Cypress	24 BOX
SHRUBS			
QNT	Latin Name	Common Name	Scheduled Size
14	Ceanothus 'Julia Phelps'	Julia Phelps California Lilac	5 GAL
22	Fremontodendron 'Californicum Glory'	Flannel Bush	5 GAL
6	Rhmanus 'San Bruno Mound'	CA Coffee Berry	5 GAL

6039 Buena Ventura Ave.
Oakland, CA 94605
office@artgardendesign.net

Member APLD

LANDSCAPE

BELOW 11 TH STREET
PLANTING PLAN B

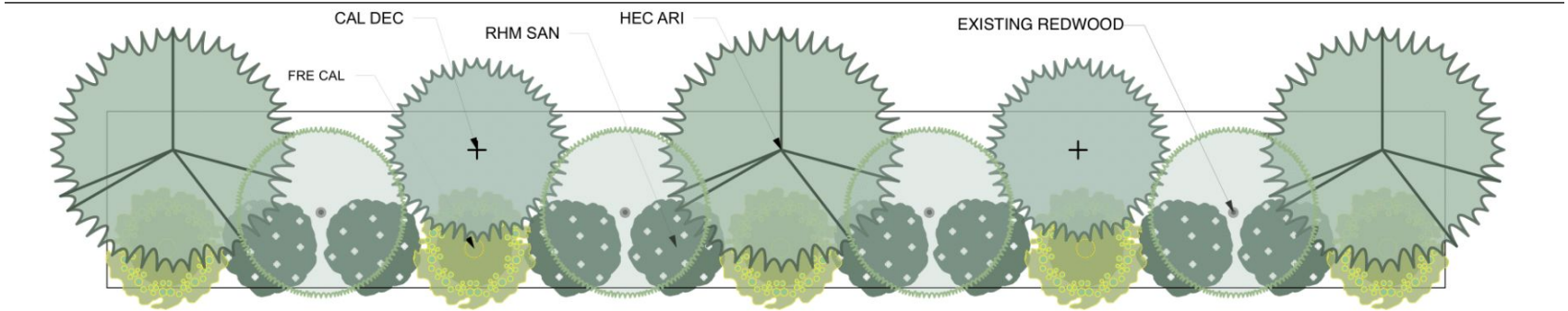
PROJECT:
IMMEDIATELY PLANTABLE PLANTING AREA
PRESCOTT FRONTAGE ROAD,
OAKLAND, CA 94607

Scale: 1/16"=1'-0"

0 8 16 24

Date:
FEB 19, 2025

IPA



IPA questions:

1. How should we approach the question of redwoods being removed or replaced with the community.
2. What permits are needed to proceed?
3. How should we proceed if we receive pushback on our tree choices.

OMSS – 20 years in the making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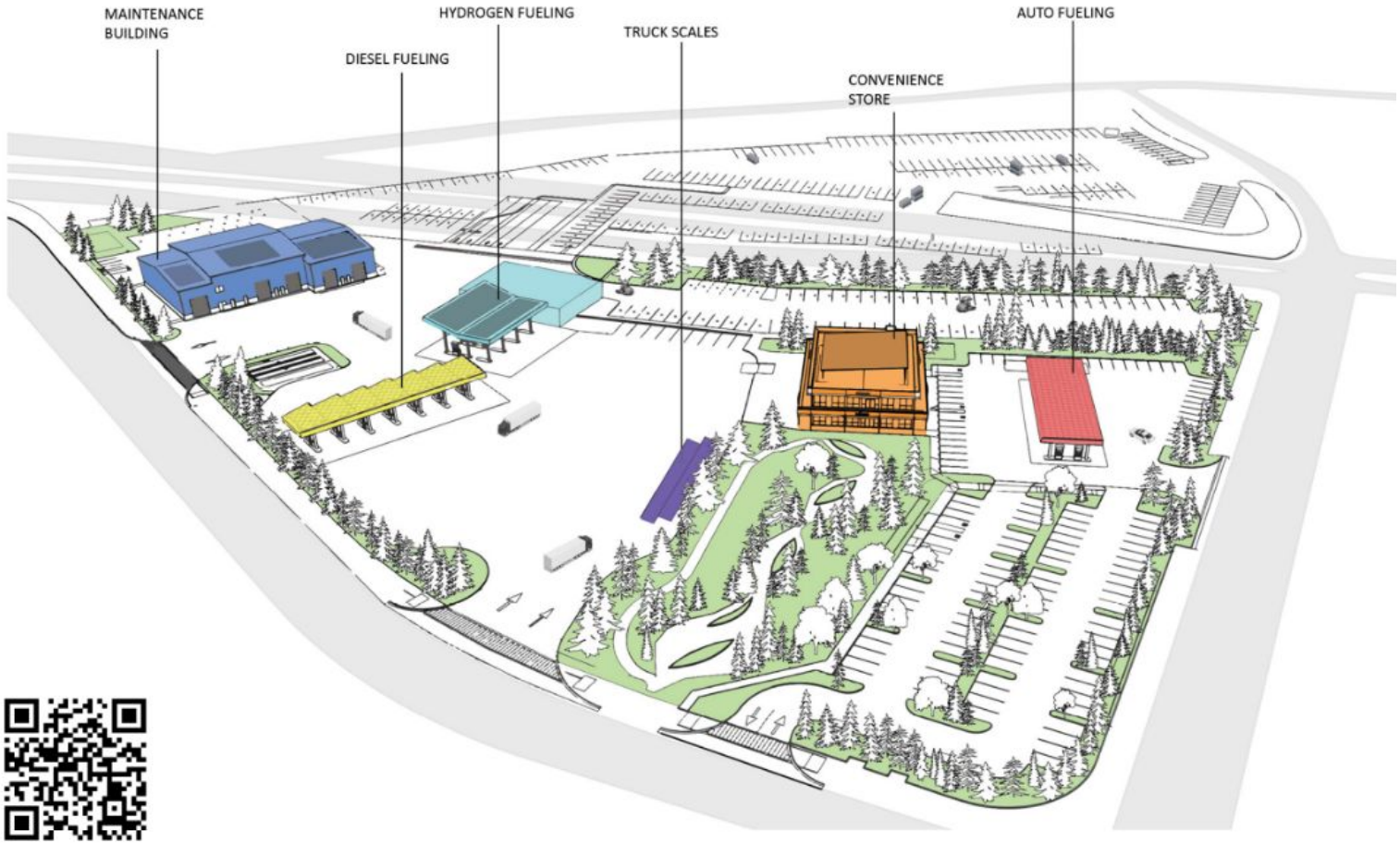
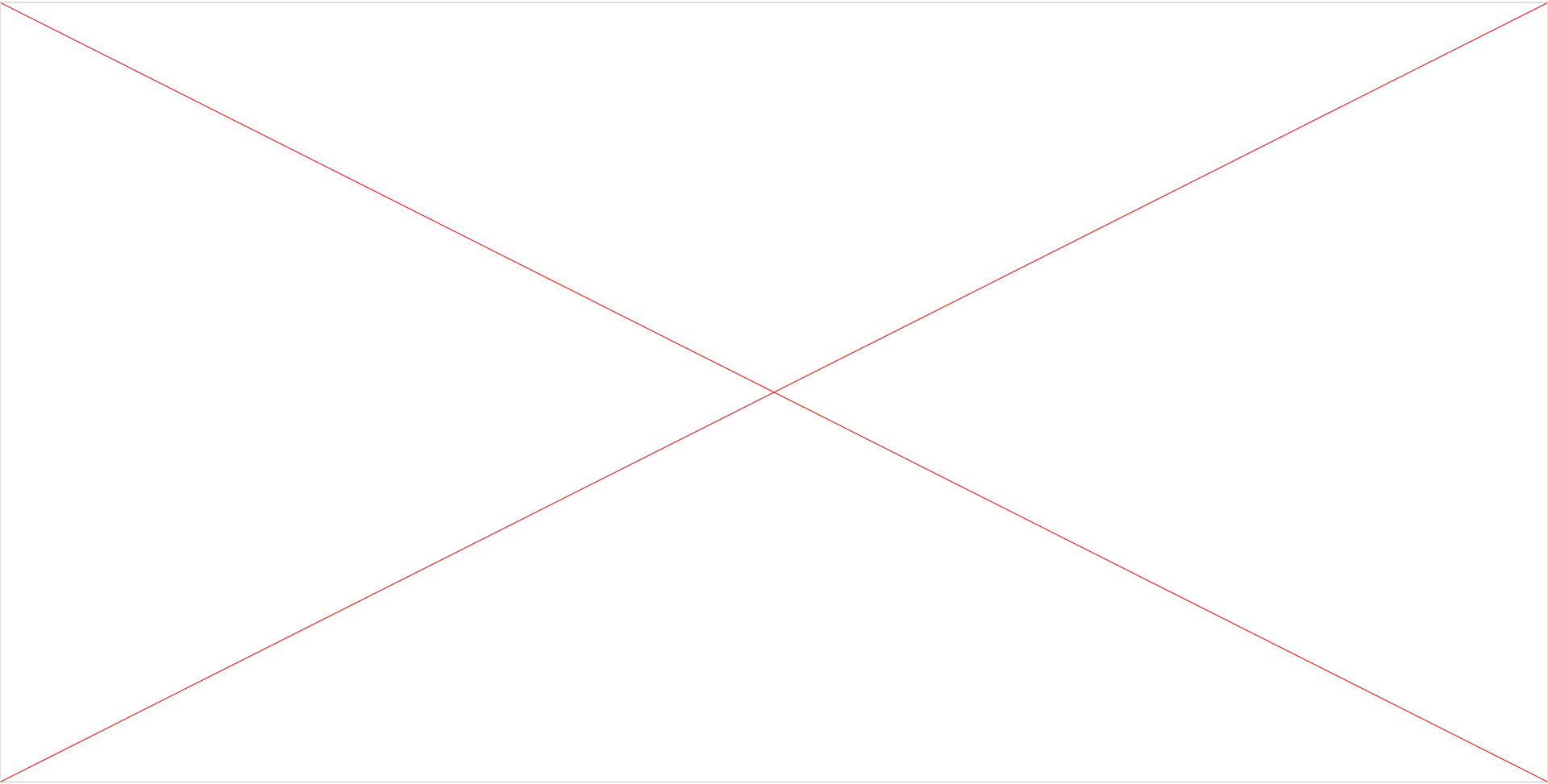
COMMUNITY HUB
OAKLANDGATEWAY.COM
OMSS


TRUCKER


TRUCKER


MAINTENANCE BUILDING
DIESEL FUELING
HYDROGEN FUELING
TRUCK SCALES
CONVENIENCE STORE
AUTO FUELING




OAKLAND GATEWAY

Next month

Next meeting for Steering Committee members

Topic: TBD

June 4th

Working Session, Pubic Meeting or Break?

Keep an eye on your email for the invitation.

Thank you.

Scan me.

West Oakland
Environmental
Indicators
Project