



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

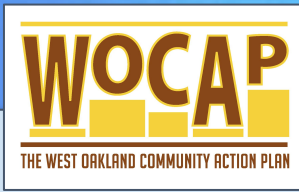


**West Oakland
Environmental
Indicators Project**
know which way the wind blows



Steering Committee

February 7, 2024



Welcome!

Name, Affiliation/Organization

Please sign in/add comments in the sheet:

- **Member Sign In Sheet-**

https://docs.google.com/spreadsheets/d/1ByQ_QDRd1QLrFk-fBVGSOos-80uNPpFOUXy8v2ZBMZY/edit#gid=0

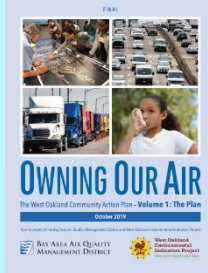
- **Meeting Attendees-**

https://docs.google.com/spreadsheets/d/1SYPRUBuhS0gW6r0kVA3unOEsklg7mgyKAZu3dhEzo_E/edit#gid=660277727

Owning Our Air - West Oakland AB 617 Steering Committee Meeting

Wednesday, February 7, 2024 | 6:00 pm to 8:00 p.m.

Time	Item
6:00-6:05 pm (5 min)	Roll Call
6:05-6:10 pm (5 min)	Welcome and Co-leads Report
6:10-6:20 pm (10 min)	Follow Up from Previous Meeting
6:20-6:55 pm (35 min)	Prescott Greening Presentation
6:55-7:15 pm (20 min)	Prescott Large Group Discussion/Q&A
7:15-7:55 pm (40 min)	Prescott Breakout Rooms (30 min) + Report Back (10 min)
7:55-8:00pm (5 min)	Meeting Evaluation Survey





Welcome and Co-Leads Report

Q&A Protocol

- 1. No questions/comments during presentations**
(Questions in the chat are okay)
- 2. SC Members FIRST**
- 3. Then General Public**
- 4. THEN Co-Leads**

New WOEIP Staff



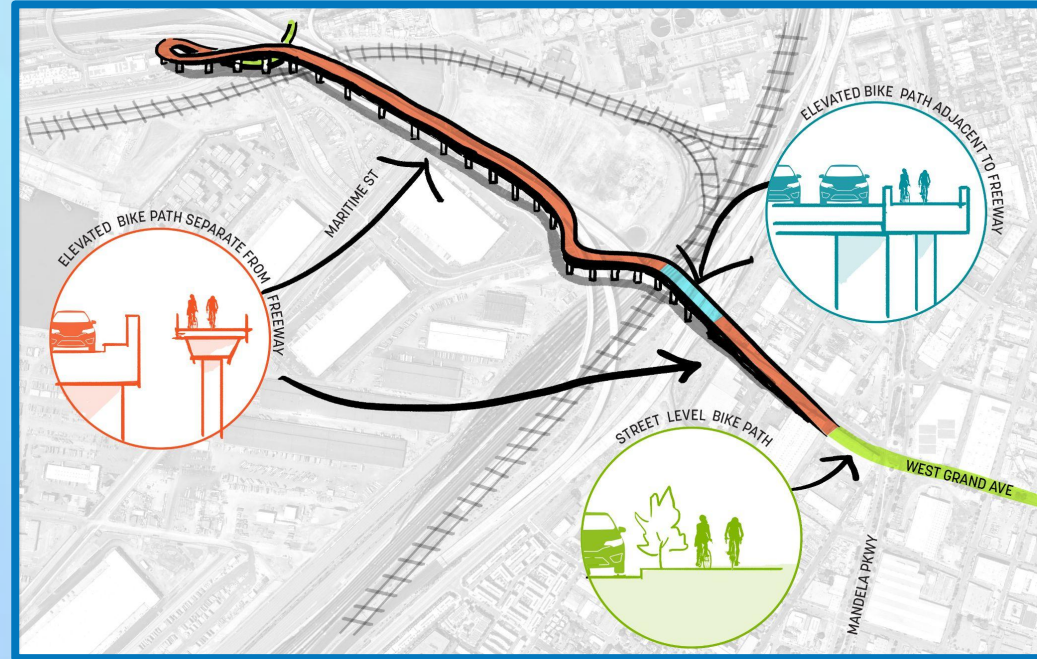
Tarangini Saxena
Project Manager



Clara Weinstein
Communications Manager

West Oakland Link update

- West Oakland Link meeting # 6 - Week of April 8th, 2024
- Design 35% complete
- More details to follow





Follow-Up from Past Meetings

Town Hall Recap

- **Cristina Garcia (keynote)**
- **16 organizations tabled**
- **150+ attendees** (including new participants)
- **Feedback:** Overall positive!
 - Information provided was helpful & understandable.
 - Locals felt slightly less able to participate. Volume was an issue in the venue.



Semi-annual Evaluation Survey

- Keep your eyes open for a survey in your email
- Open to all WOCAP participants including Steering Committee members, partner agencies, and the general public

Prescott Greening Project



February 7, 2024

Prescott Greening Agenda

- ❖ Introduction
- ❖ Project Area
- ❖ Modeling
 - What is modeling
 - Building a 3D world
 - Pollution Levels
 - Vegetated Buffers
- ❖ Concept Designs
- ❖ Discussion

Prescott Greening (*brief overview*)



Overview:

- Pilot project to reduce pollution exposure
- Developing way to model different planting options
- Vegetative buffers along:
 - Frontage Rd from 7th -16 th St
 - Caltrans Freeway
 - 7th street
- Creation of Stewardship Model for Green Infrastructure

AB 617 Greening Strategies

Strategy #10: The City of Oakland creates a comprehensive, area-wide urban canopy and vegetation plan that identifies locations that trees can be added and maintained, such as parks and along Caltrans' rights-of-way and develops a plan to protect existing trees that reduce exposure to air pollution emissions in West Oakland. This includes partnering with local nonprofit groups, encouraging trees on private property, and working with the community on tree maintenance and (as needed) removal.

Strategy #11: The City of Oakland works with local groups to train residents to maintain biofilters.

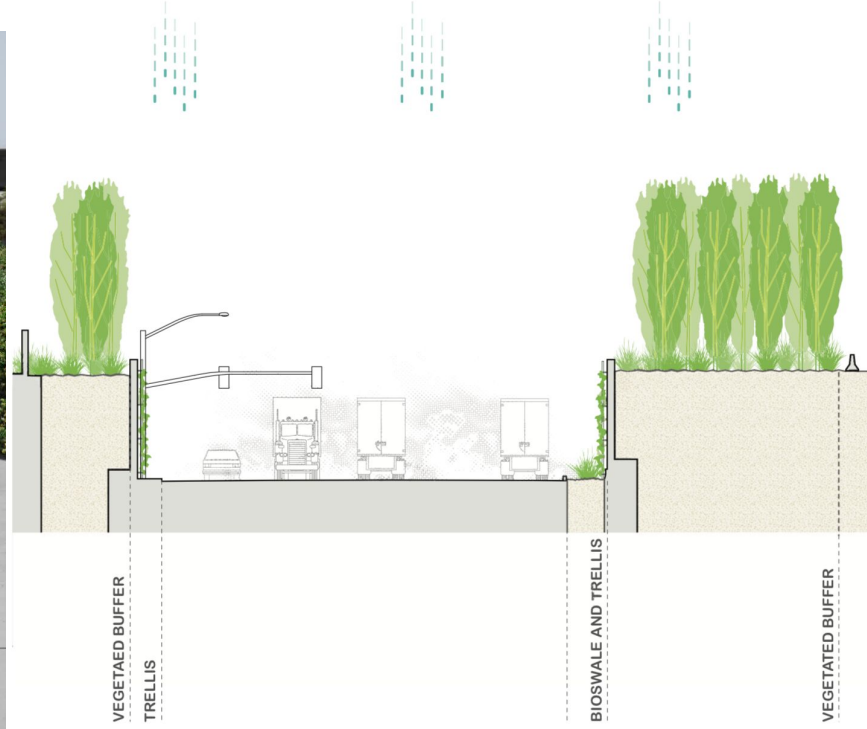
Strategy #12: The Air District and the West Oakland Environmental Indicators Project intends to implement the green infrastructure project currently under development between Interstate I-880 and the Prescott neighborhood in West Oakland by 2021.

Strategy #16: The City of Oakland, in partnership with the Steering Committee, CARB and the Air District, studies the exposure reduction benefit of requiring solid or vegetative barriers to be incorporated into site design between buildings and sources of air pollution (for example, a freeway).

Prescott Greening

This project is ONE piece of the puzzle toward improved air quality in West Oakland along with all the other WOCAP strategies that address both indoor and outdoor air pollution and exposure



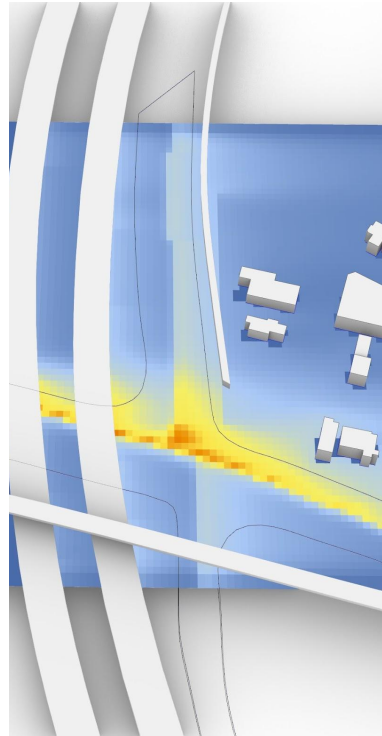


VEGETATED BUFFER
TRELLIS

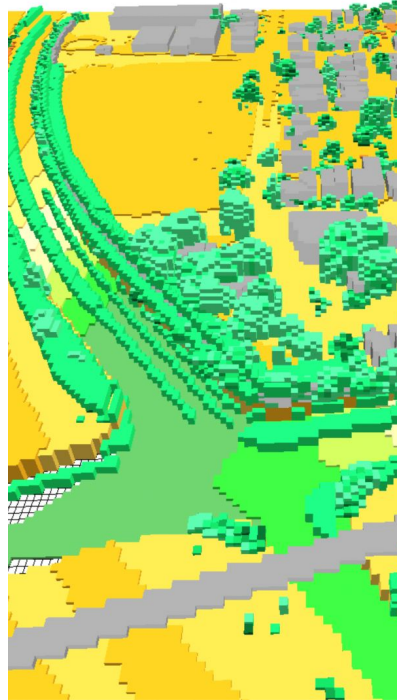
BIOSWALE AND TRELLIS

VEGETATED BUFFER

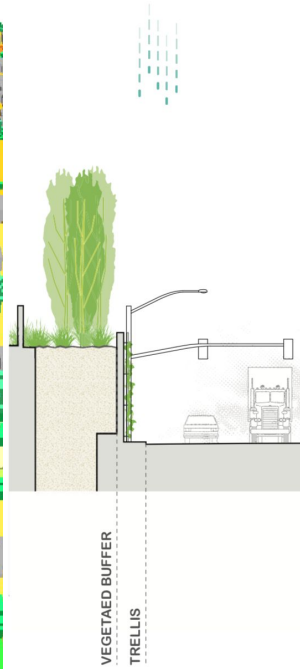
Prescott Showcase Goals



Model Pollution



Model Solutions



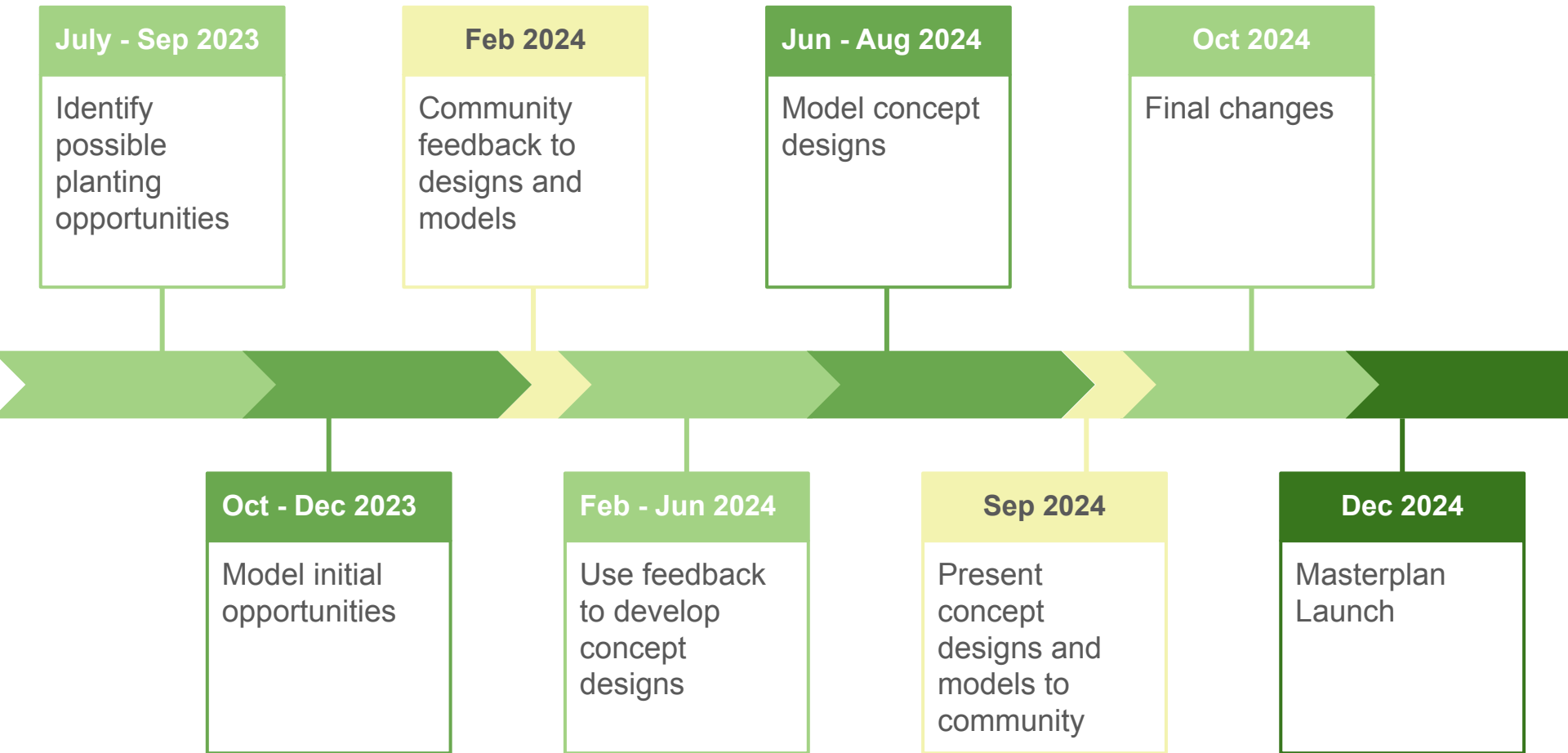
Design



Build Interventions



Monitor Results



July - Sep 2023

Identify possible planting opportunities

Feb 2024

Community feedback to designs and models

Jun - Aug 2024

Model concept designs

Oct 2024

Final changes

Oct - Dec 2023

Model initial opportunities

Feb - Jun 2024

Use feedback to develop concept designs

Sep 2024

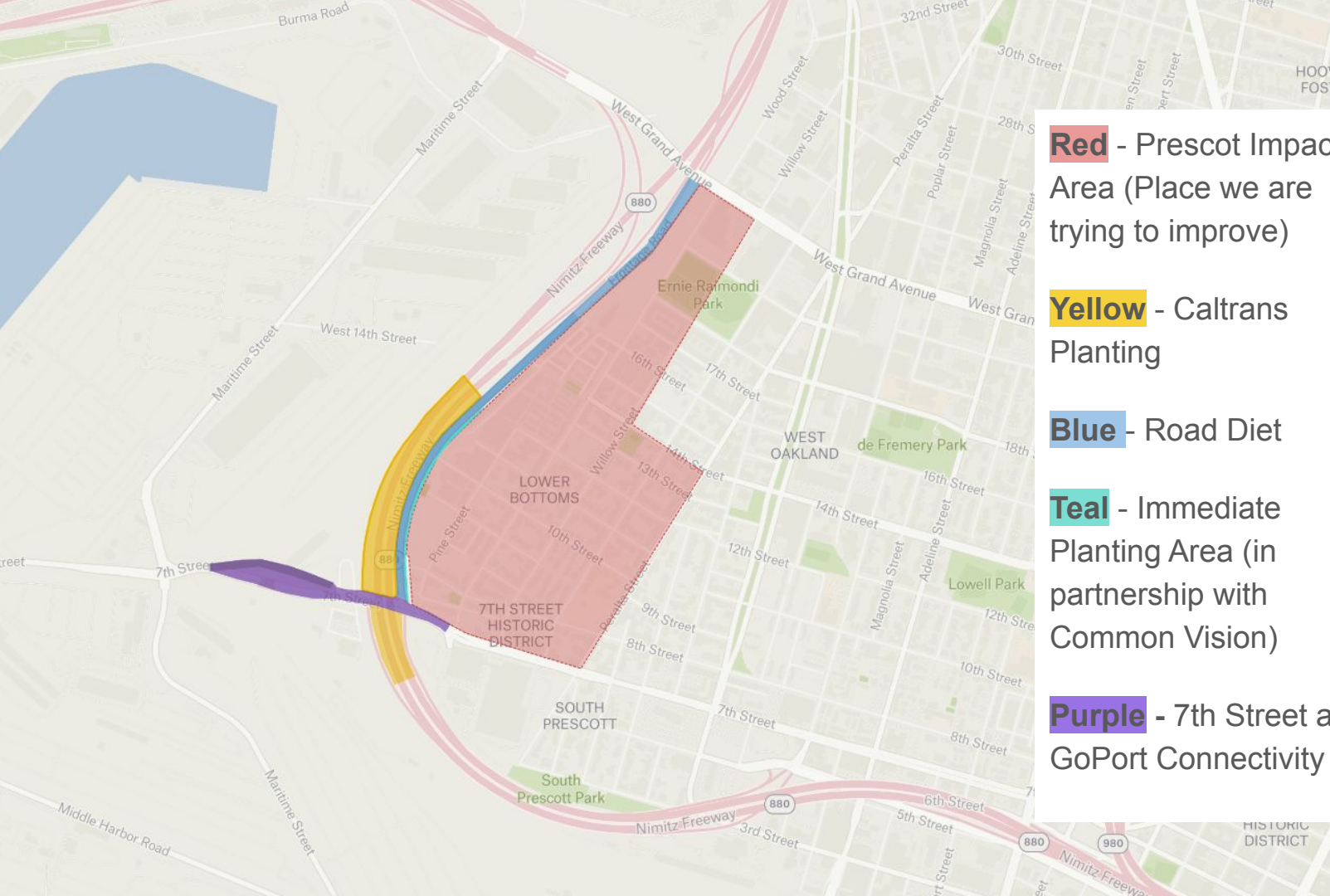
Present concept designs and models to community

Dec 2024

Masterplan Launch

Prescott Greening Agenda

- ❖ Introduction
- ❖ **Project Area**
- ❖ Modeling
 - What is modeling
 - Building a 3D world
 - Pollution Levels
 - Vegetated Buffers
- ❖ Concept Designs
- ❖ Discussion



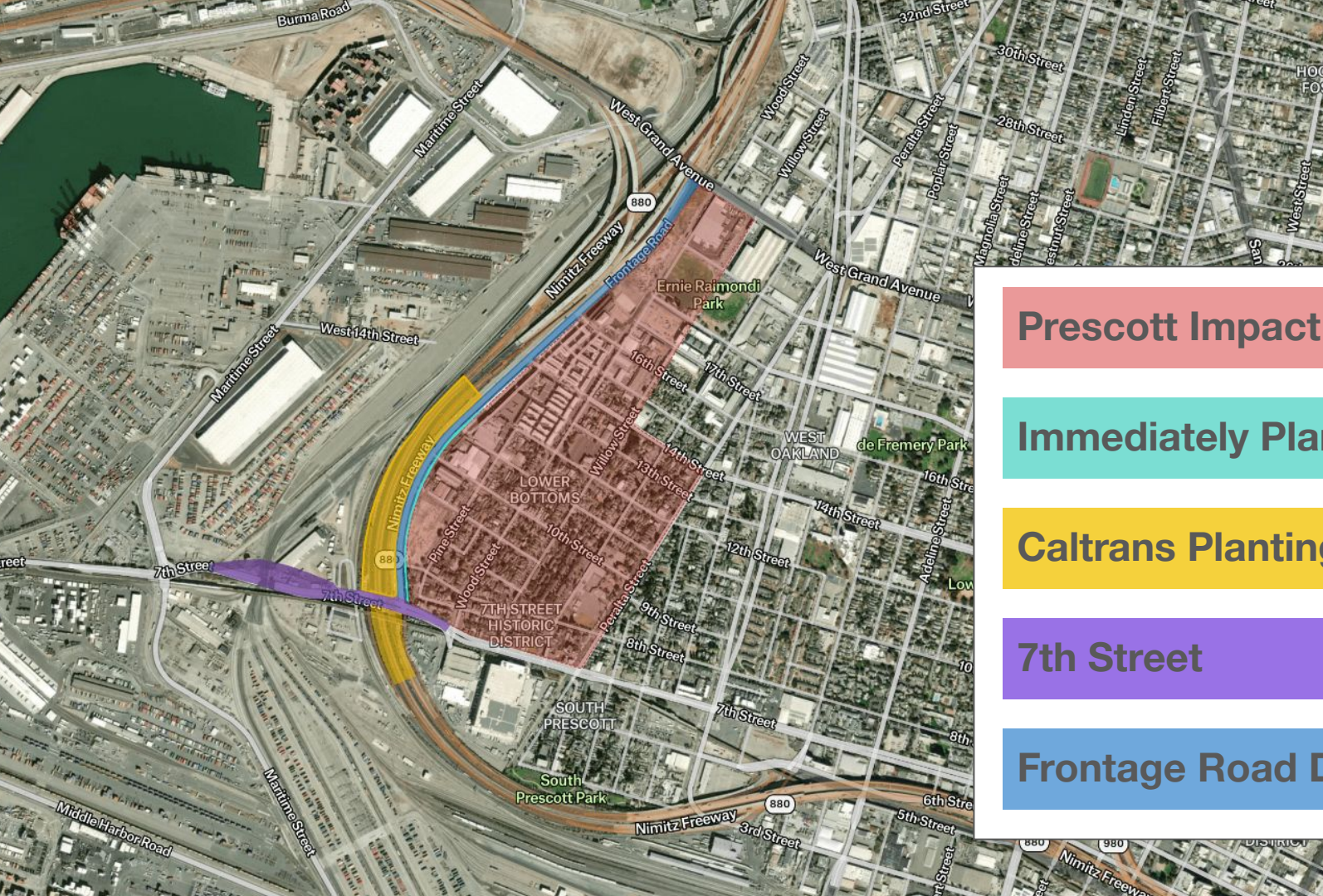
Red - Prescot Impact Area (Place we are trying to improve)

Yellow - Caltrans Planting

Blue - Road Diet

Teal - Immediate Planting Area (in partnership with Common Vision)

Purple - 7th Street and GoPort Connectivity



Prescott Impact Zone

Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet



Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

Immediately Plantable

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

Immediately Plantable

Raimondi Park



Immediately Plantable



Some places have lots of spaces for new trees

Immediately Plantable



This area could have hanging vines



Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

880 Freeway - Caltrans Land

Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet





Immediately Plantable

Caltrans Planting

7th Street

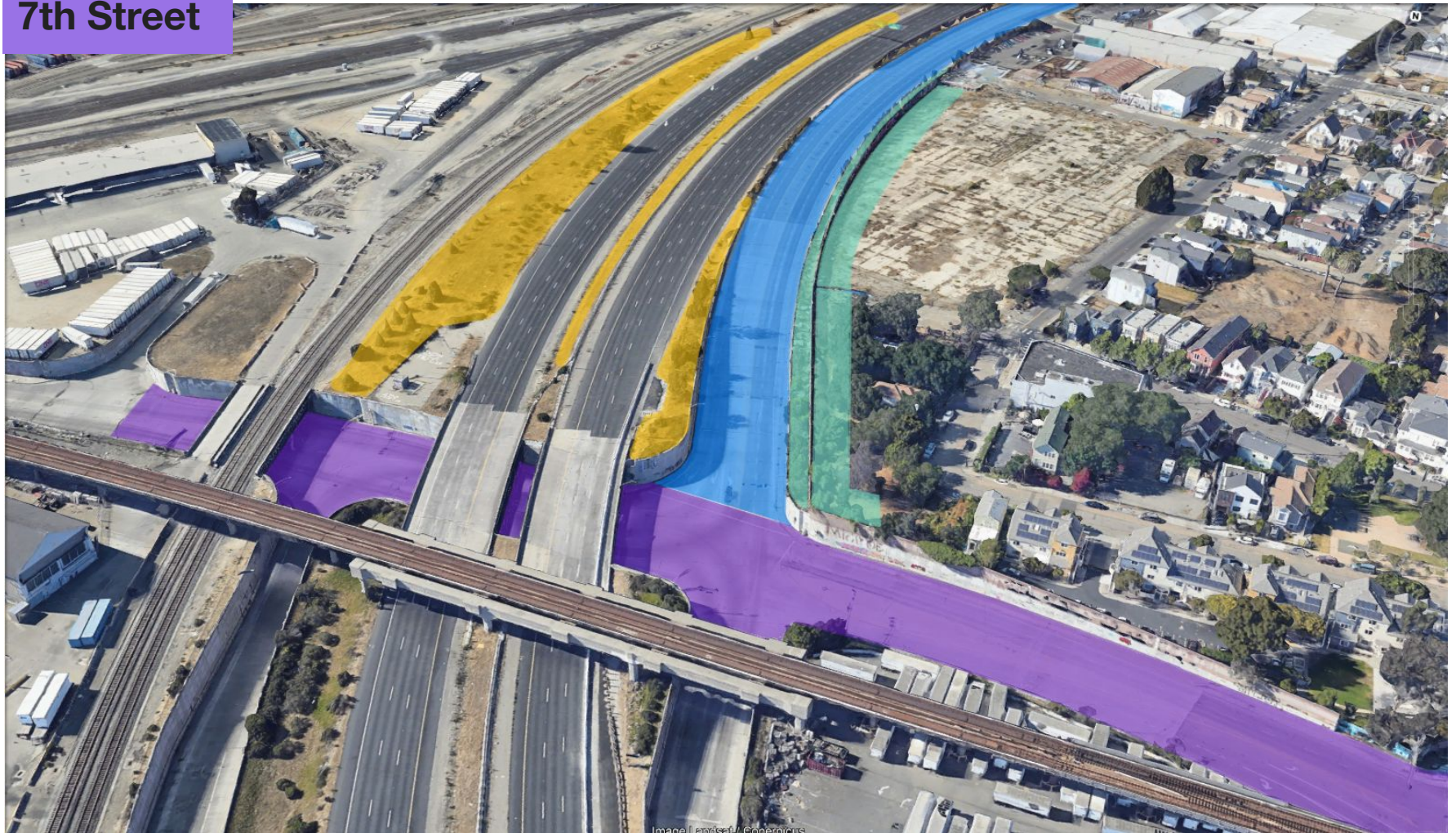
Frontage Road Diet

7th Street



- Immediately Plantable
- Caltrans Planting
- 7th Street**
- Frontage Road Diet

7th Street





Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

Frontage Road Diet



Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

Frontage Road Diet

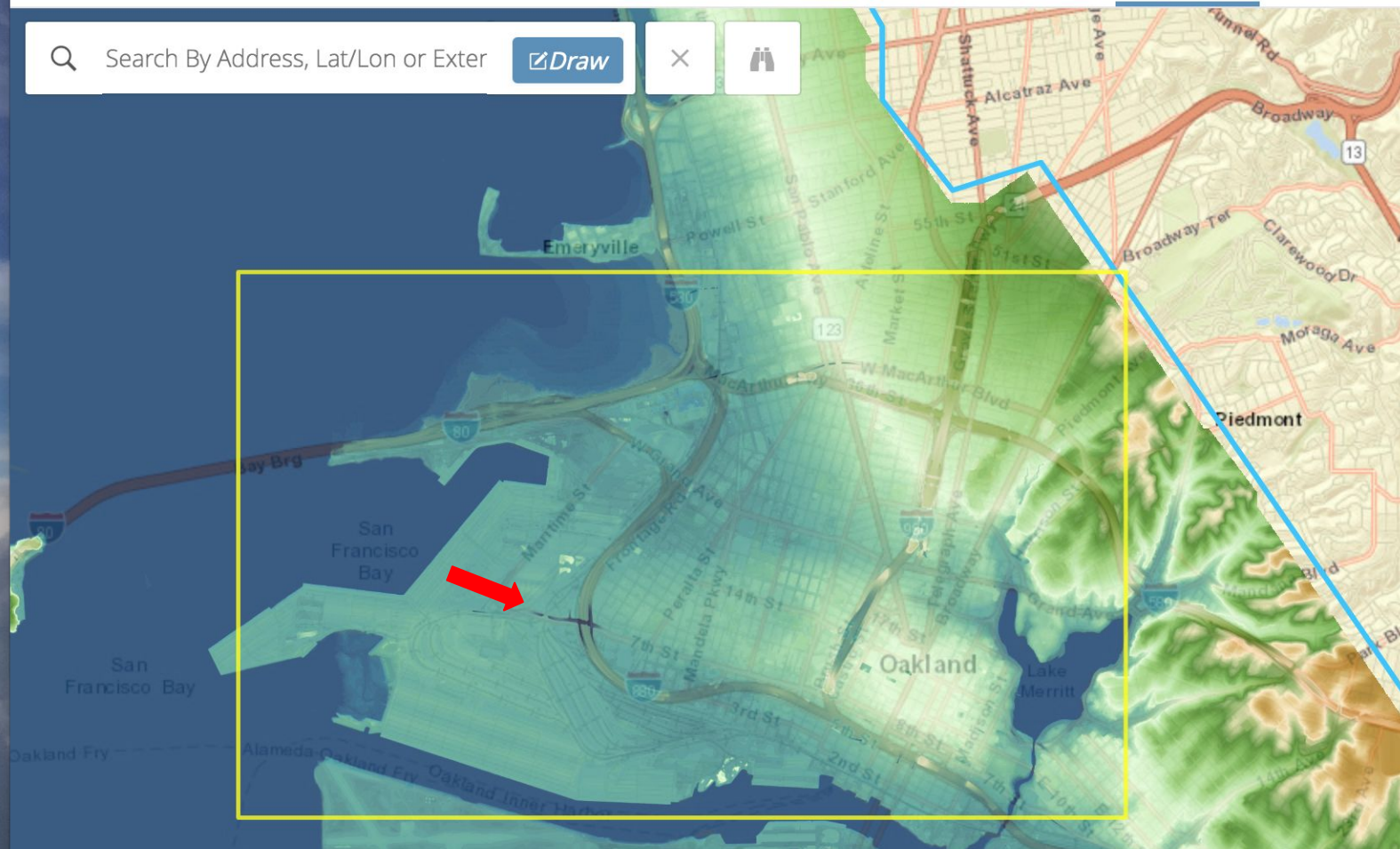


Street dips down lower than the surrounding area



Search By Address, Lat/Lon or Extent

[Draw](#)



Frontage Road Diet



Frontage Road Diet



Frontage Road Diet



Frontage Road Diet



Frontage Road Diet



Zoom Poll (3 min)

❖ **What does Frontage road mean to you?**

- If you know these areas, what is your experience of them?
- How do you use the area(s)?
- What are your concerns about these areas?

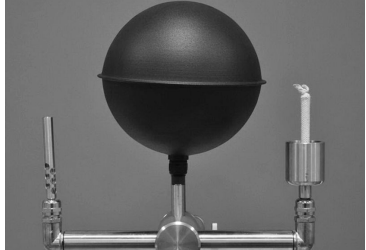
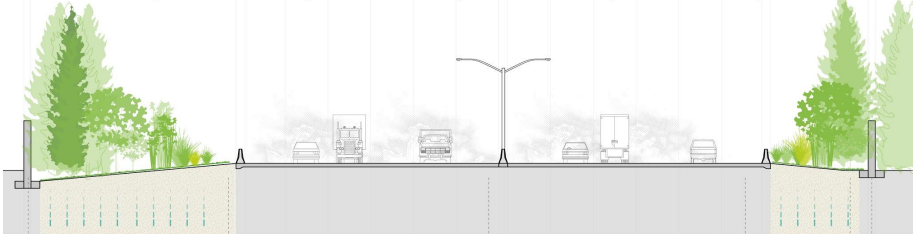
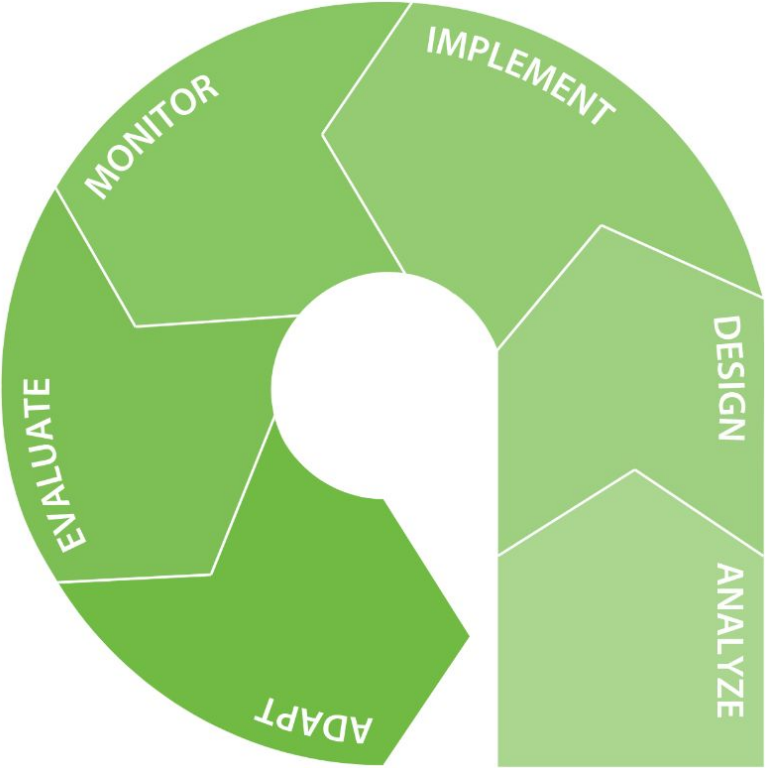
Discussion (10 min) - NOTES

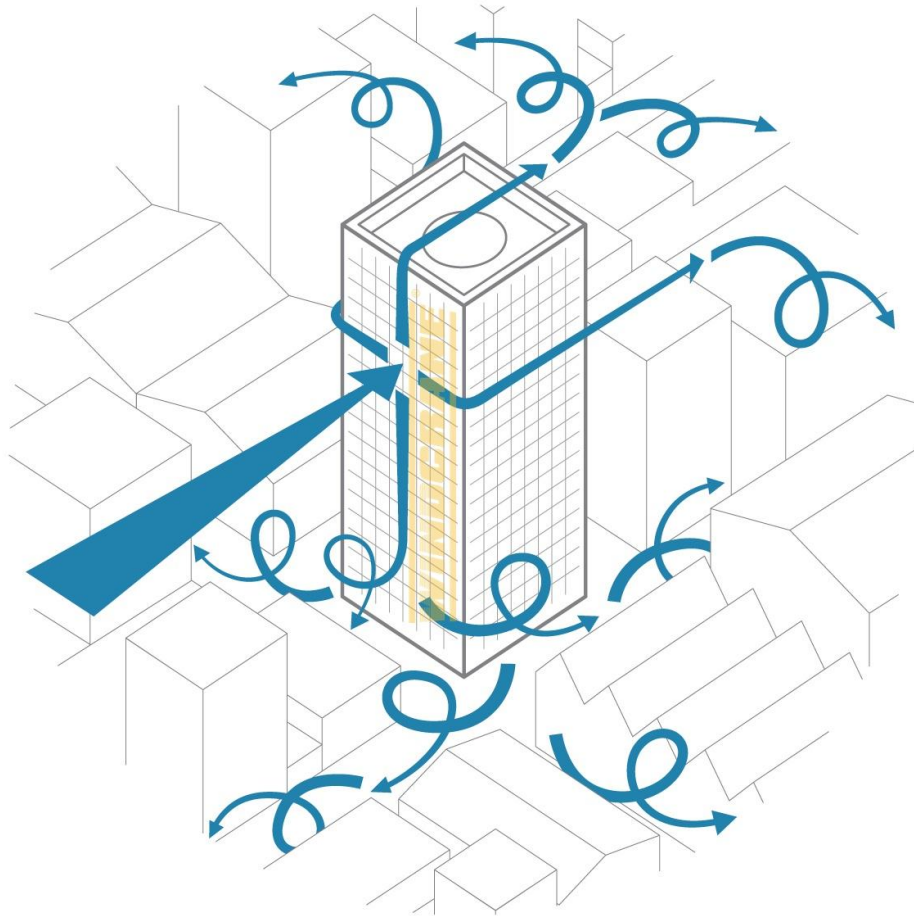
- What does Frontage road mean to you?
- If you know these areas, what is your experience of them?
 -
- How do you use the area(s)?
 -
- What are your concerns about these areas?
 -

Prescott Greening Agenda

- ❖ Introduction
- ❖ Project Area
- ❖ **Modeling**
 - **What is modeling**
 - **Building a 3D world**
 - **Pollution Levels**
 - **Vegetated Buffers**
- ❖ Concept Designs
- ❖ Discussion

Evidence Based Design

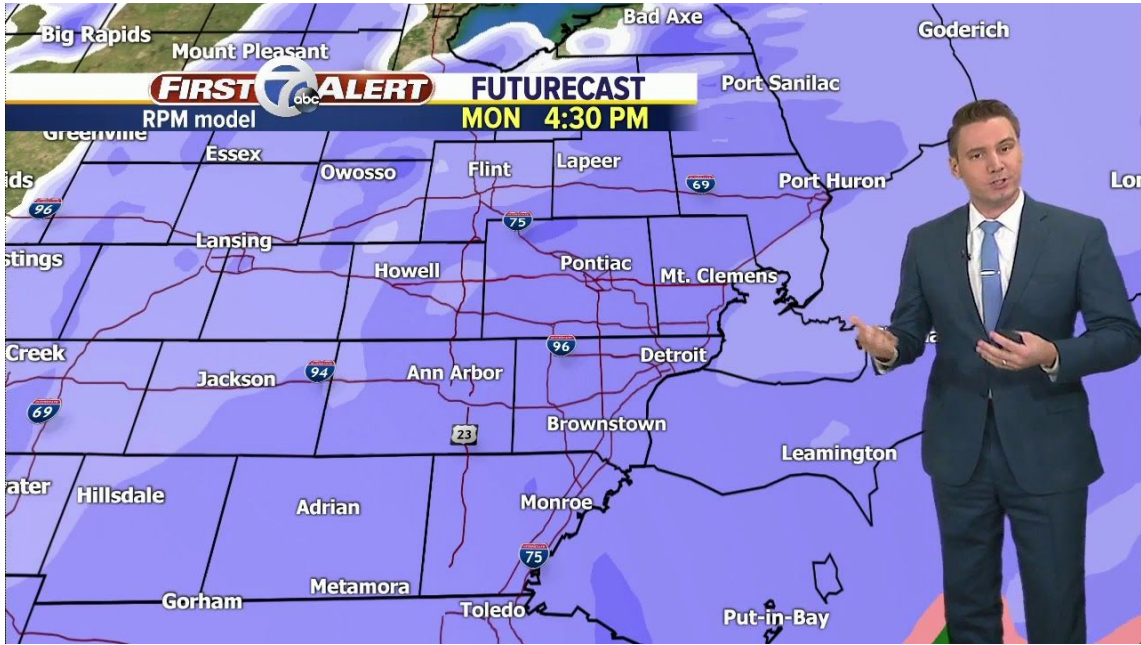




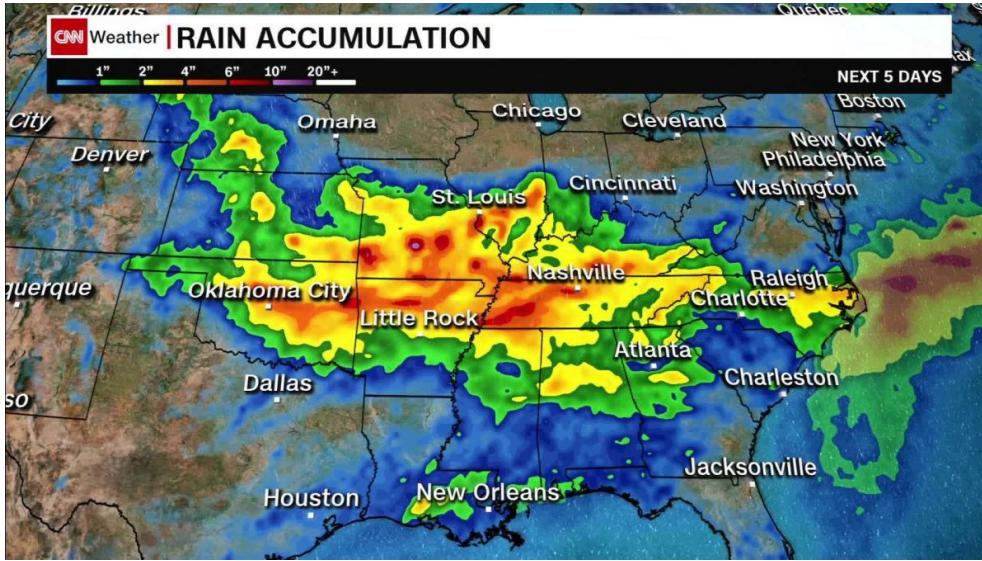
ENVIRONMENTAL MODELLING

Key Points about Models

- A model uses inputs to make predictions
- Models aren't always accurate, but they are still useful
- We working on trying to make the inputs that we use more accurate so that we can try to get more accurate results
- We are developing models that can test the differences between different planting interventions



Modeling is predicting outcomes based on a set of inputs



Modeling



Measuring

Weather predictions are not completely correct.

But the information that we get is still useful.

Models allow you to compare multiple options before spending the resources on creating the full sized version

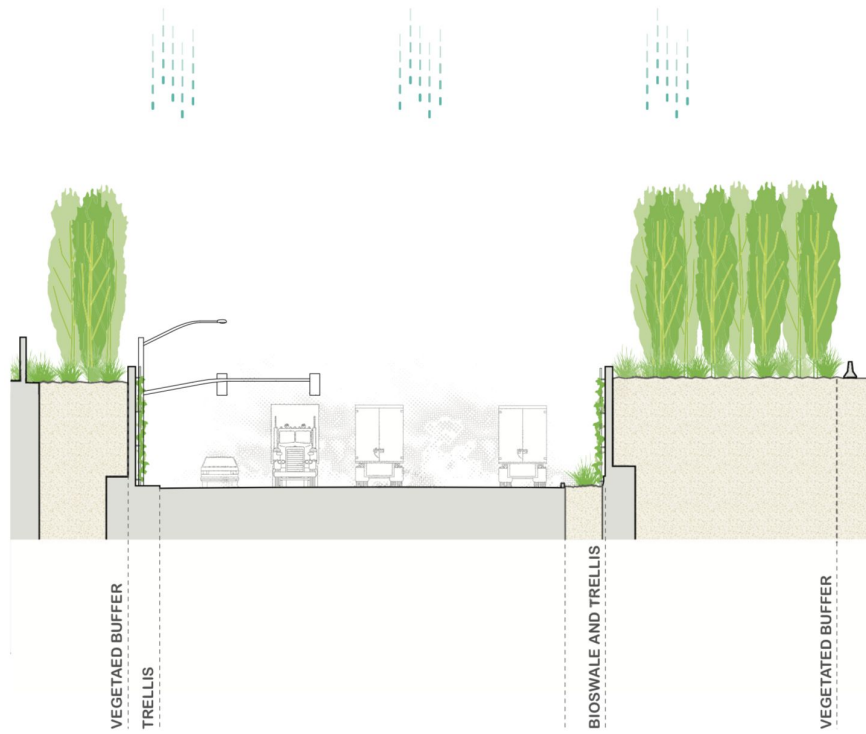


Modeling the way air moves over an airplane wing



Building the first airplane





What we need to model how a green intervention impacts exposure risk

**Change
in Air
Pollution
Level =**

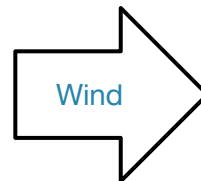
Physical
Environment



Pollution
Sources



How Air Moves
through the
environment



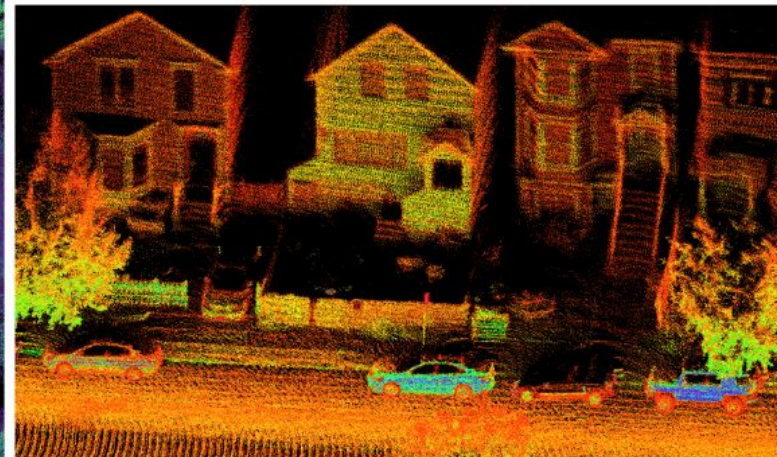
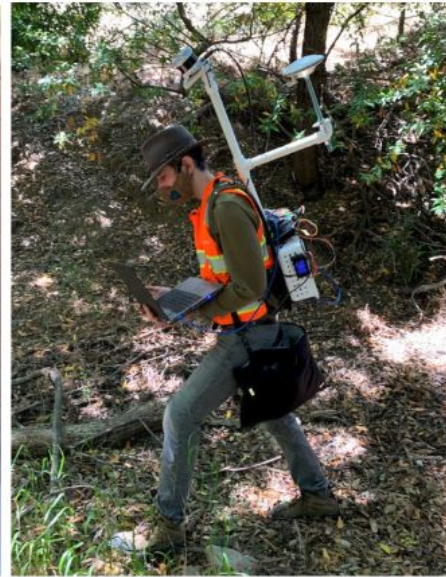
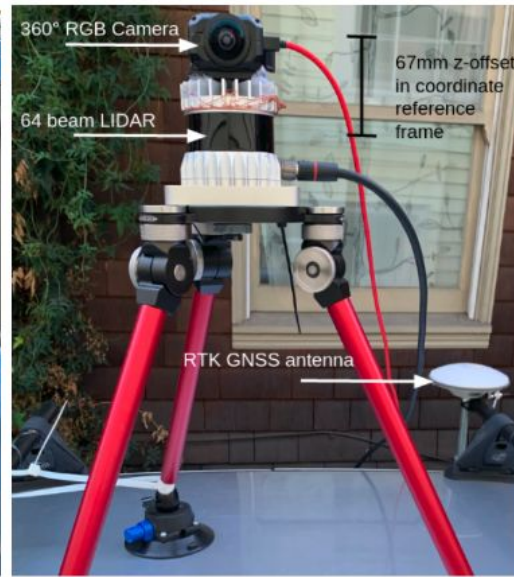
Different Buffer
Designs



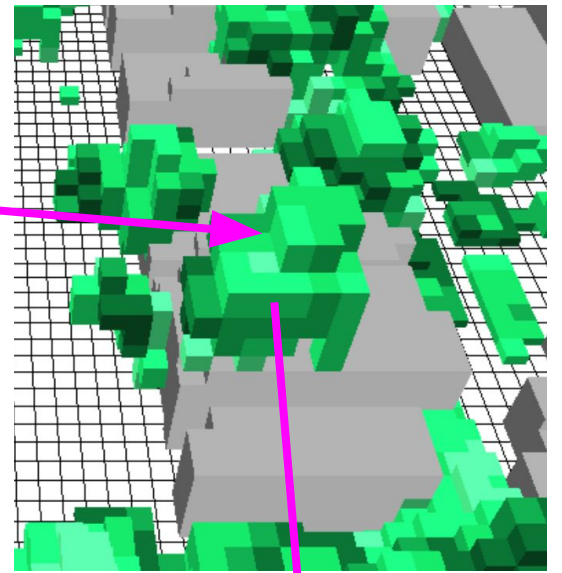
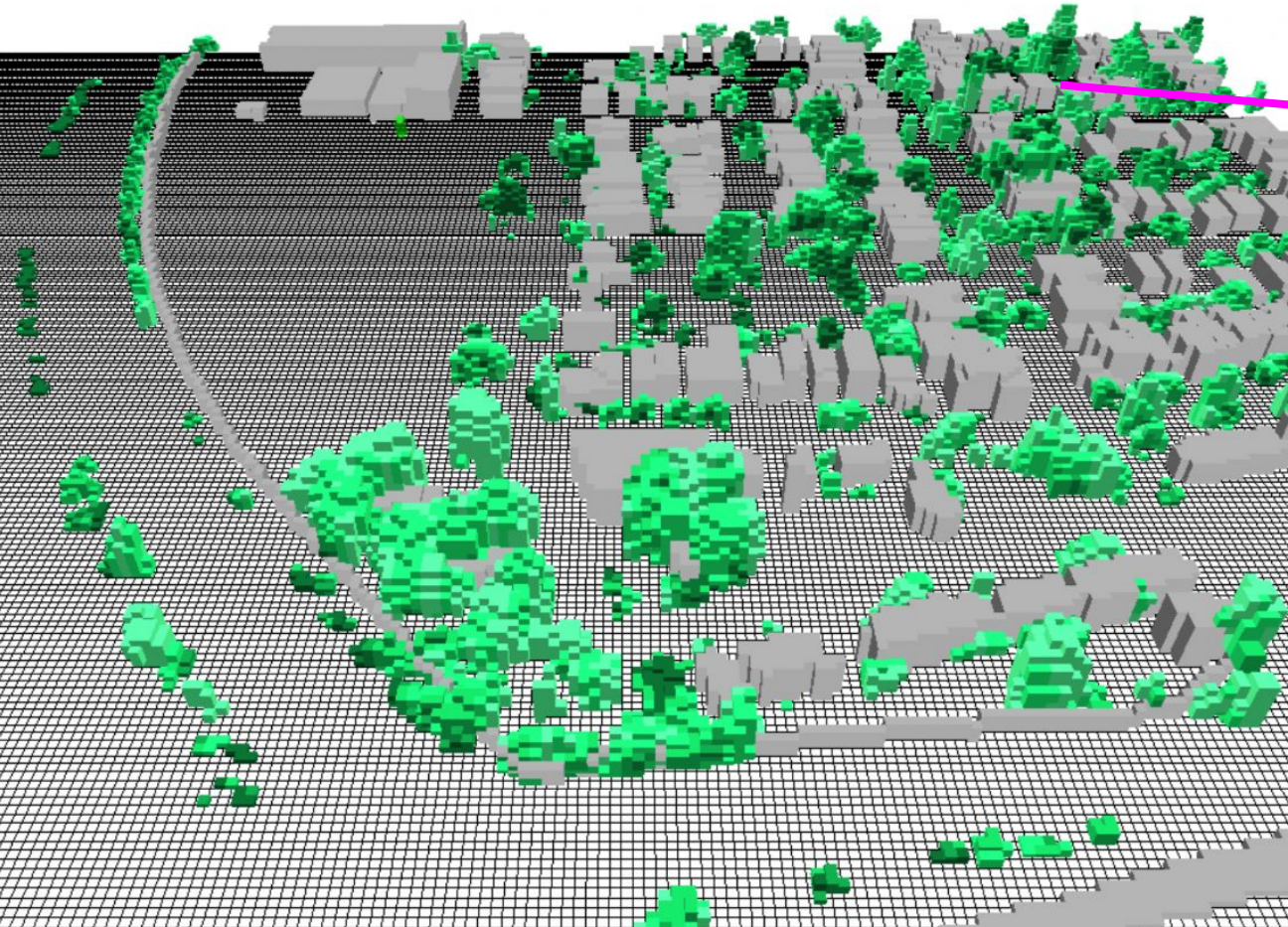
Collect LiDAR data of the structures and trees

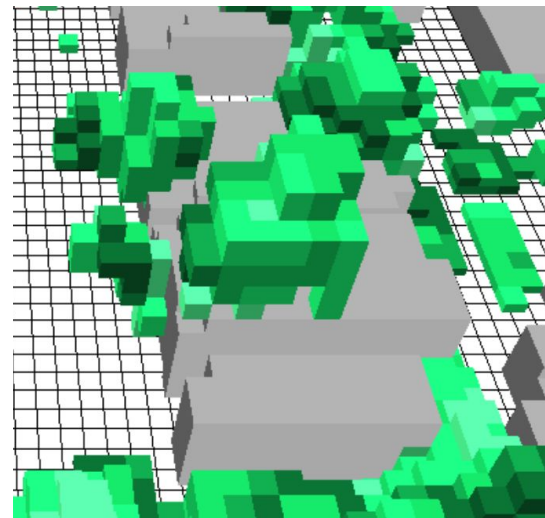
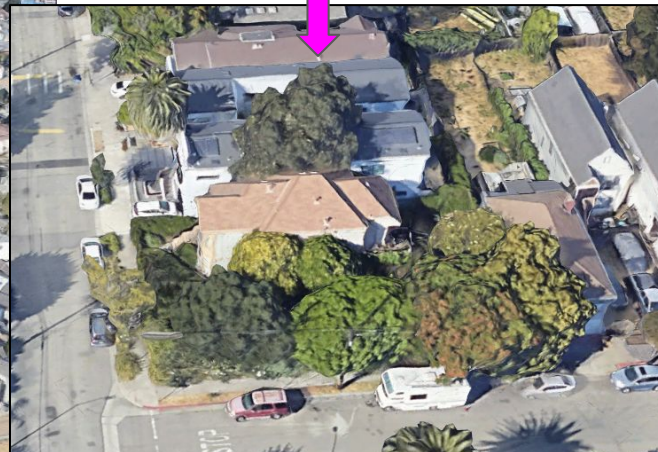


LiDAR scan process



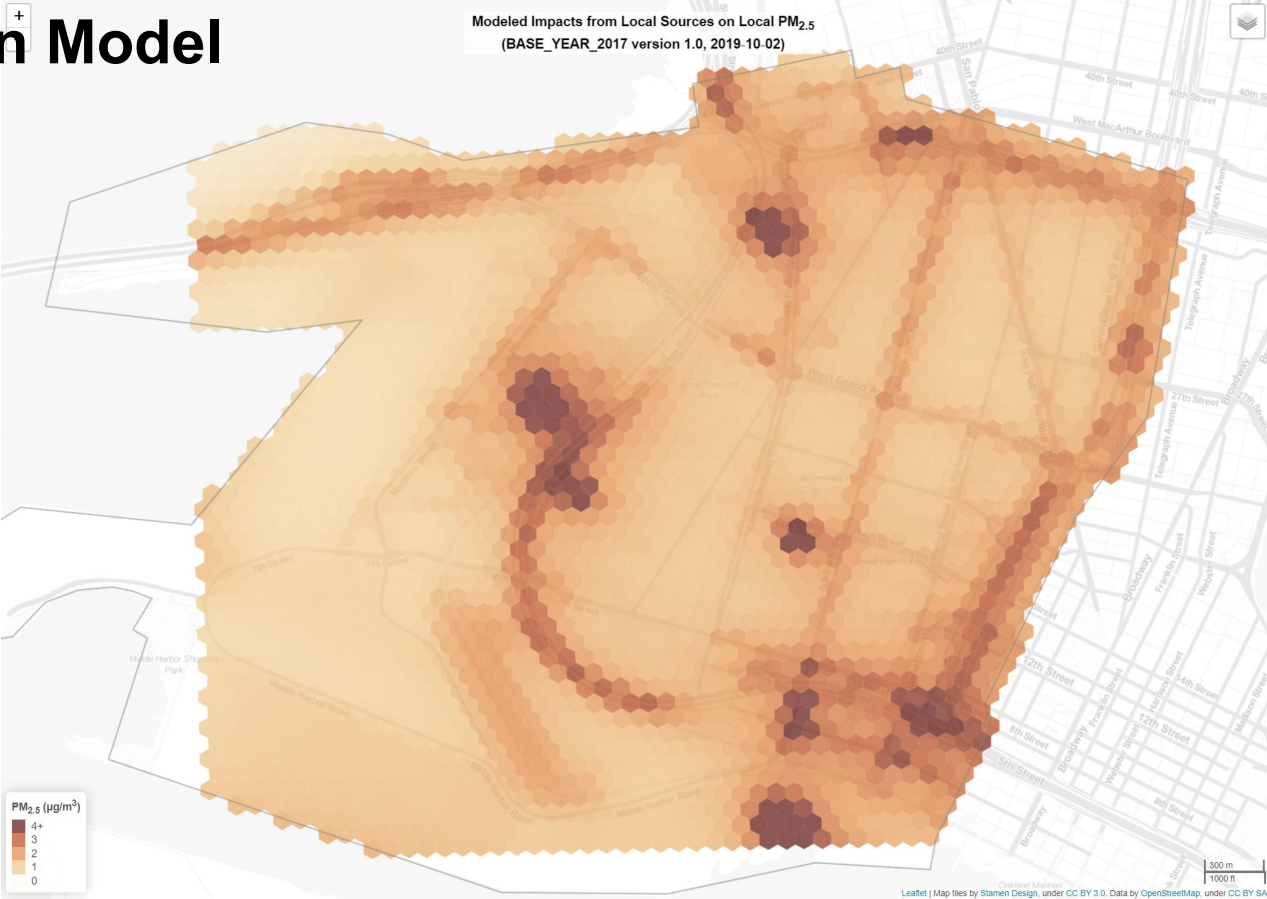
Simplify the 3D world into blocks





BAAQMD Air Pollution Model

Bay Area Air Quality Management District created used AERMOD to predict the way pollution from local sources would disperse across the city / region



Local PM_{2.5} (µg/m³)**Highway**

Passenger vehicles	0.217	6%
Heavy/Medium HD trucks	0.067	2%
Light HD trucks	0.010	0%
Road dust	0.094	2%

Street

Passenger vehicles	0.066	2%
Heavy/Medium HD trucks	0.018	0%
Light HD trucks	0.004	0%
Road dust	0.413	11%

Port

OGV (maneuvering)	0.022	1%
OGV (berthing)	0.043	1%
Harbor craft	0.055	1%
Dredging	0.015	0%
Bunkering (tugs + pumps)	0.003	0%
Drayage trucks	0.019	1%
Road dust	0.018	0%
Cargo handling	0.009	0%
Railyard (OGRE)	0.018	0%
Railyard (BNSF)	0.004	0%

Rail

Rail lines	0.038	1%
Railyard (UP)	0.040	1%

Permitted

Schnitzer (stationary)	0.044	1%
EBMUD	0.033	1%
Dynegy	0.001	0%
Pinnacle Ag	0.316	8%
Sierra Pacific	0.015	0%
CASS	0.002	0%
California Cereal	0.018	0%
CA Waste (10th St)	2.151	57%
Other facilities	0.016	0%

Other

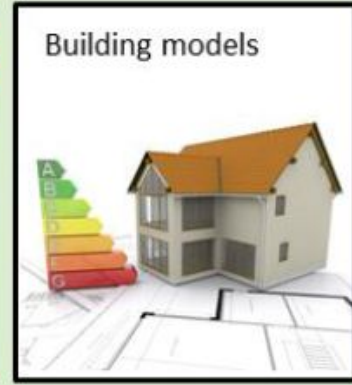
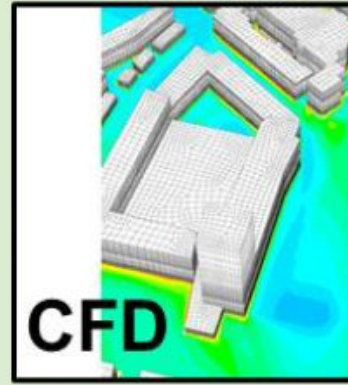
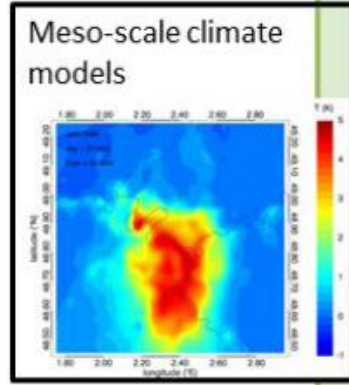
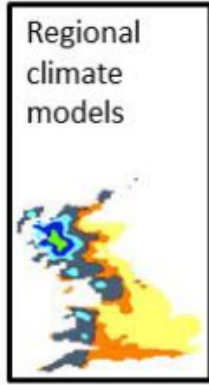
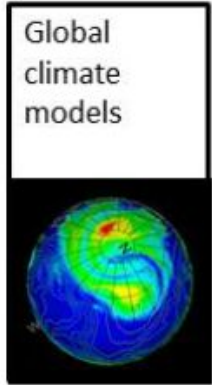
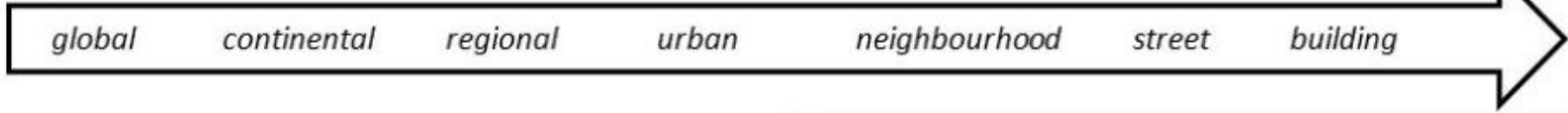
Ferries	0.005	0%
Schnitzer (ships)	0.002	0%
Schnitzer (trucks)	0.001	0%
Truck-related businesses	0.003	0%
	3.780	100%

Modeled impacts from local sources.

2019-10-02 (BASE_YEAR_2017).

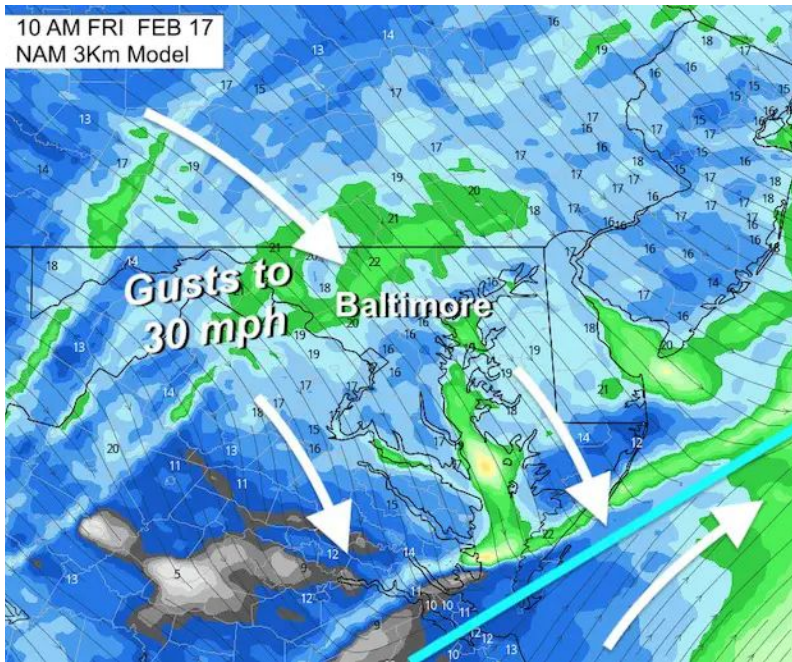
BAAQMD Model isn't at the scale needed for Prescott Greening

SCALE

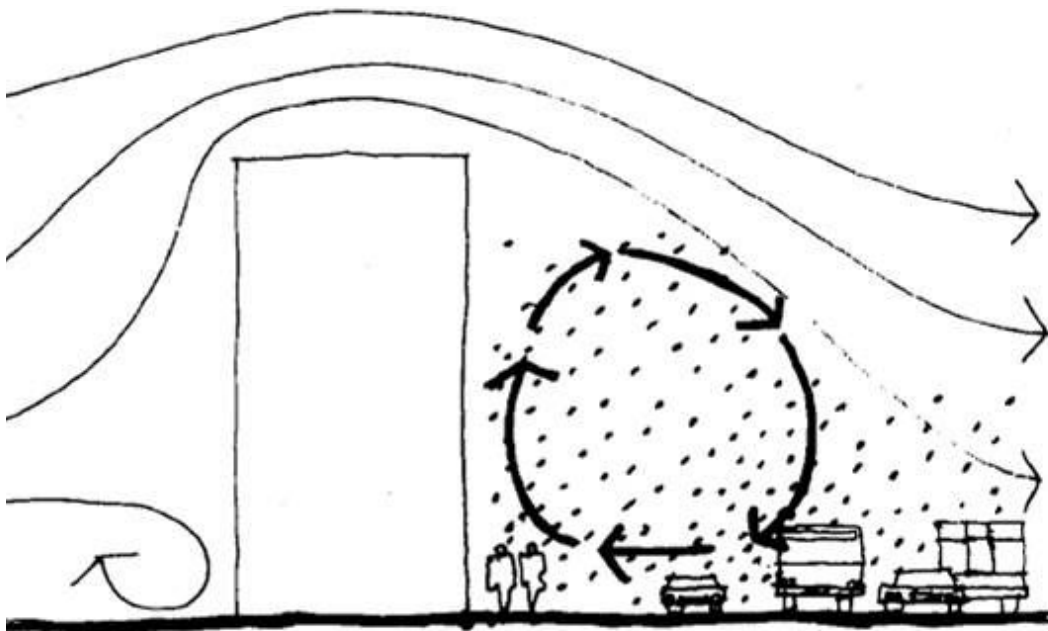


Scale needed for intervention studies

**A larger scale model may tell you the direction of the wind.
But at a smaller scale there could be areas behind buildings
where the wind is blocked.**

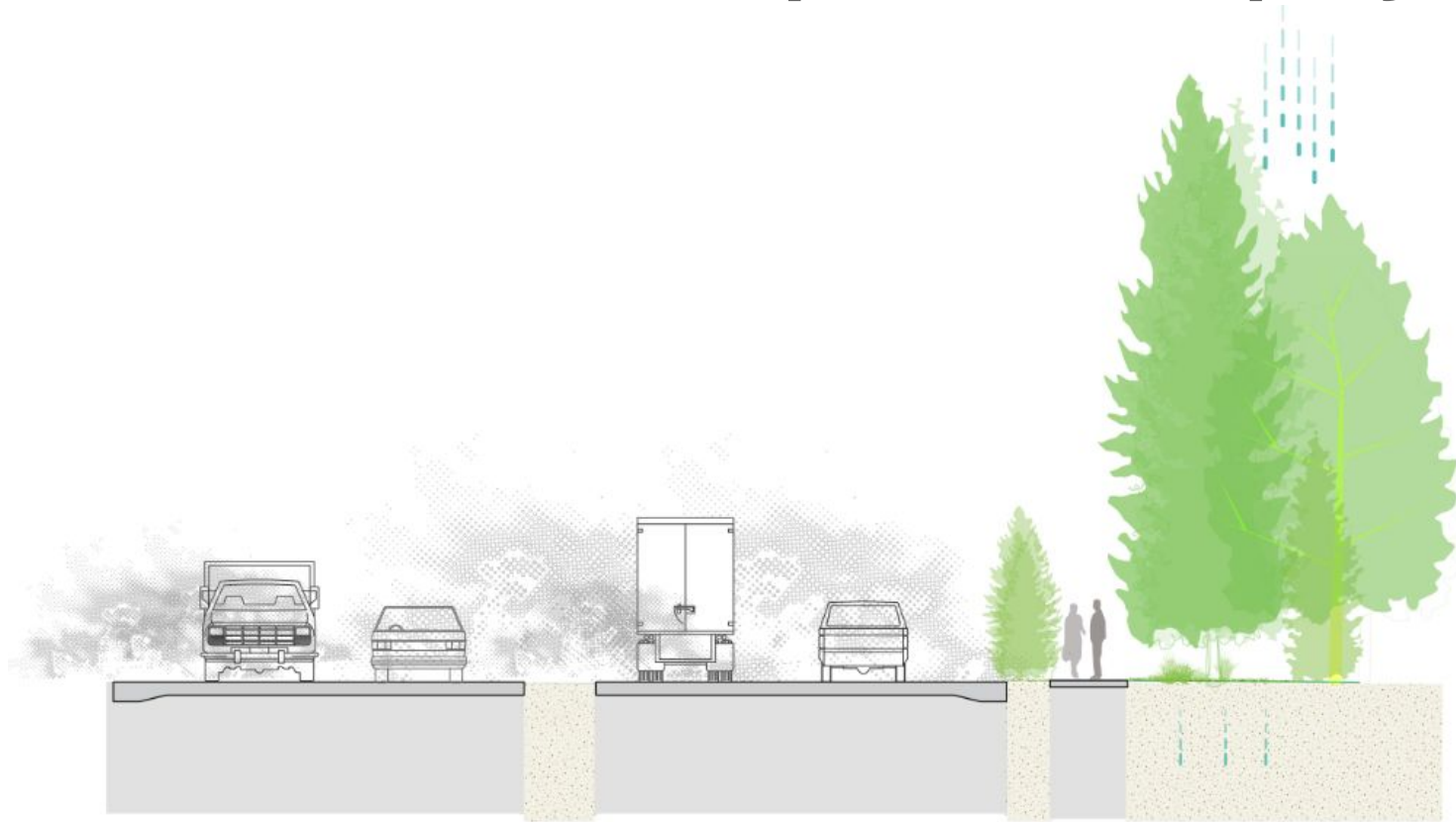


Larger scale



Smaller scale

AERMOD doesn't include vegetation, which is a critical part of our project

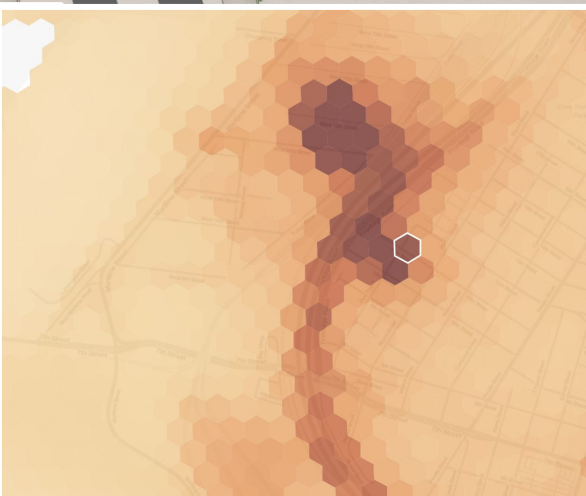
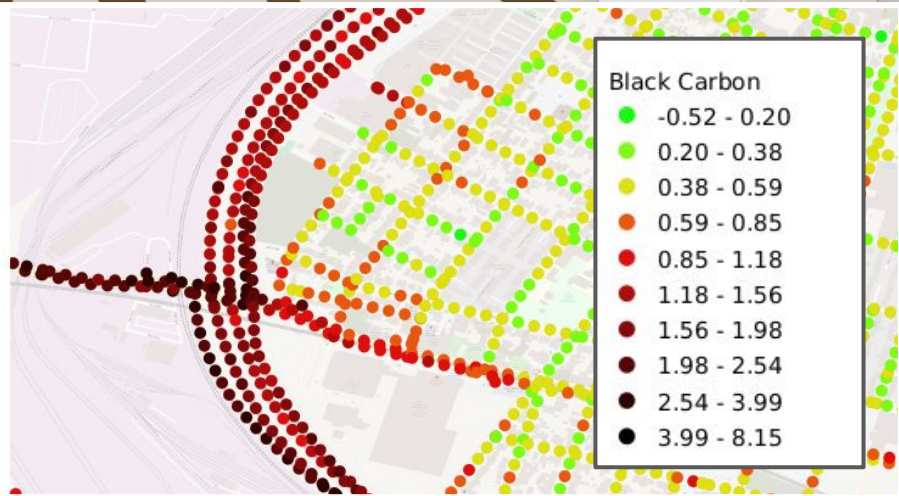


Bridging scales:

We model site-scale interventions and connect them to large scale models and measured data.

880

7th St.



Local PM _{2.5} ($\mu\text{g}/\text{m}^3$)		
Highway		
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Road dust	0.018	0%
Cargo handling	0.009	0%
Railyard (OGRE)	0.018	0%
Railyard (BNSF)	0.004	0%

Add Wind Velocity to Model

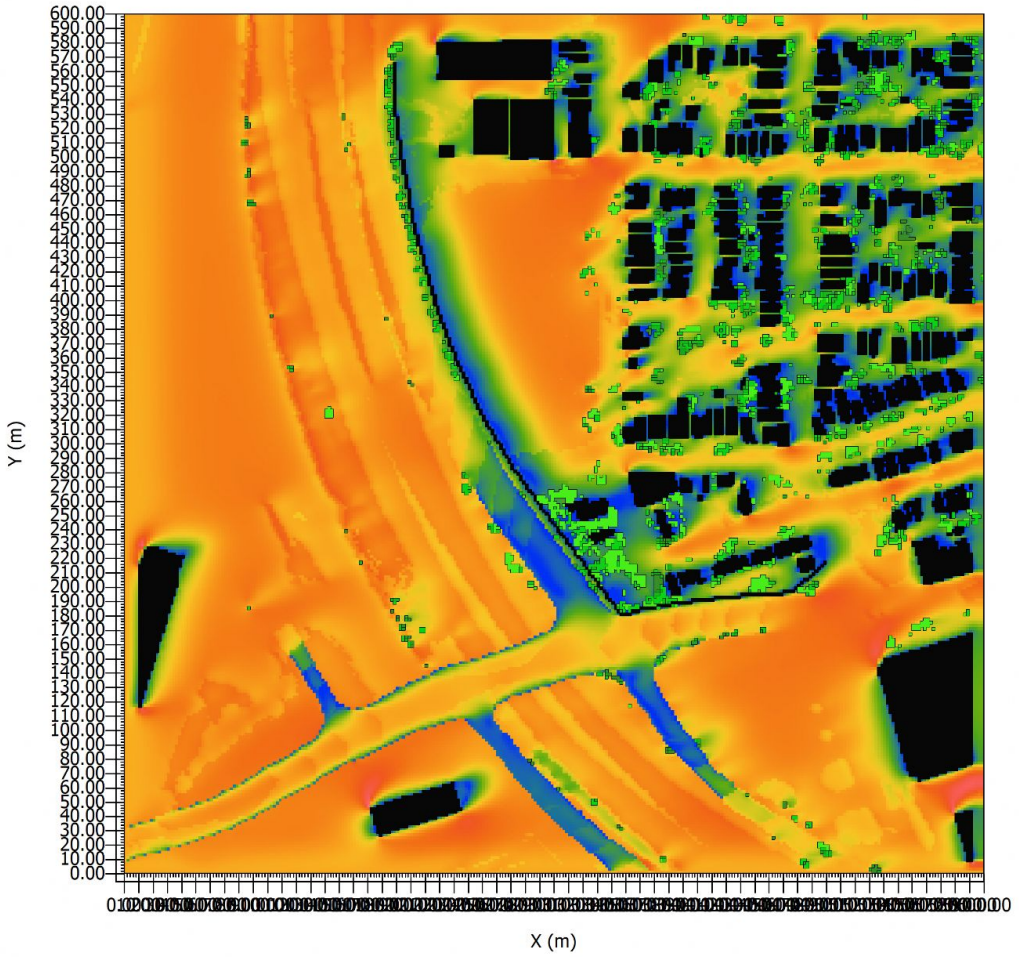
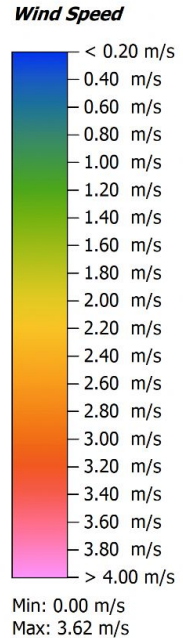
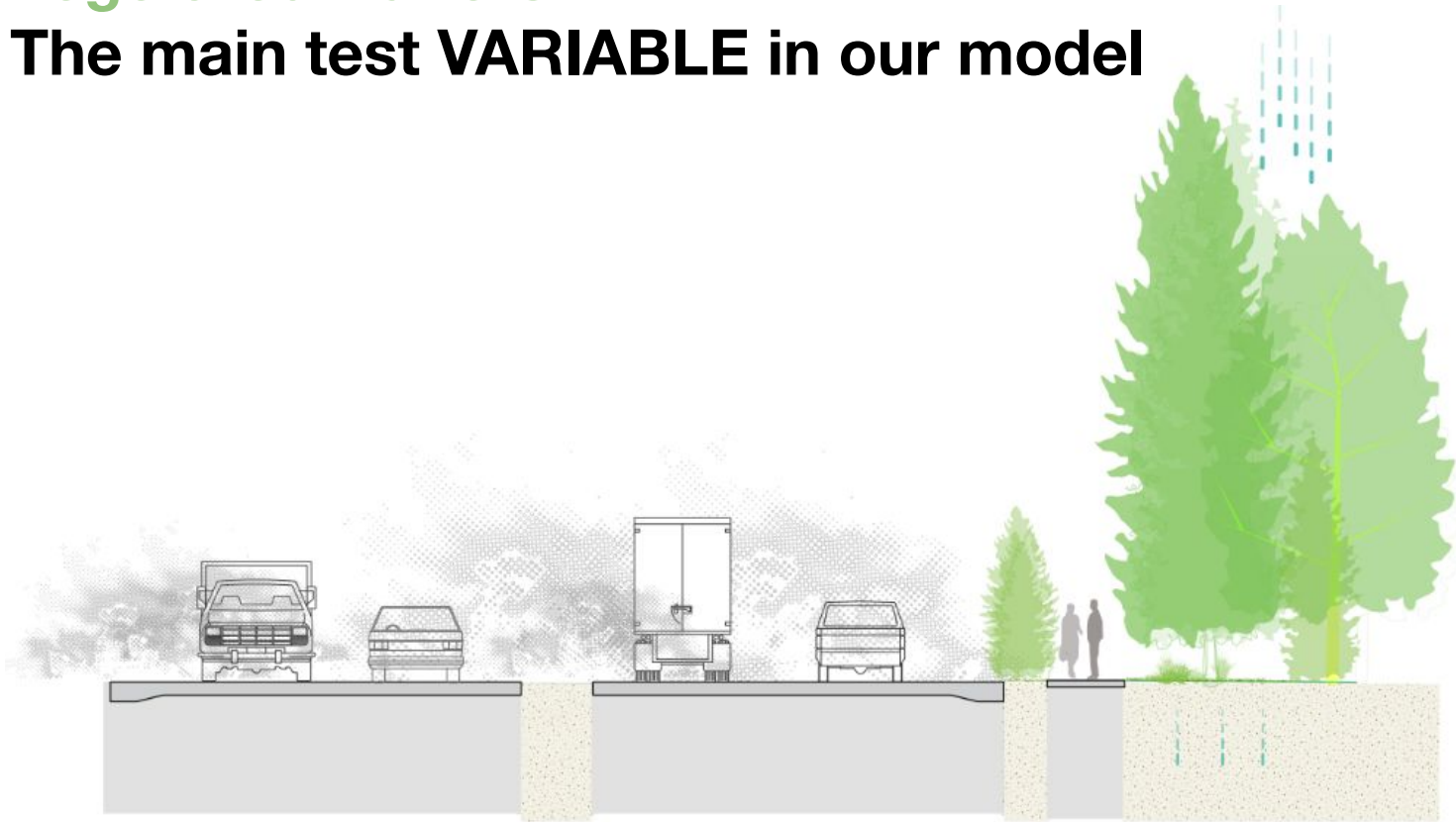


Figure -: pr24_exveg_1a
05.00.00 23.05.2023
x/y Cut at k=2 (z=2.5000 m) above terrain



Vegetated Buffers:
The main test VARIABLE in our model



The Relationship Between Trees and Human Health

Evidence from the Spread of the Emerald Ash Borer

Geoffrey H. Donovan, PhD, David T. Butry, PhD, Yvonne L. Michael, ScD,
Jeffrey P. Prestemon, PhD, Andrew M. Liebhold, PhD,
Demetrios Gatzliolis, PhD, Megan Y. Mao

Background: Several recent studies have identified a relationship between the natural environment and improved health outcomes. However, for practical reasons, most have been observational, cross-sectional studies.

Purpose: A natural experiment, which provides stronger evidence of causality, was used to test whether a major change to the natural environment—the loss of 100 million trees to the emerald ash borer, an invasive forest pest—has influenced mortality related to cardiovascular and lower-respiratory diseases.

Methods: Two fixed-effects regression models were used to estimate the relationship between emerald ash borer presence and county-level mortality from 1990 to 2007 in 15 U.S. states, while controlling for a wide range of demographic covariates. Data were collected from 1990 to 2007, and the analyses were conducted in 2011 and 2012.

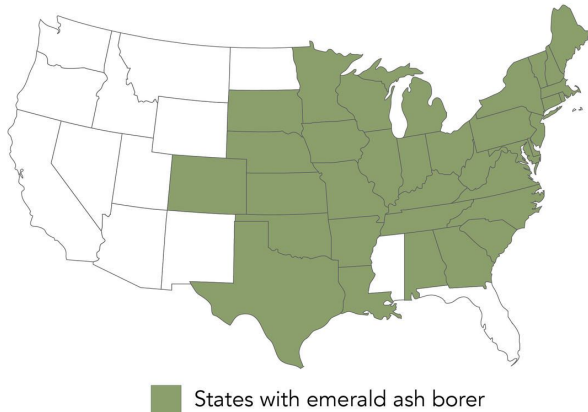
Results: There was an increase in mortality related to cardiovascular and lower-respiratory-tract illness in counties infested with the emerald ash borer. The magnitude of this effect was greater as infestation progressed and in counties with above-average median household income. Across the 15 states in the study area, the borer was associated with an additional 6113 deaths related to illness of the lower respiratory system, and 15,080 cardiovascular-related deaths.

Conclusions: Results suggest that loss of trees to the emerald ash borer increased mortality related to cardiovascular and lower-respiratory-tract illness. This finding adds to the growing evidence that the natural environment provides major public health benefits.

(Am J Prev Med 2013;44(2):139–145) Published by Elsevier Inc. on behalf of American Journal of Preventive Medicine



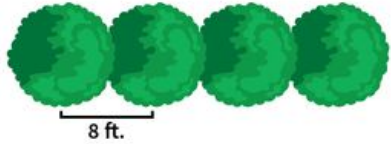
Counties where the Emerald Ash Borer had killed more trees had more cardiovascular-related deaths



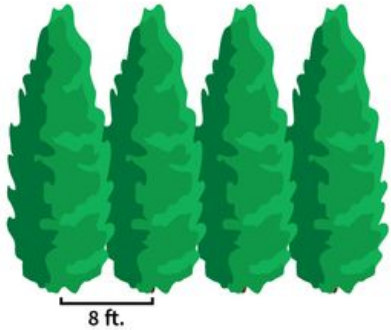
Vegetated Buffers: Using trees as technology

Row Planting

overhead view

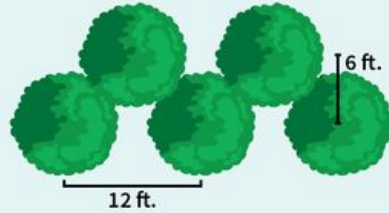


side view

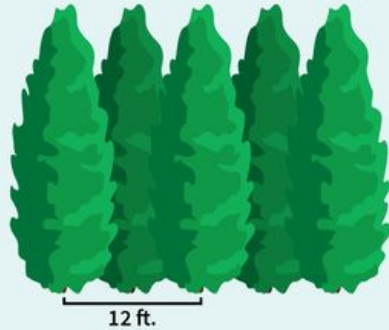


Alternate Planting

overhead view



side view



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

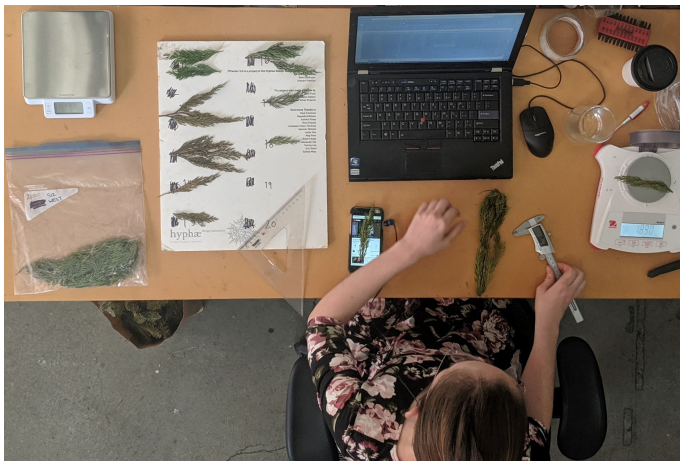
5-10 meters recommended, but effectiveness impacted by porosity of barrier

Effective Barrier

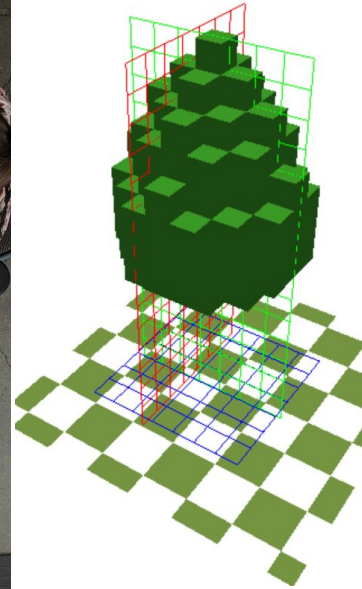
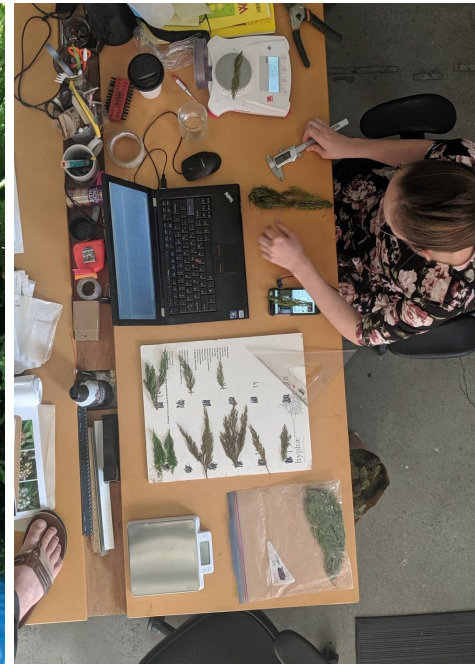
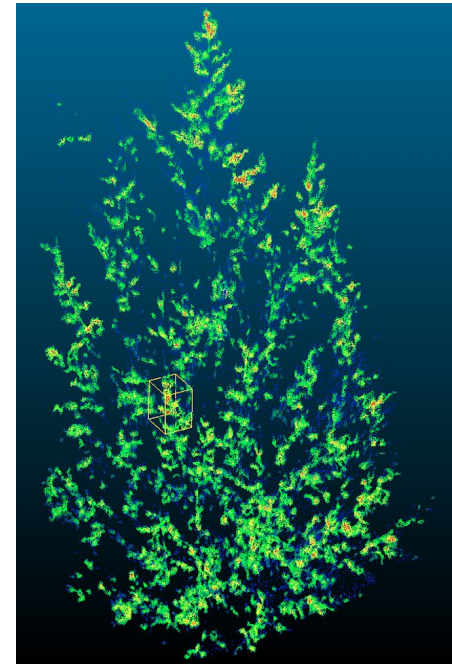
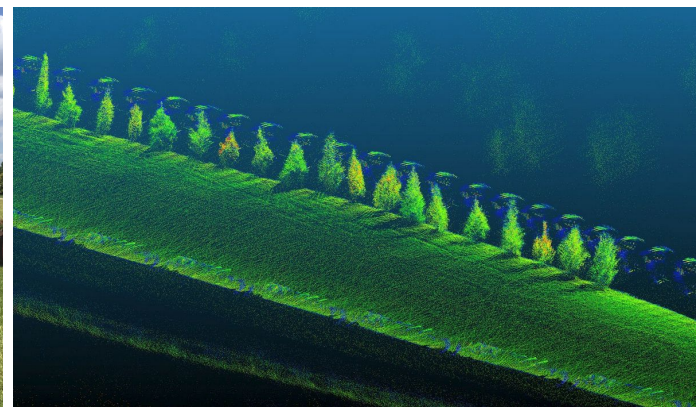


Ineffective Barrier

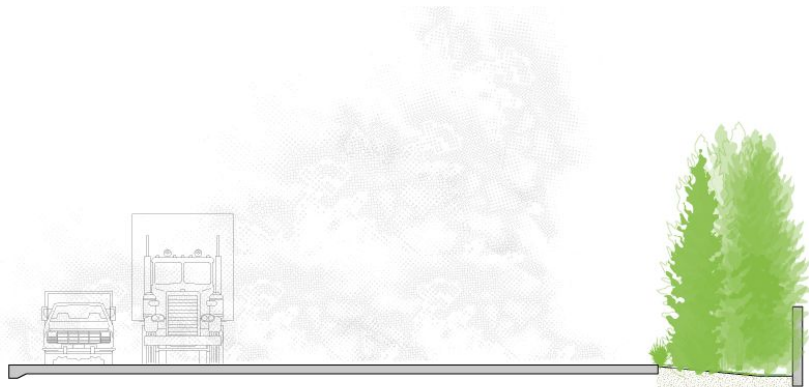




Measuring the leaf area density of trees to input into our models



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



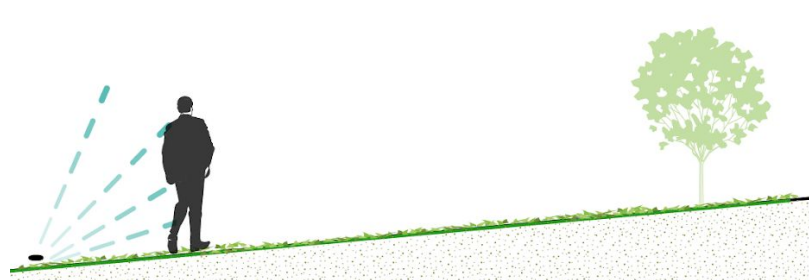
Less effective at blocking



Less effective at blocking



More effective at blocking



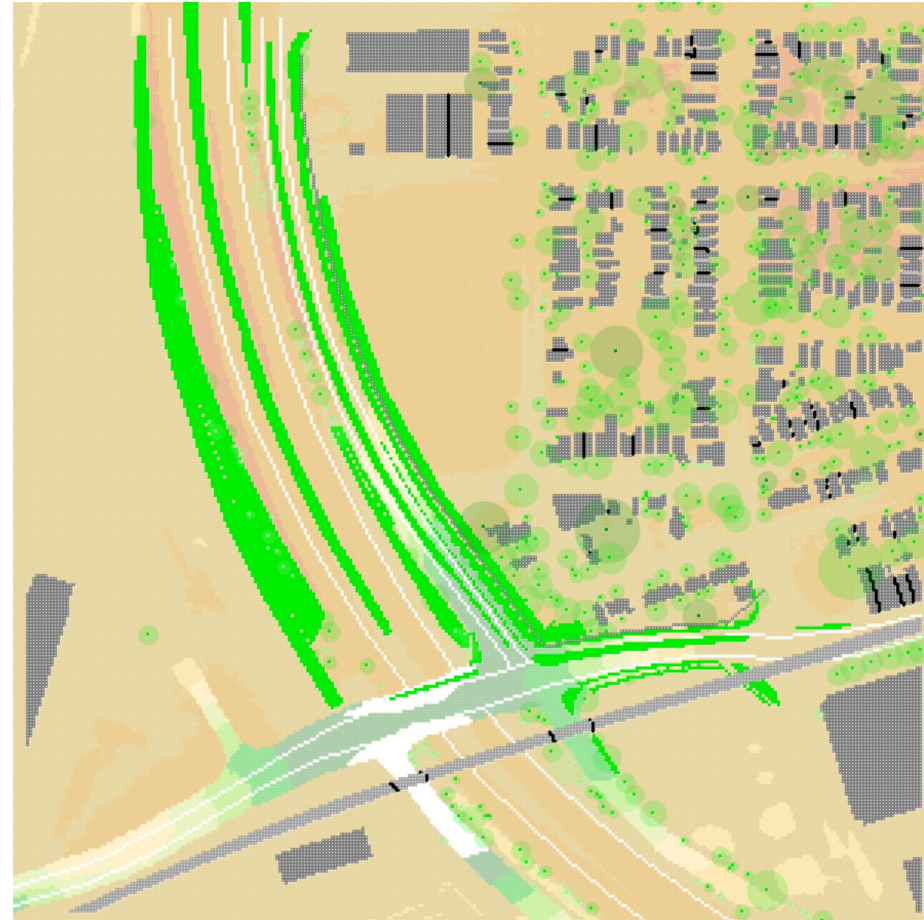
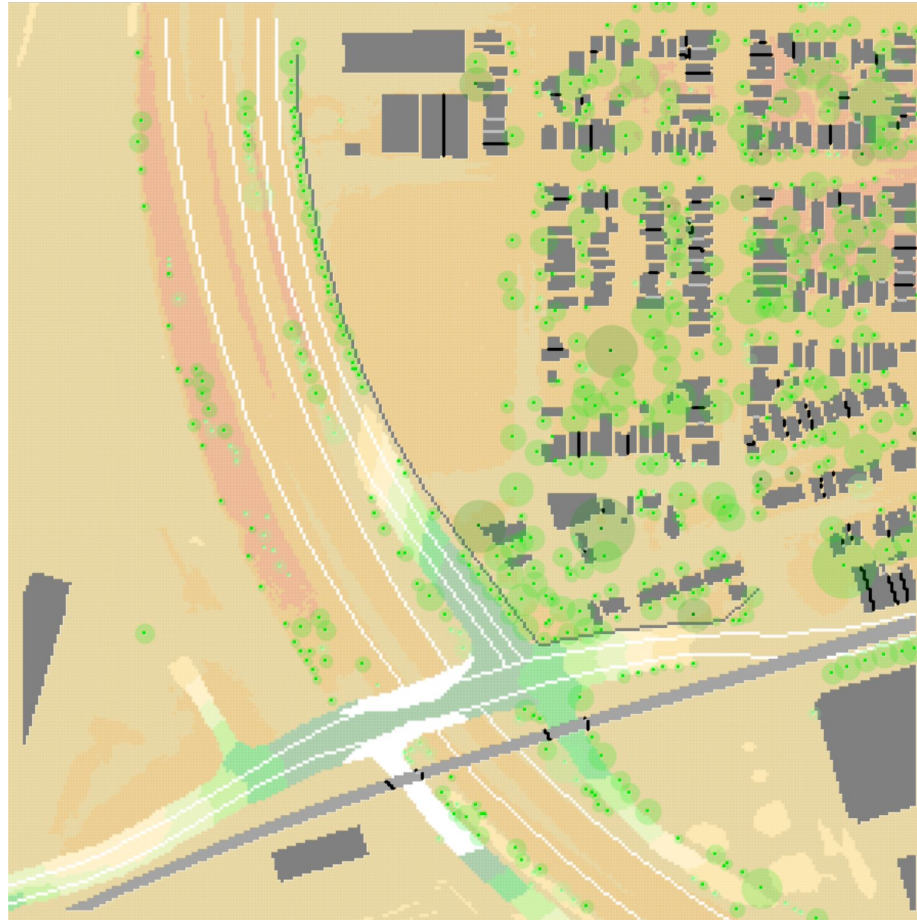
More effective at blocking

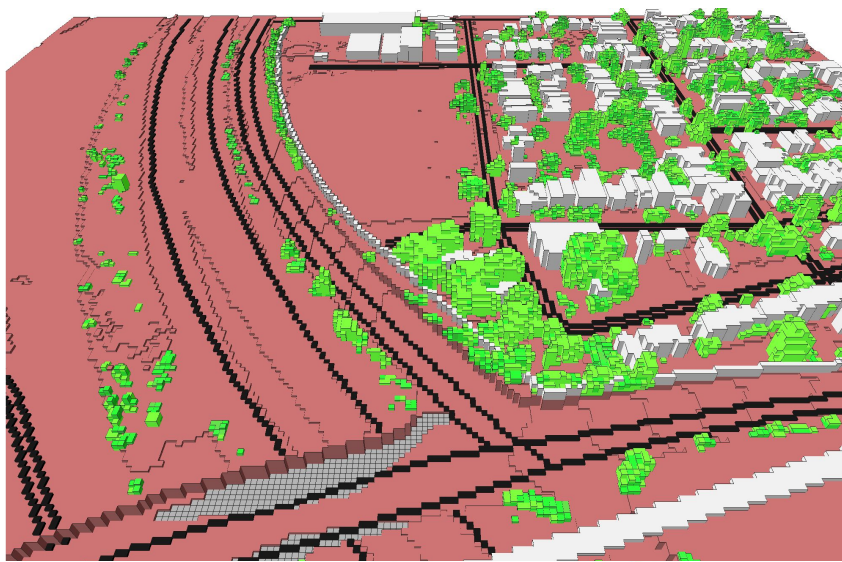
Key Points about Vegetated Buffers

- Having a buffer that is tall and thick is more effective
- Using evergreen trees with dense leaves is better for blocking more pollution
- Its better to plant buffers close to the source of pollution

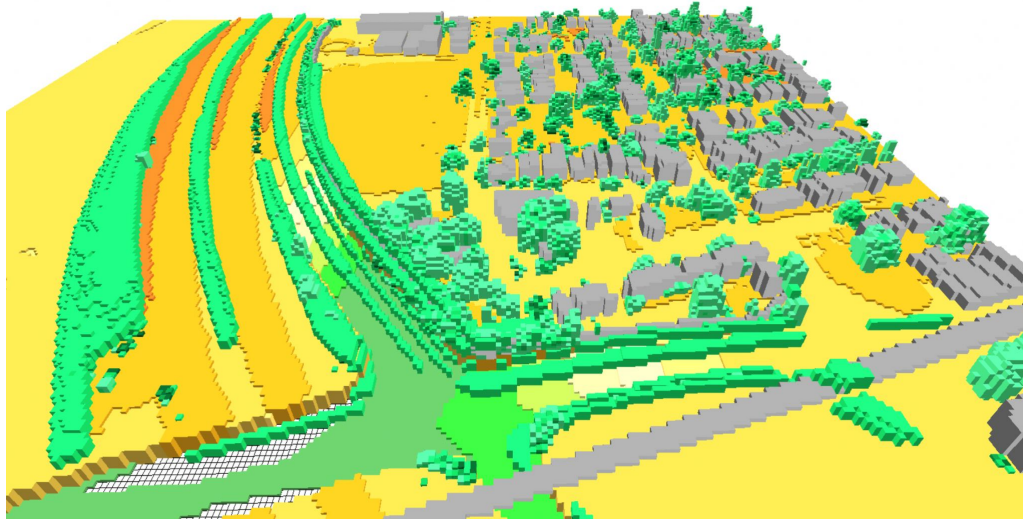


Example of our draft Prescott Model

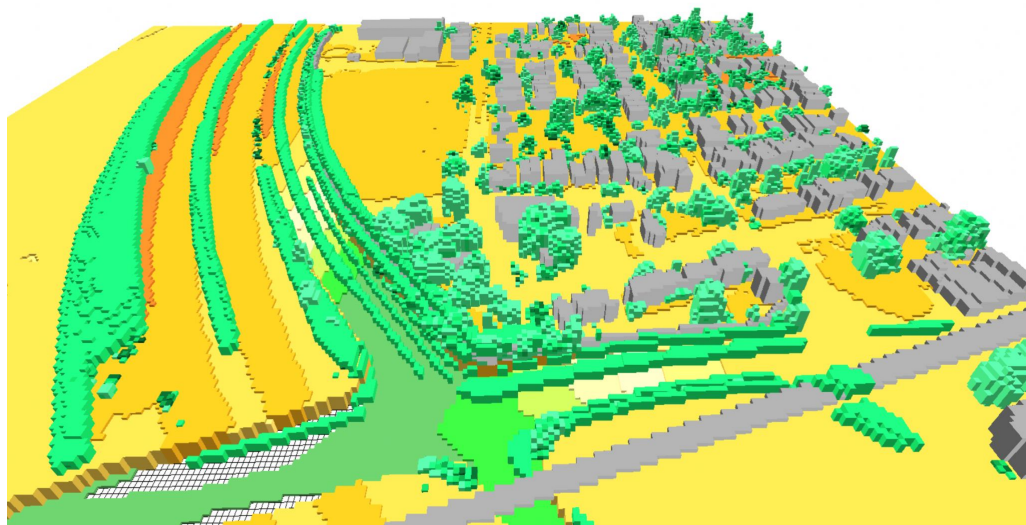
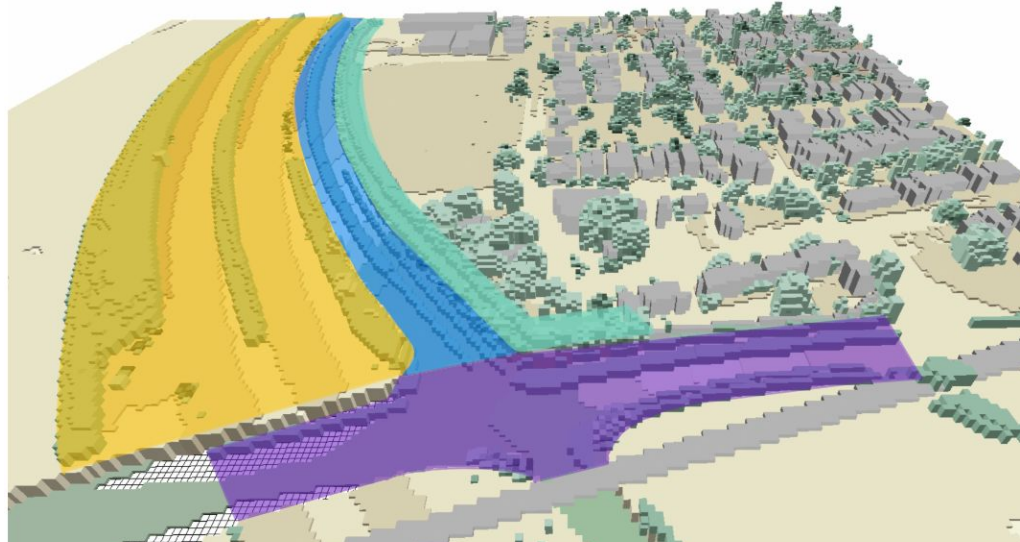




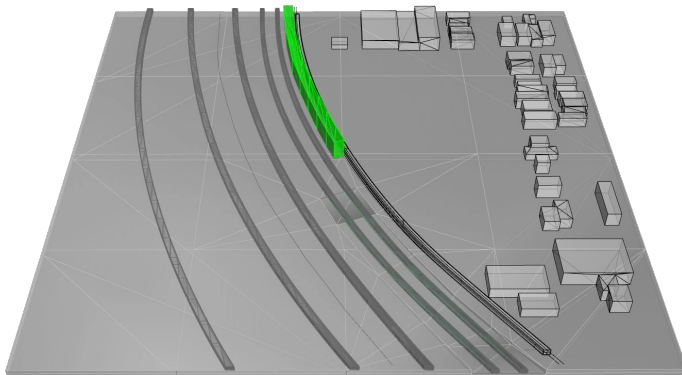
Existing Vegetation



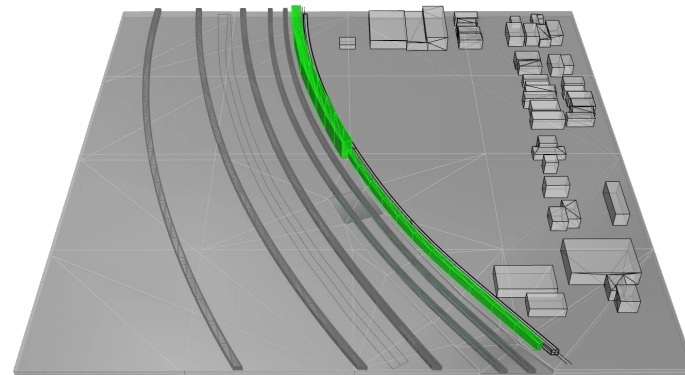
Adding in proposed
vegetation



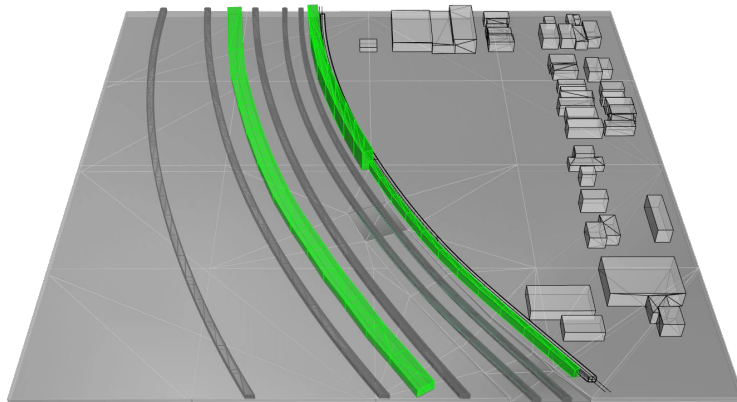
Decide what planting areas to compare



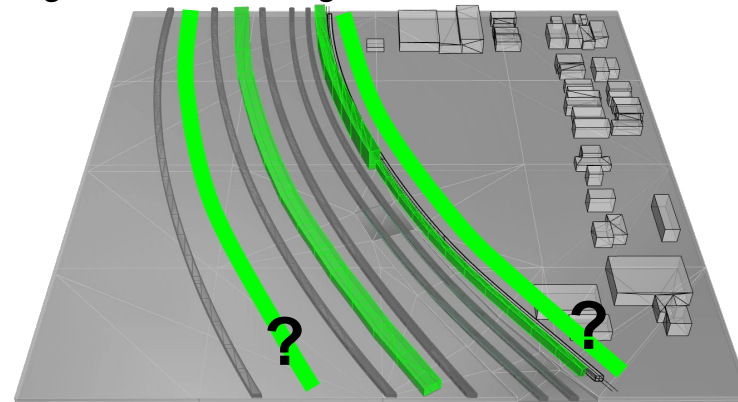
Existing Condition (Can be tested w/monitors)



Single downwind vegetated buffer



Additional buffer between freeway directions



Upwind buffer or outside wall?

Modeling Key Points

- A model uses inputs to make predictions
- Models aren't always accurate, but they are still useful
- We working on trying to make the inputs that we use more accurate so that we can try to get more accurate results
- We are developing models that can test the differences between different planting interventions

Clarifications/questions about modeling? (10 min)

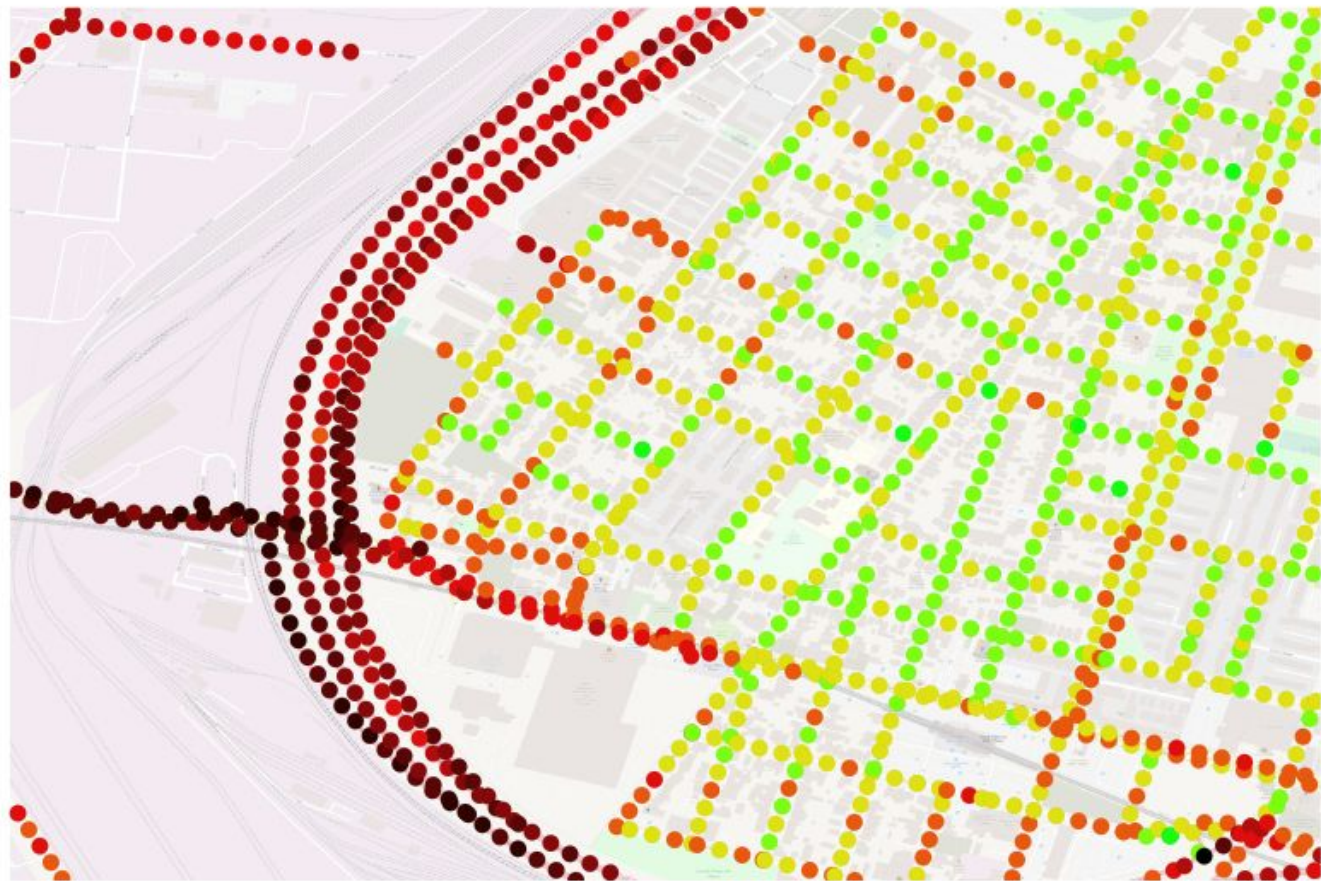
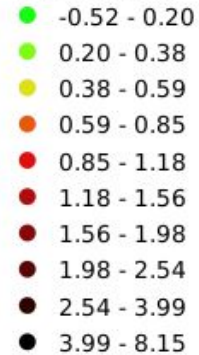
Prescott Greening Agenda

- ❖ Introduction
- ❖ Project Area
- ❖ Modeling
 - What is modeling
 - Building a 3D world
 - Pollution Levels
 - Vegetated Buffers
- ❖ **Concept Designs**
- ❖ Discussion

EDF/Aclima Black Carbon Measurements

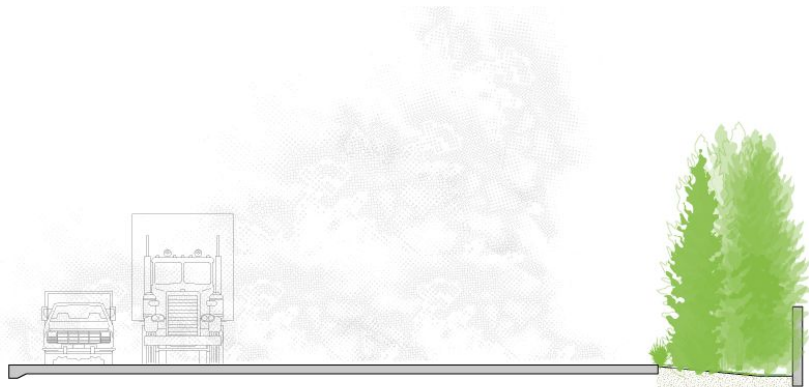
micrograms/m³

Black Carbon



Existing data from EDF/Aclima has shown that significant air quality issues exist in the target neighborhood, especially near the roads with heavy truck traffic.

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



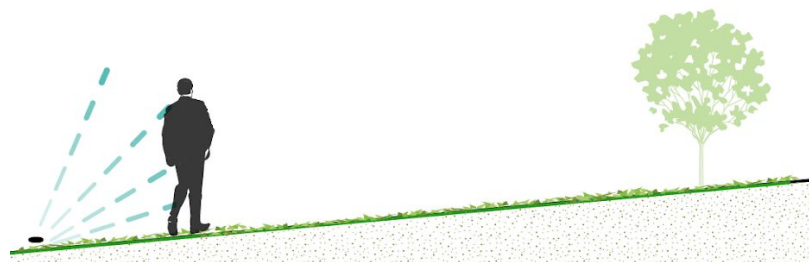
Less effective at blocking



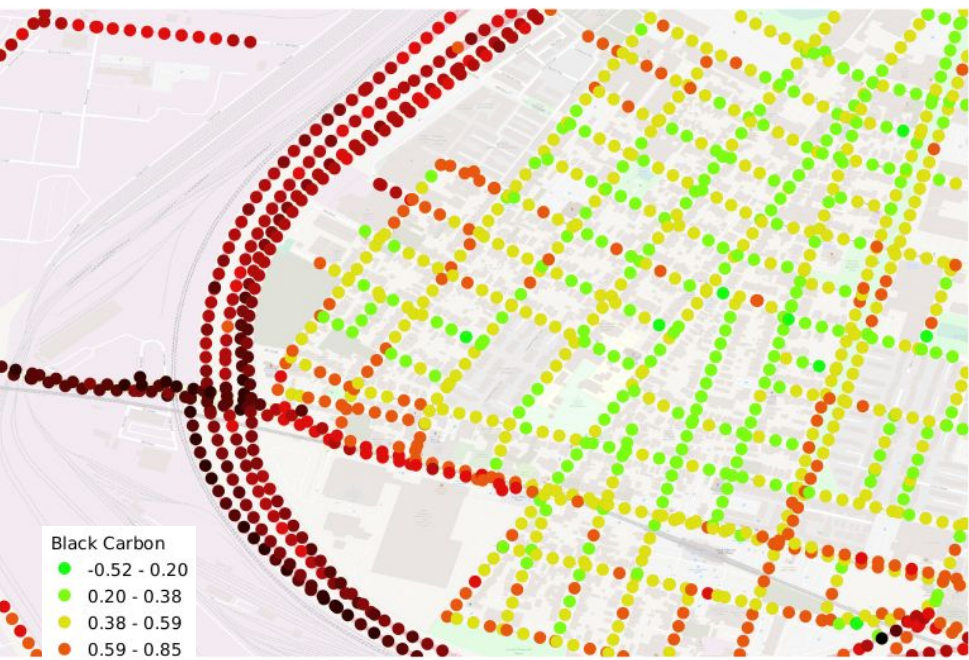
Less effective at blocking



More effective at blocking



More effective at blocking



Black Carbon

- -0.52 - 0.20
- 0.20 - 0.38
- 0.38 - 0.59
- 0.59 - 0.85
- 0.85 - 1.18
- 1.18 - 1.56
- 1.56 - 1.98
- 1.98 - 2.54
- 2.54 - 3.99
- 3.99 - 8.15



- Immediately Plantable
- Caltrans Planting
- 7th Street
- Frontage Road Diet



Immediately Plantable

- Simpler design: fill in with trees
- No concrete removal
- Can be planted the fastest
- Permitting with City of Oakland
- Can be planted by local tree planting groups

Caltrans Planting

- Simpler design: fill in with trees
- No concrete removal
- Requires building soundwalls and guard rails
- Permitting through Caltrans
- Need to use Caltrans approved contractors

7th Street

- More complex design: costlier to design, engineer, and construct
- Other projects, such as one headed by the port of Oakland, are potentially being planned for this area, so important to move fast

Frontage Road Diet

- More complex design: costlier to design, engineer, and construct
- Lots of possibilities for how the area can be designed: want community input
- Innovative road diet: community support is critical



Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

Immediately Plantable

Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet



Immediately Plantable



Fill in and replace trees

Immediately Plantable



Easiest place to ask local tree planting groups to plant this area





Immediately Plantable

Caltrans Planting

7th Street

Frontage Road Diet

Frontage Road Diet



Immediately Plantable

Caltrans Planting

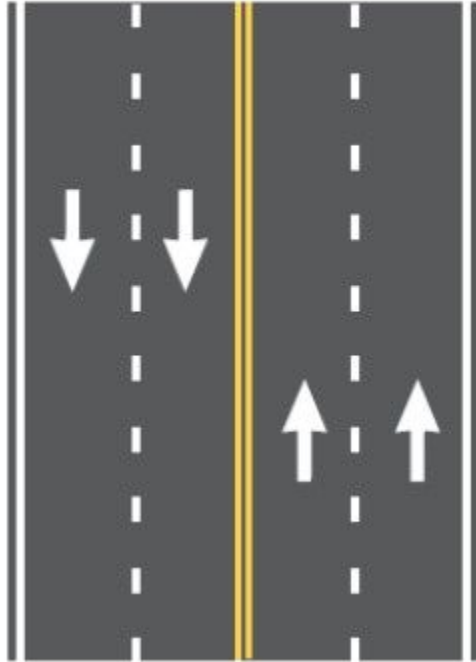
7th Street

Frontage Road Diet

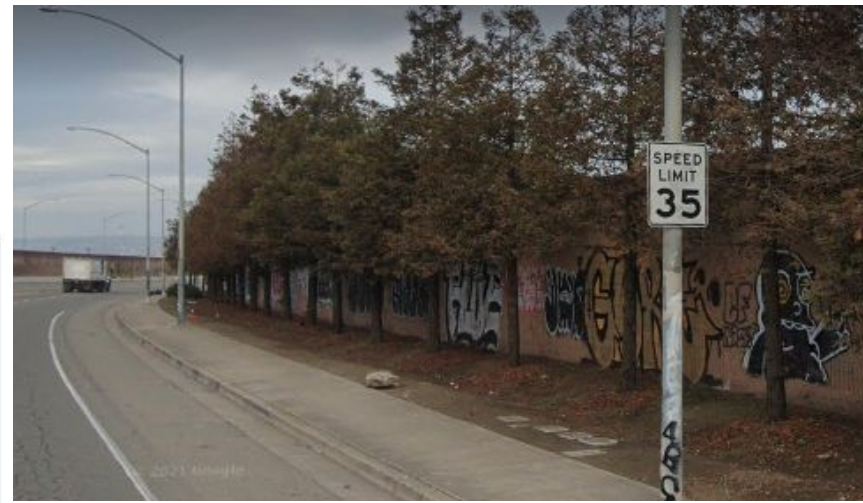
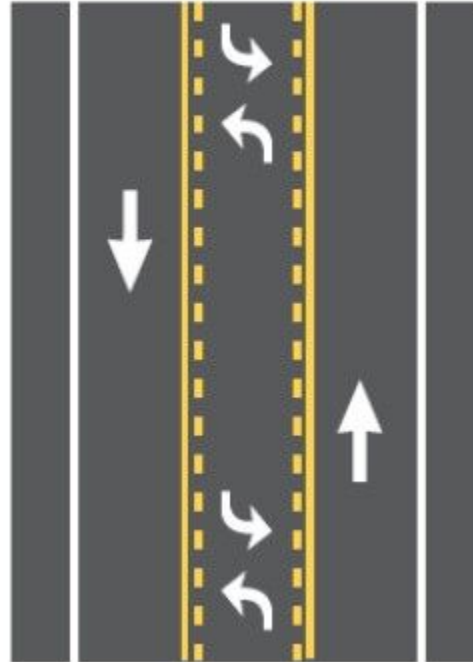


Frontage Road Diet

Before

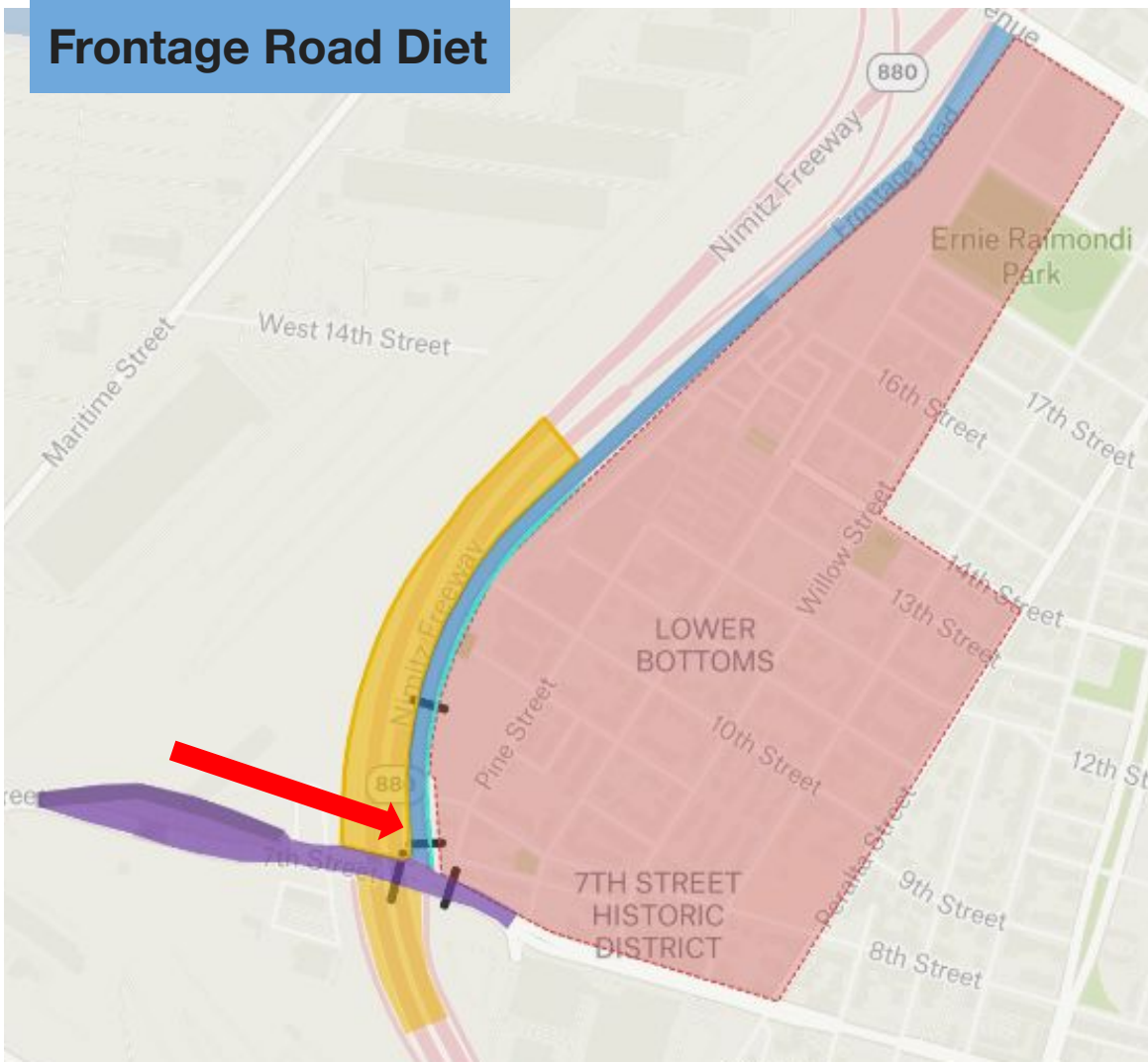


After



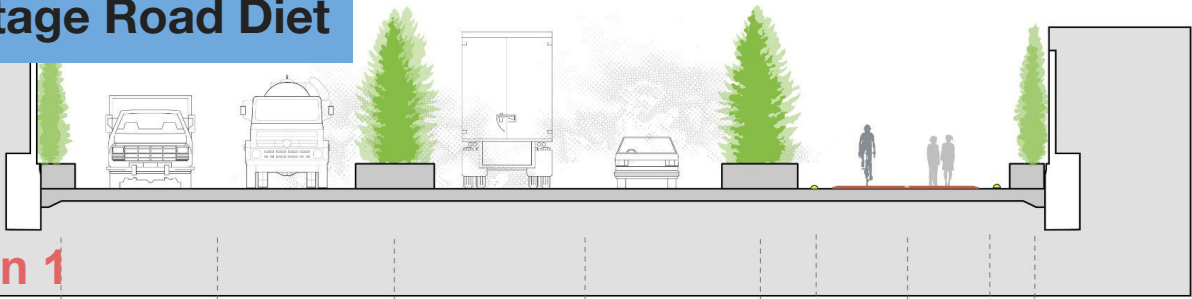
Utilizing the unused middle lane and reducing lane sizes could increase safety

Frontage Road Diet



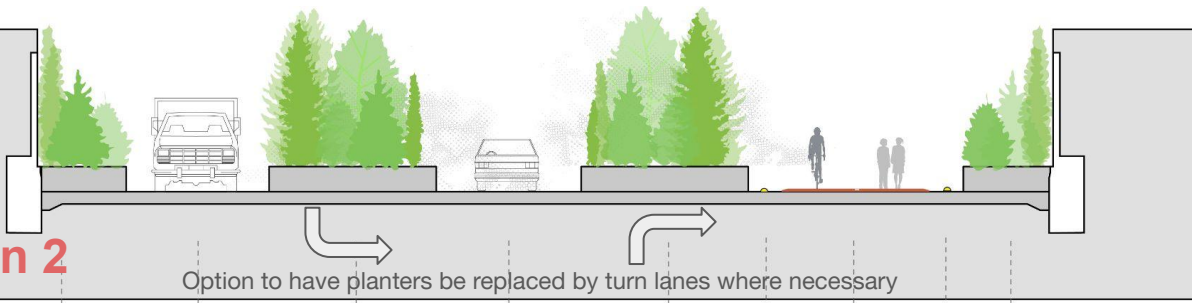
Frontage Road Diet

Option 1



7.5' planter
Multi-use path
Maintains 2 lanes

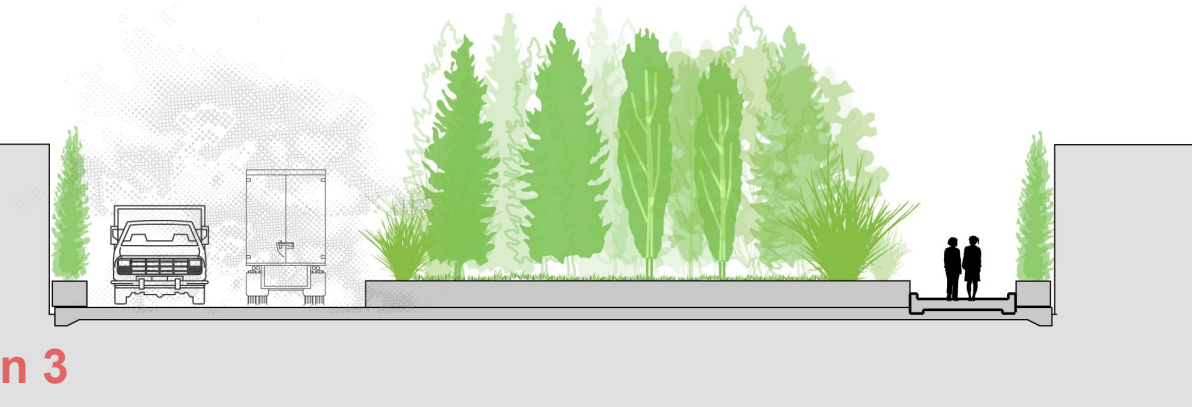
Option 2



Option to have planters be replaced by turn lanes where necessary

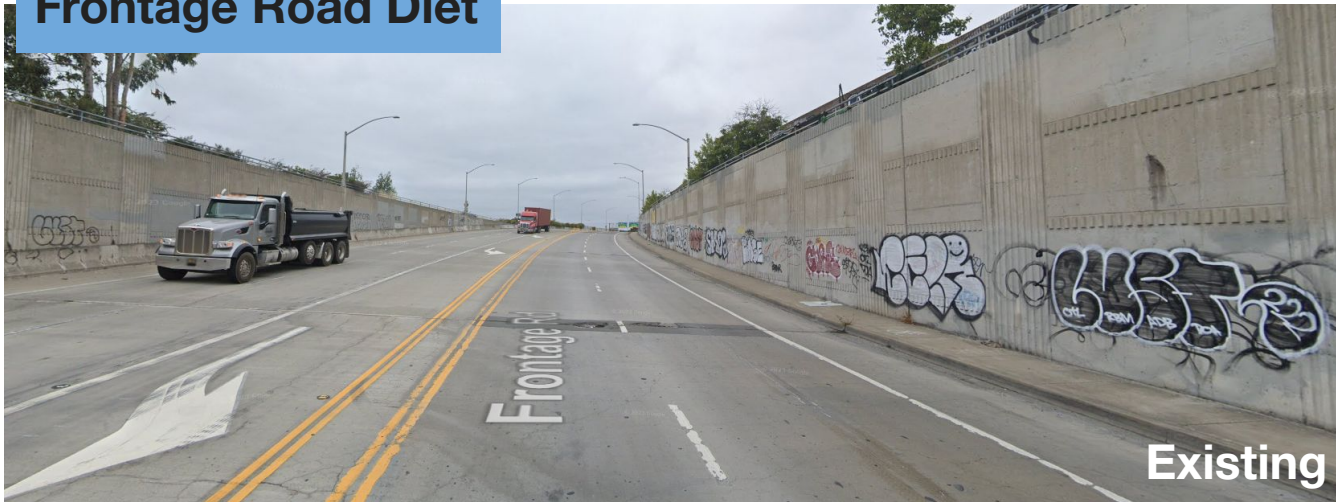
10-14' planter.
Multi-use path
Reduces lanes to 1
going each direction

Option 3



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

Frontage Road Diet



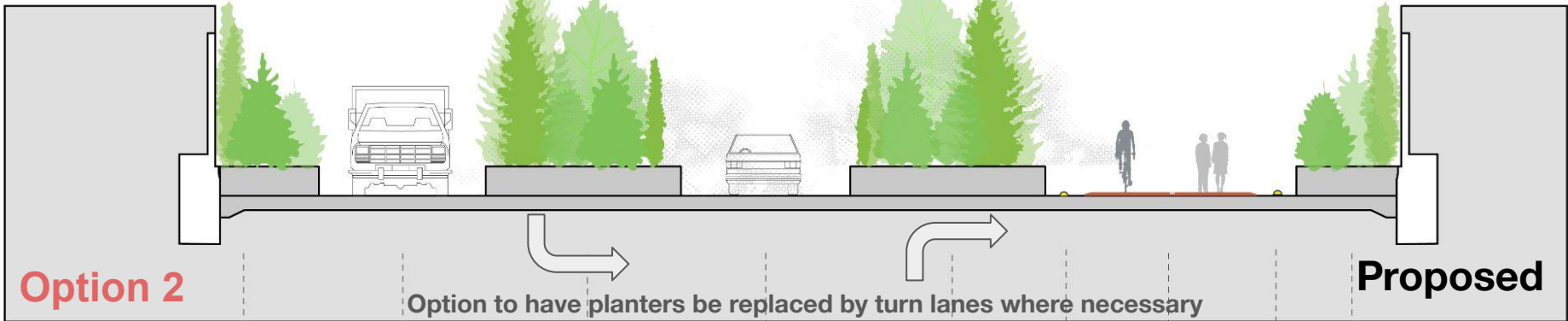
7.5' planter
Multi-use path
Maintains 2 lanes



Frontage Road Diet



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



Frontage Road Diet



Existing

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



Option 3

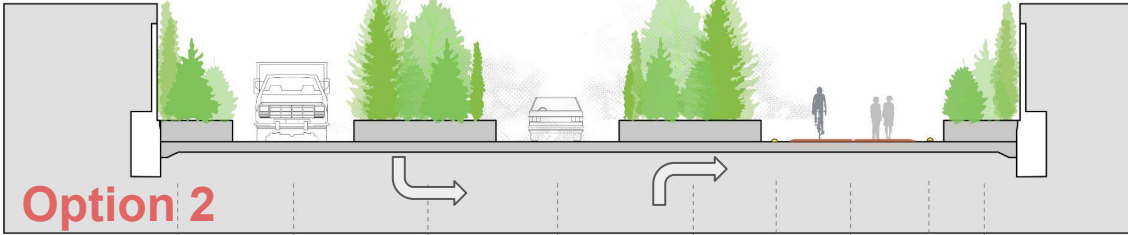
Proposed

Frontage Road Diet

Option 1



Option 2

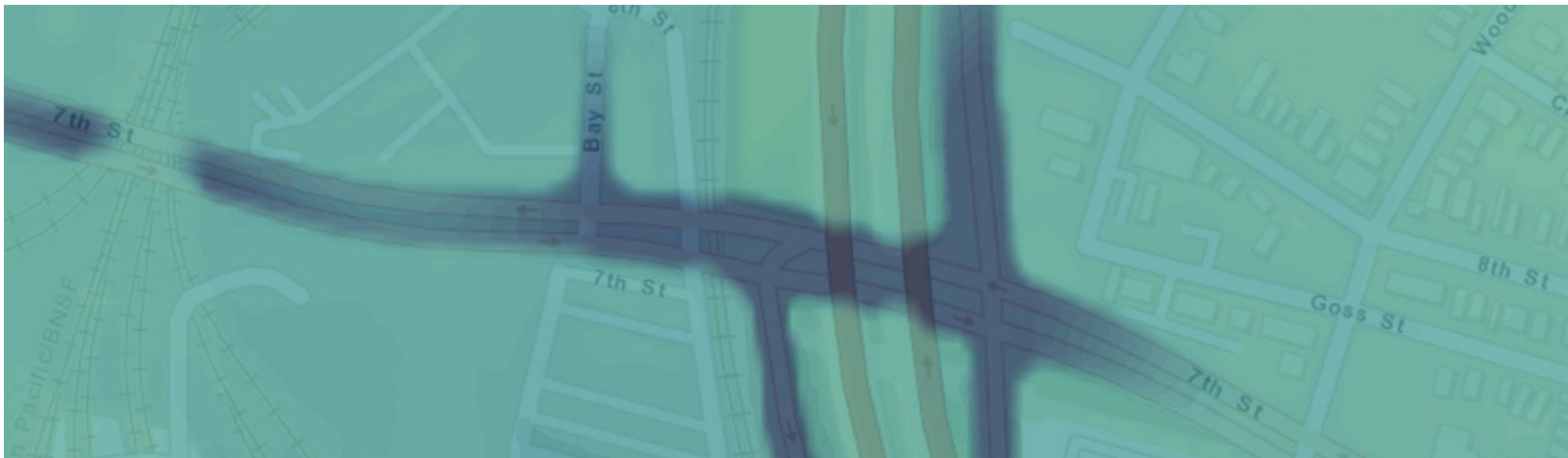


Option 3



Which design features do people like?

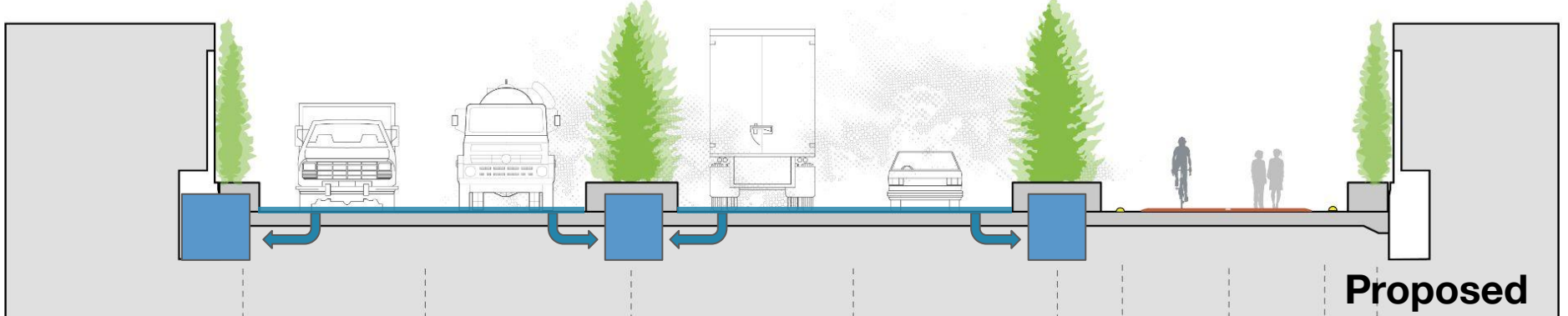
- Lanes: 1 vs 2
- Planters: medians vs 1 big
- Path: Multi-use vs small
- Dedicated turn lanes?



Frontage Road Diet



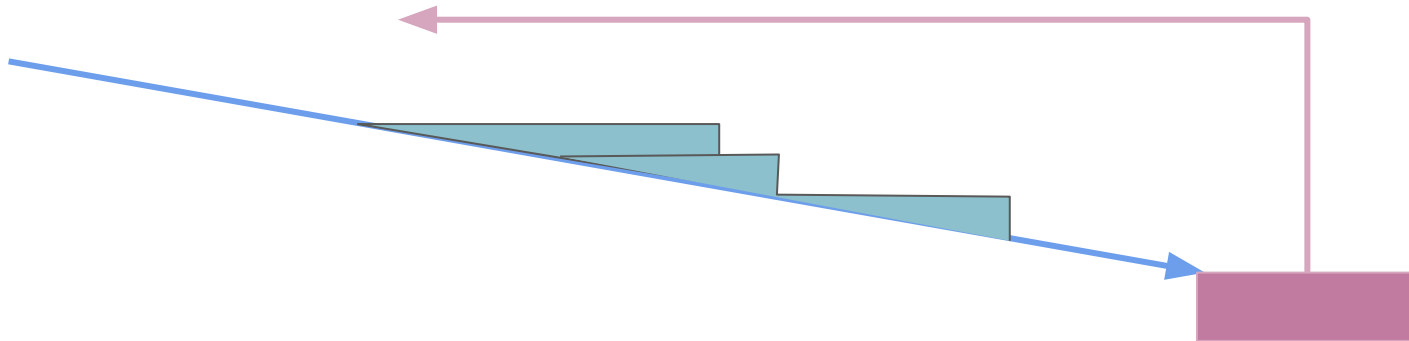
Frontage Road Diet



Frontage Road Diet

A series of stepped bioswales to absorb water.

Overflow to be stored for irrigation and pumped out.



Frontage Road Diet

Some of the greened areas will double as bioswales





Comparing Scenarios Using Models

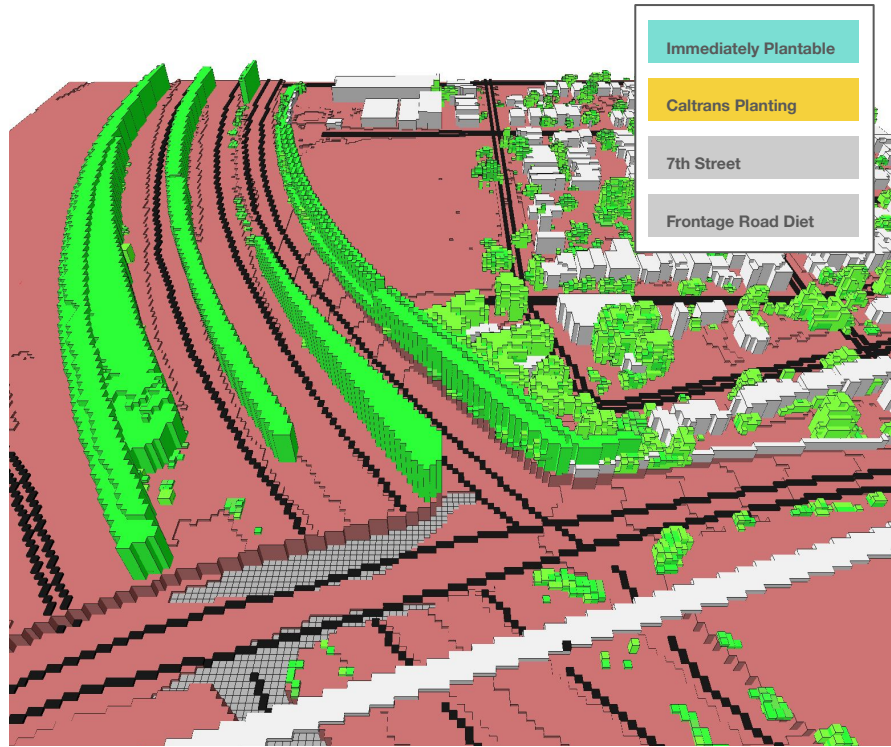


A) Caltrans + Immediately Plantable

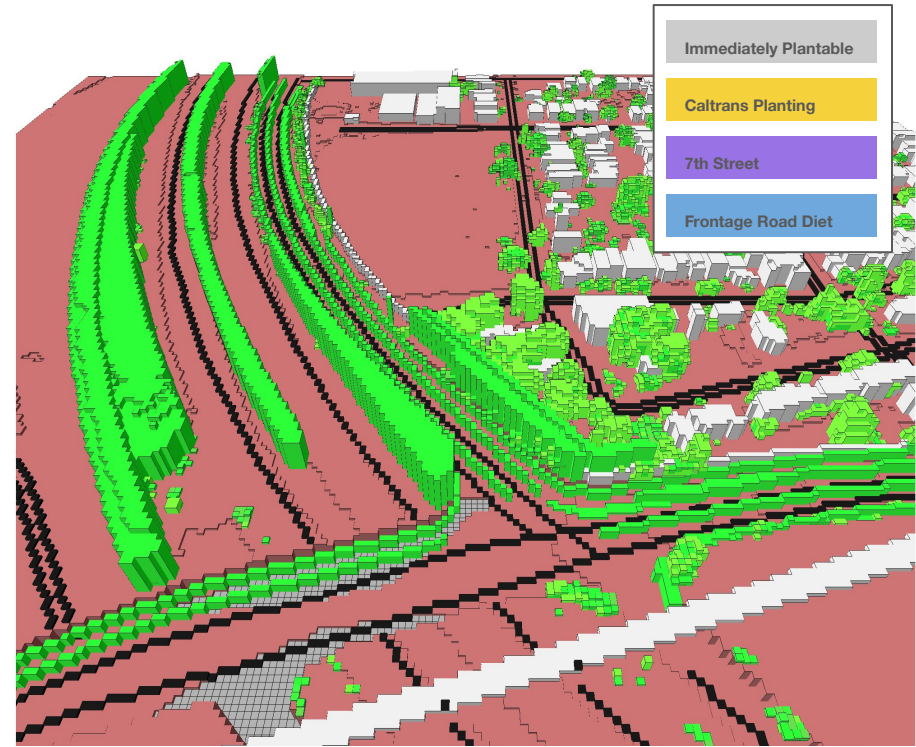


B) Caltrans + Frontage Road Diet & 7th

Comparing Scenarios Using Models

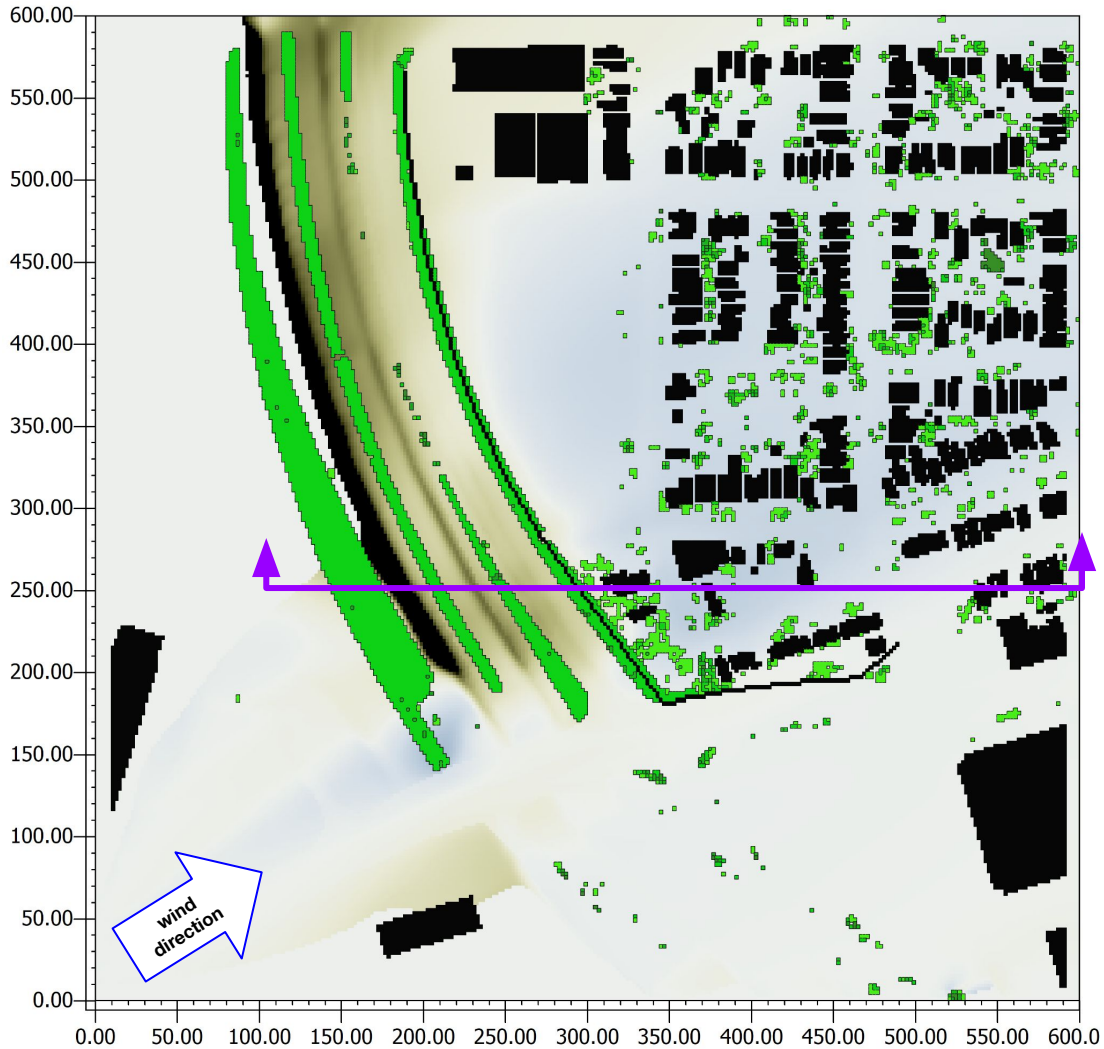


A) Caltrans + Immediately Plantable

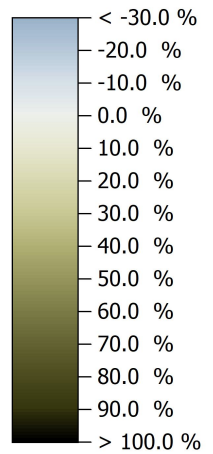


B) Caltrans + Frontage Road Diet & 7th

A) Caltrans + Immediately Plantable



*relative difference PM0.015
Concentration*

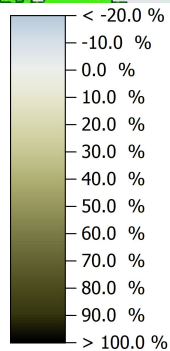
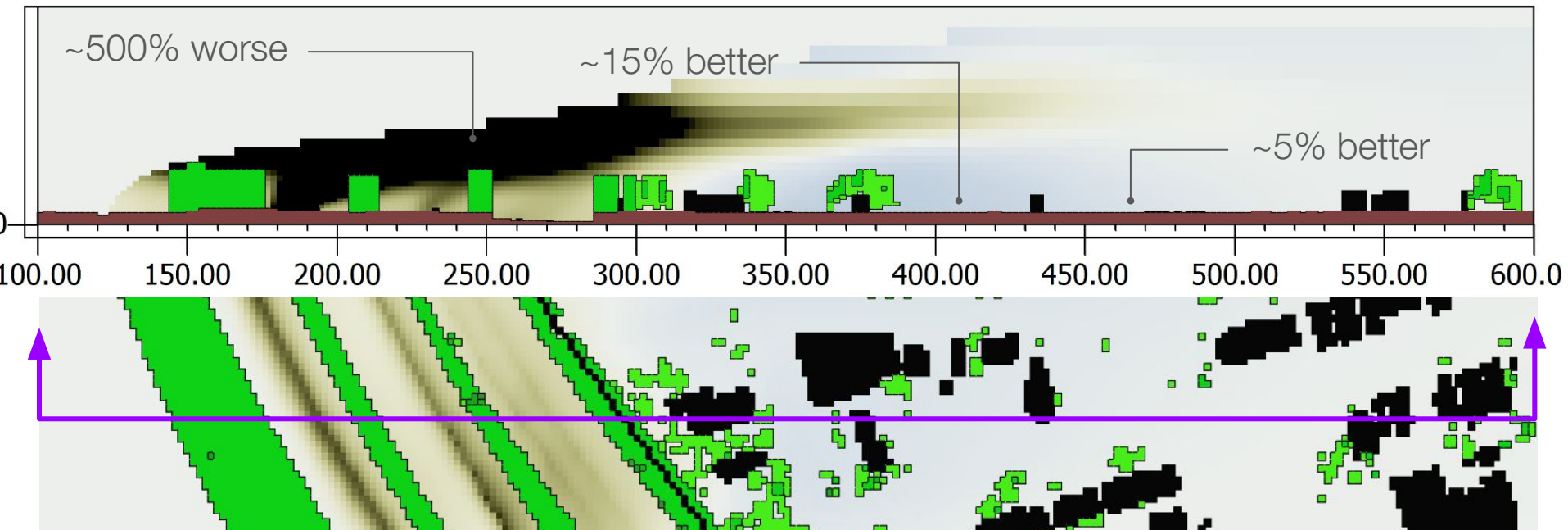


Min: -25.3 %
Max: 2717.2 %
98%-Percentile 63.9 %

Bluer areas are where the pollution is better than existing

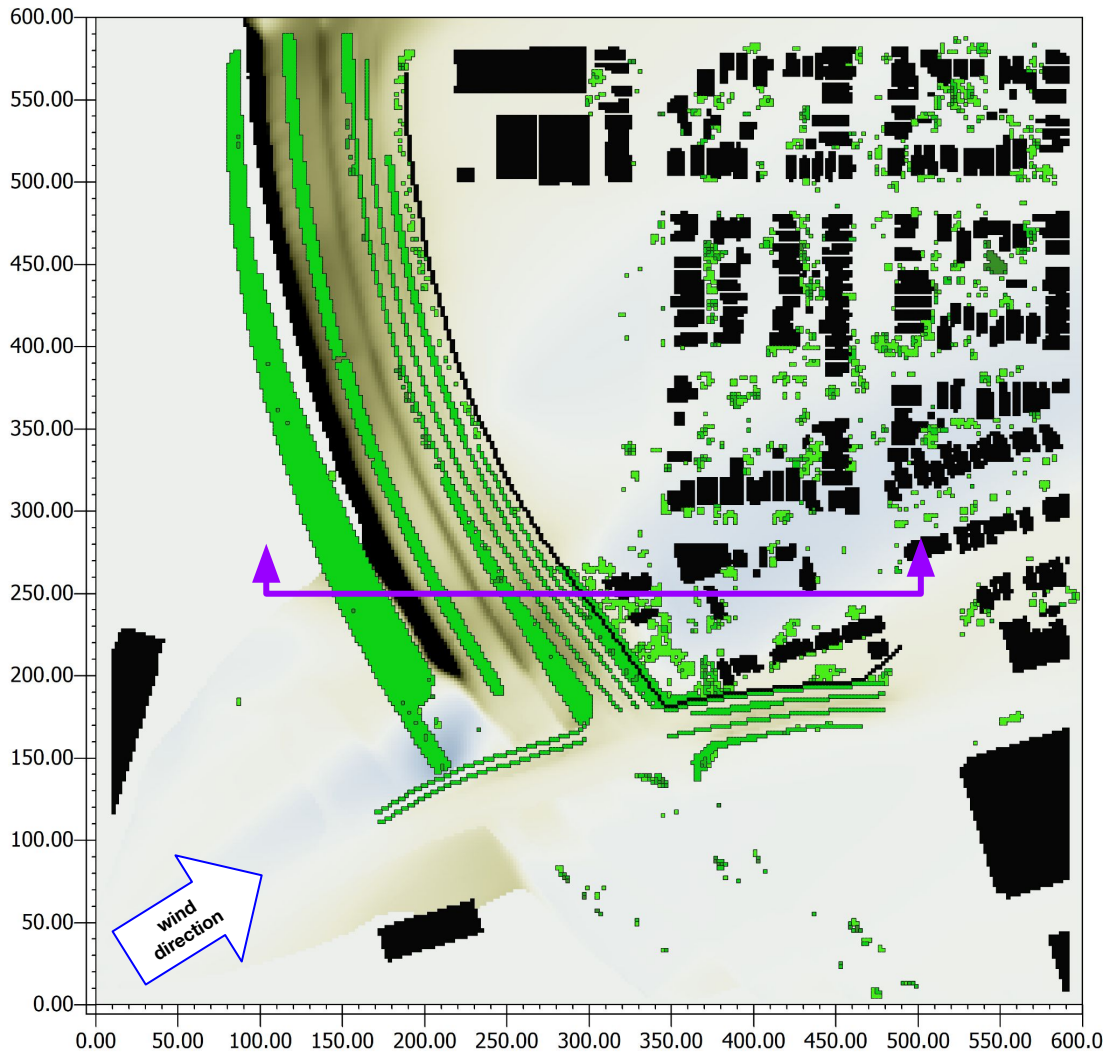
Darker areas are where pollution is worse



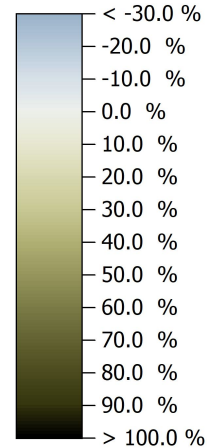


**A) Caltrans +
Immediately
Plantable**

B) Caltrans + Frontage Road Diet & 7th



*relative difference PM_{0.015}
Concentration*



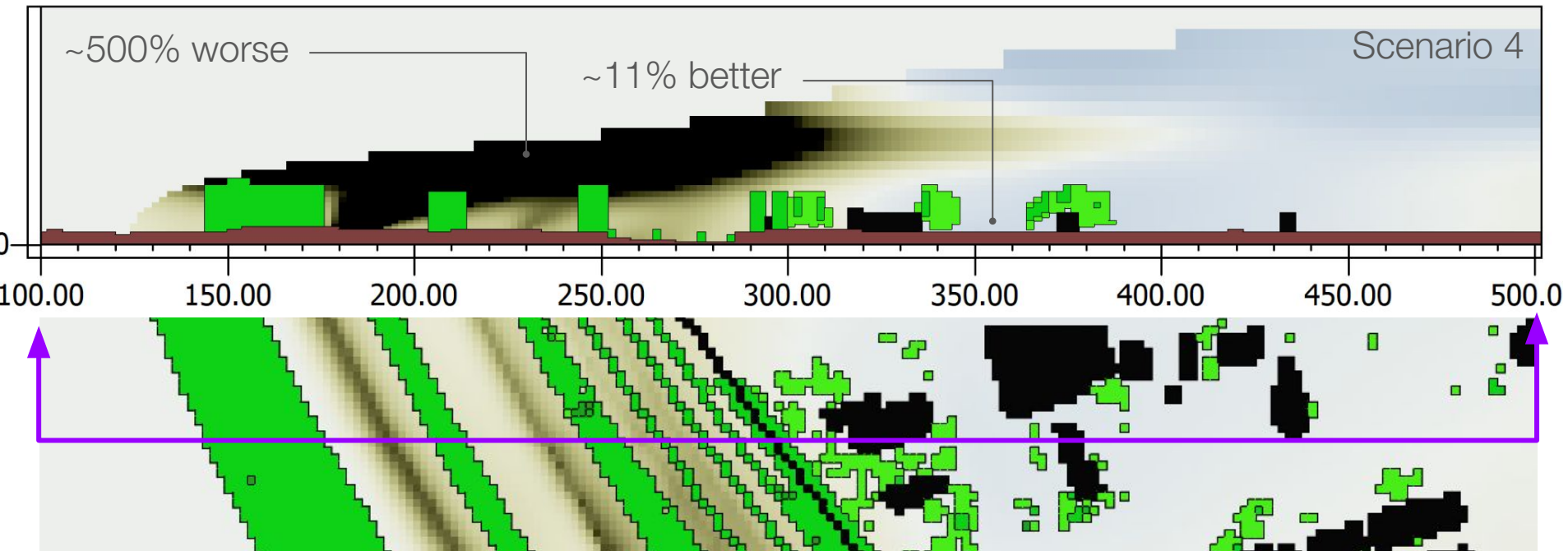
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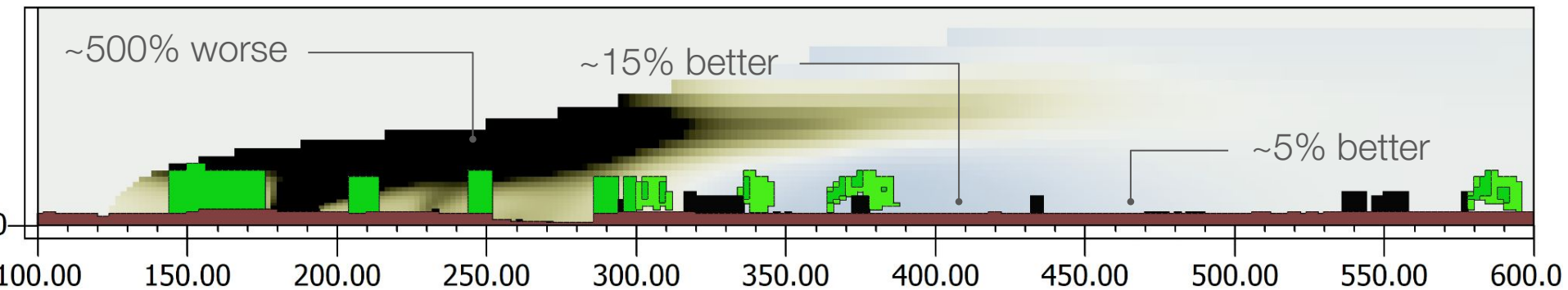
Darker areas are
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worse



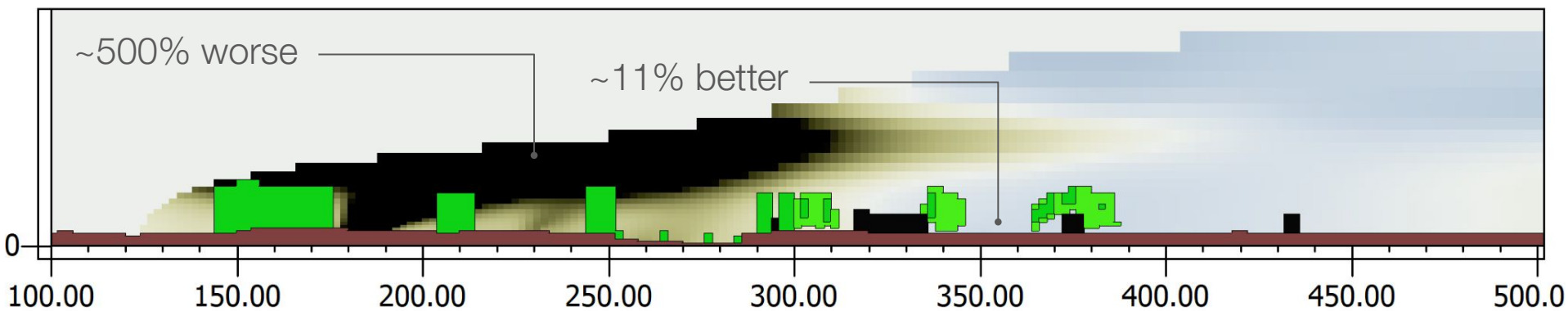


**B) Caltrans + Frontage
Road Diet & 7th**

A) Caltrans + Immediately Plantable



B) Caltrans + Frontage Road Diet & 7th



Questions:

- If we know that a buffer concentrates pollution upwind of it, how do you best design buffers?
- Does it make sense to potentially cause spikes at frontage road where pedestrians may be, if it might make the neighborhood better?
- What are some of the other scenarios that we should and shouldn't test?

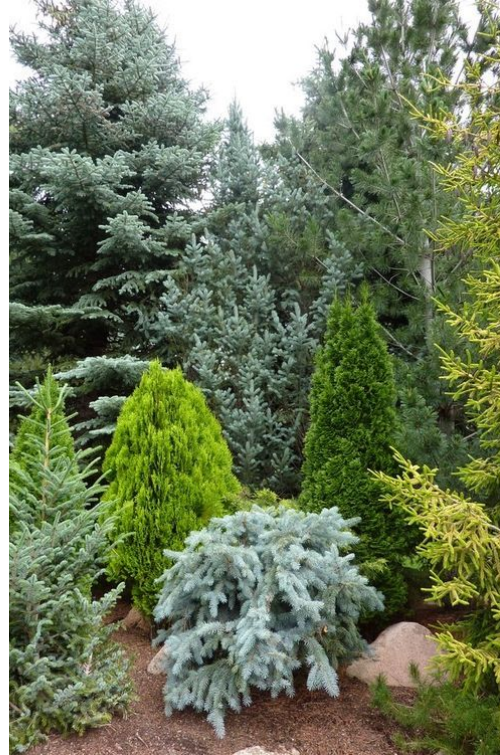
There are lots of different things we can choose to prioritize in designing the place we live



Habitat



Stormwater



Aesthetics



Road safety

Prescott Greening Agenda

- ❖ Introduction
- ❖ Project Area
- ❖ Modeling
 - What is modeling
 - Building a 3D world
 - Pollution Levels
 - Vegetated Buffers
- ❖ Concept Designs
- ❖ **Discussion**

Group Q&A (10 min)

- What questions do you have about the designs?
- What additional information do you want to know before breakouts?



Q&A Notes

- What questions do you have about the designs?
- What additional information do you want to know before breakouts?
-

Zoom Poll #2 - Prioritization and Trade-offs (10 min)

Different designs and design assumptions will have different trade offs.

- **What are the things we should uplift as priorities when working on this project? (Choose your top 3)**
 1. Road safety (reducing collisions)
 2. Safe pedestrian/biking access
 3. Noise reduction
 4. Air pollution reduction
 5. Ecological benefits (habitat, biodiversity)
 6. Flooding / stormwater mitigation
 7. Vehicle traffic efficiency
 8. Aesthetics
 9. Cost
 10. Other

Zoom Poll - NOTES



1. Road safety (reducing collisions)
2. Safe pedestrian/biking access
3. Noise reduction
4. Air pollution reduction
5. Ecological benefits (habitat, biodiversity)
6. Flooding / stormwater mitigation
7. Vehicle traffic efficiency
8. Aesthetics
9. Other

Breakout Activity (30 min)

Miro Board: <https://miro.com/app/board/uXjVNyPr1Zl=/>

- Activity #1 - Design Priorities
 1. Share your thoughts on the design priorities from the zoom poll
- Activity #2 - Design Review (with section drawings)
 1. What are people's initial reactions to the designs?
 2. How do you want to see this road in the future?
 3. How should we weigh any conflicts in the community preferences vs. research results
 4. How should we involve WOCAP and the larger West Oakland Community in the the overall design process?

Large Group Report Back Notes

-

Background & Related Projects

- Adapt Oakland: Urban Greening & Living Buffers in WO (“**Prescott Greening**”)
 - Funded by CARB (Audi settlement) & Metropolitan Transportation Commission (MTC)
- West Oakland Sustainable Transportation Equity Project (“**STEP**”)
 - CARB funding to implement four strategies and recommendations from the WOCAP: (1) Truck Management Plan (TMP) implementation; (2) **Pedestrian Improvements and Urban Greening**; (3) Bike Resource Hub; and (4) Transit Access Improvements
- OakDOT/OPFR Streetscape Improvements: **7th Street Connection Project**
- **West Oakland Link**: \$100M from Bay Area Toll Authority, ACTC, City of Oakland, & Caltrans





Evaluation

Monthly Post-Meeting Evaluation Survey

You have time now to complete the survey

www.woeip.org/wocap-sc-survey

We will also email the link after the meeting

Adjourn



Blue sign with text, likely a parking or accessibility notice.

RESERVED PARKING ONLY

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