



Sammamish-Juanita 115 kV Project

Advisory Group Meeting #2



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PSE Project Manager

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GeoEngineers

October 17, 2011



Chapter 1: Response to information requests

Chapter 2: Review past route options

Chapter 3: Project routing model overview



Eastside major electric and natural gas system projects expected to be constructed over the next decade





Chapter 1: Response to information requests

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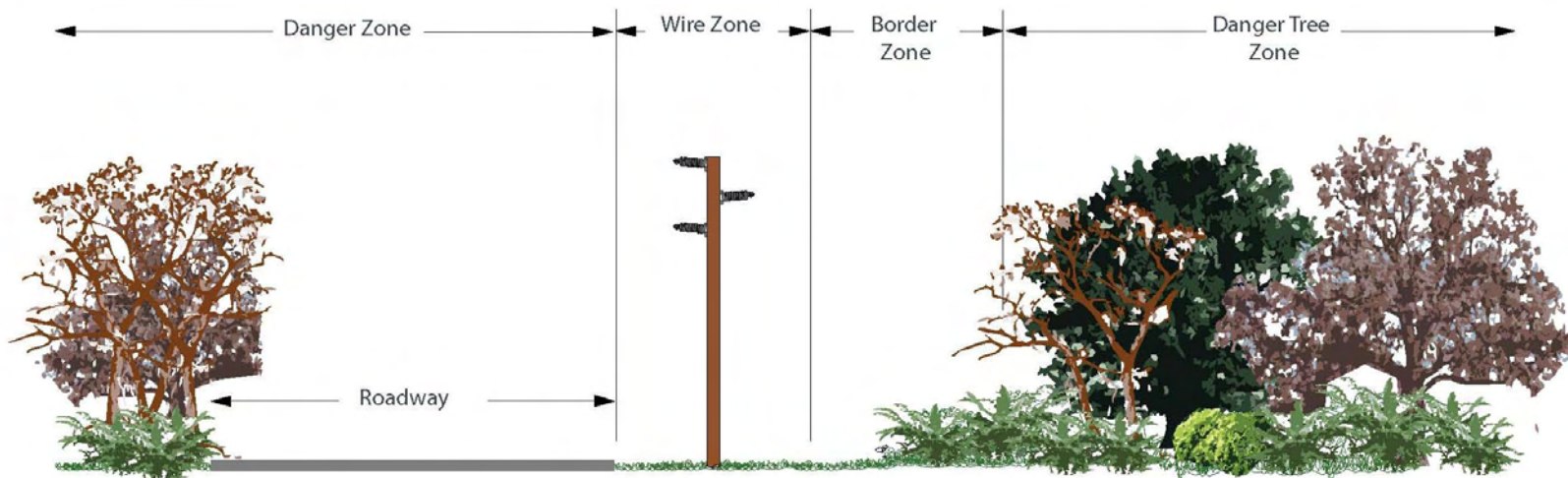
Information requested at Meeting #1

- Experience with underground transmission lines
- Trees and canopy cover
- Potential transmission line impacts
 - Noise
 - Radio interference
 - Electric and magnetic fields, science and current research
 - *Drew Thatcher, Board Certified Health Physicist*
 - Visual
 - Construction
 - Easements (existing and new)
- Public meetings notification



Trees and canopy cover

PUGET SOUND ENERGY **UTILITY LANDSCAPING ZONE**





Audible transmission line noise

- 230 kV lines can be associated with audible noise due to the higher electric fields
- 115 kV lines in general do not produce noise related issues during wet or dry weather
- Over the years transmission line construction improvements have helped minimize typical audible noises as well as radio frequency interference

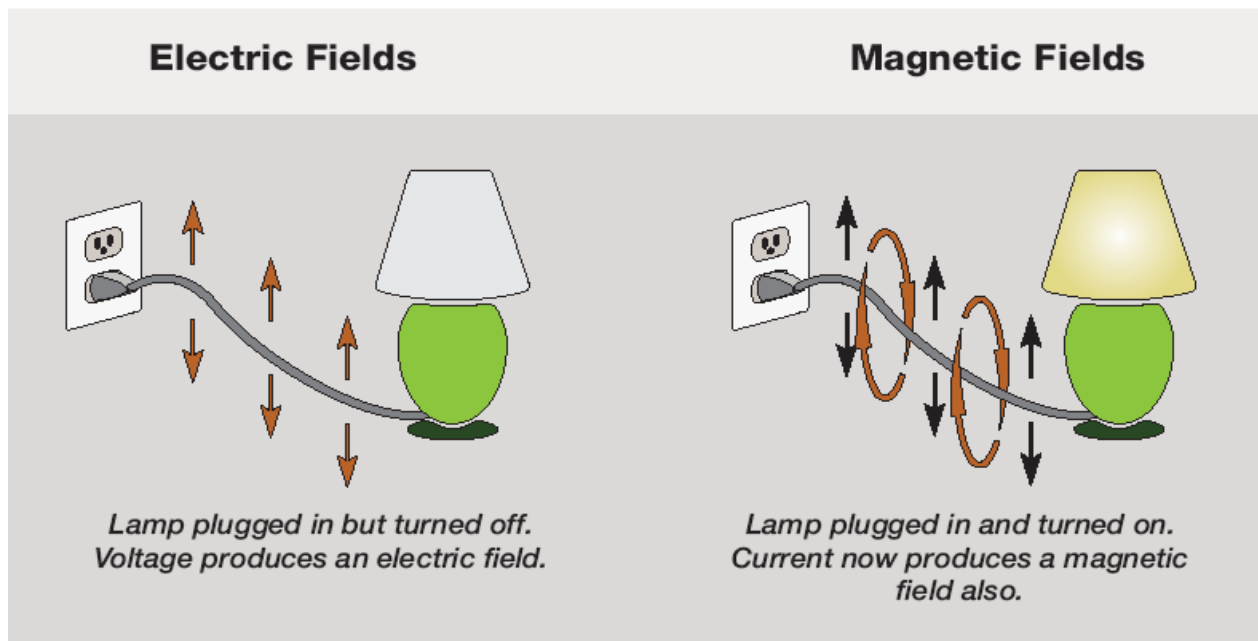


Radio and television interference

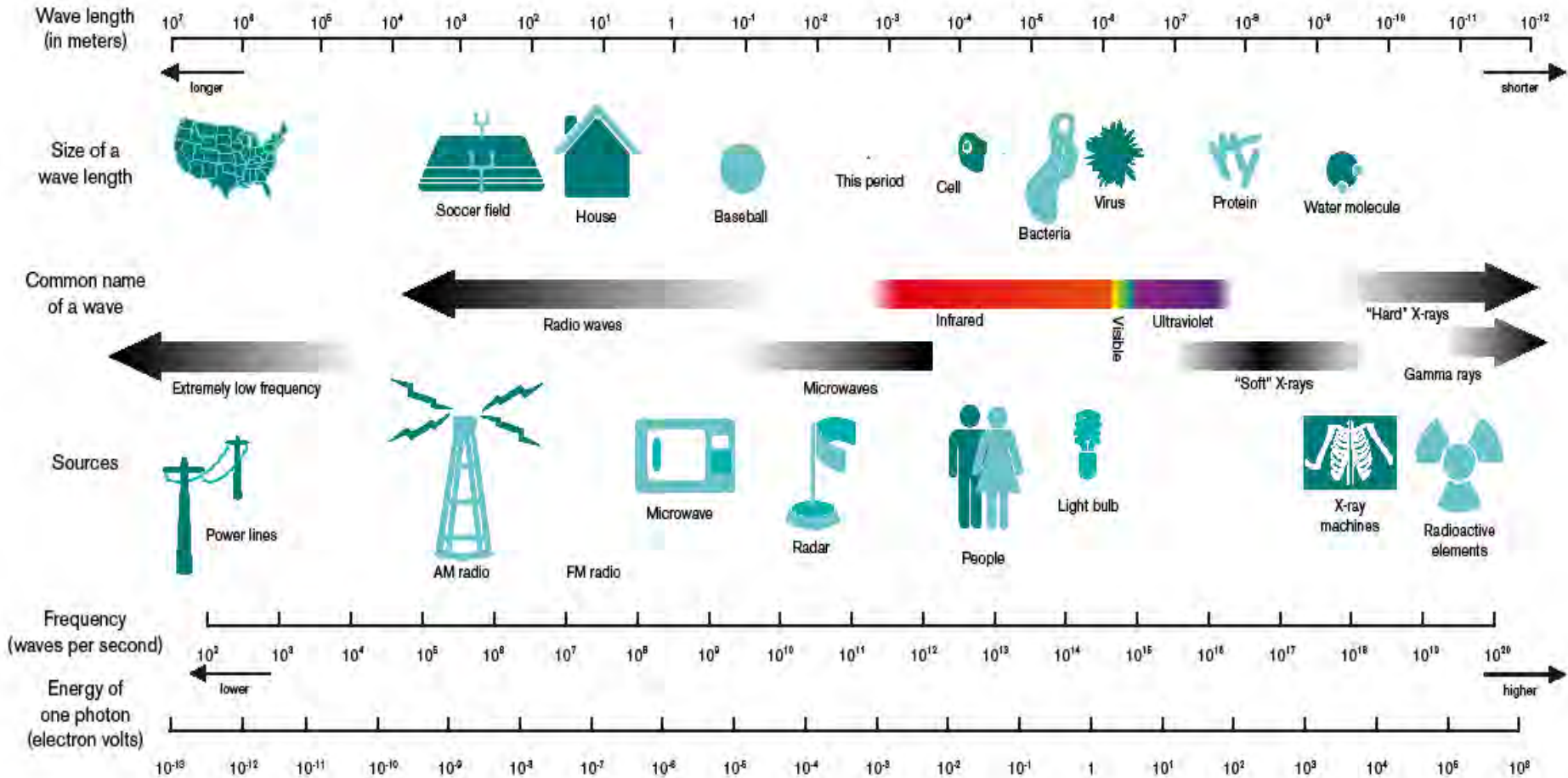
- Overhead transmission lines, in general, do not interfere with normal radio or TV reception
- For a 115 kV line the potential may exist for gap discharges due to tiny separations between connections, resulting in a broad radio frequency (RF) interference that can extend from 20 kHz to 800 MHz
- This is unusual for new transmission lines due to design improvements
- If RF interference is identified, the source can be located and repaired
- In general it is more common for distribution lines to be a source of RF interference



A comparison of electric and magnetic fields



The Electromagnetic Spectrum





Background on EMF studies

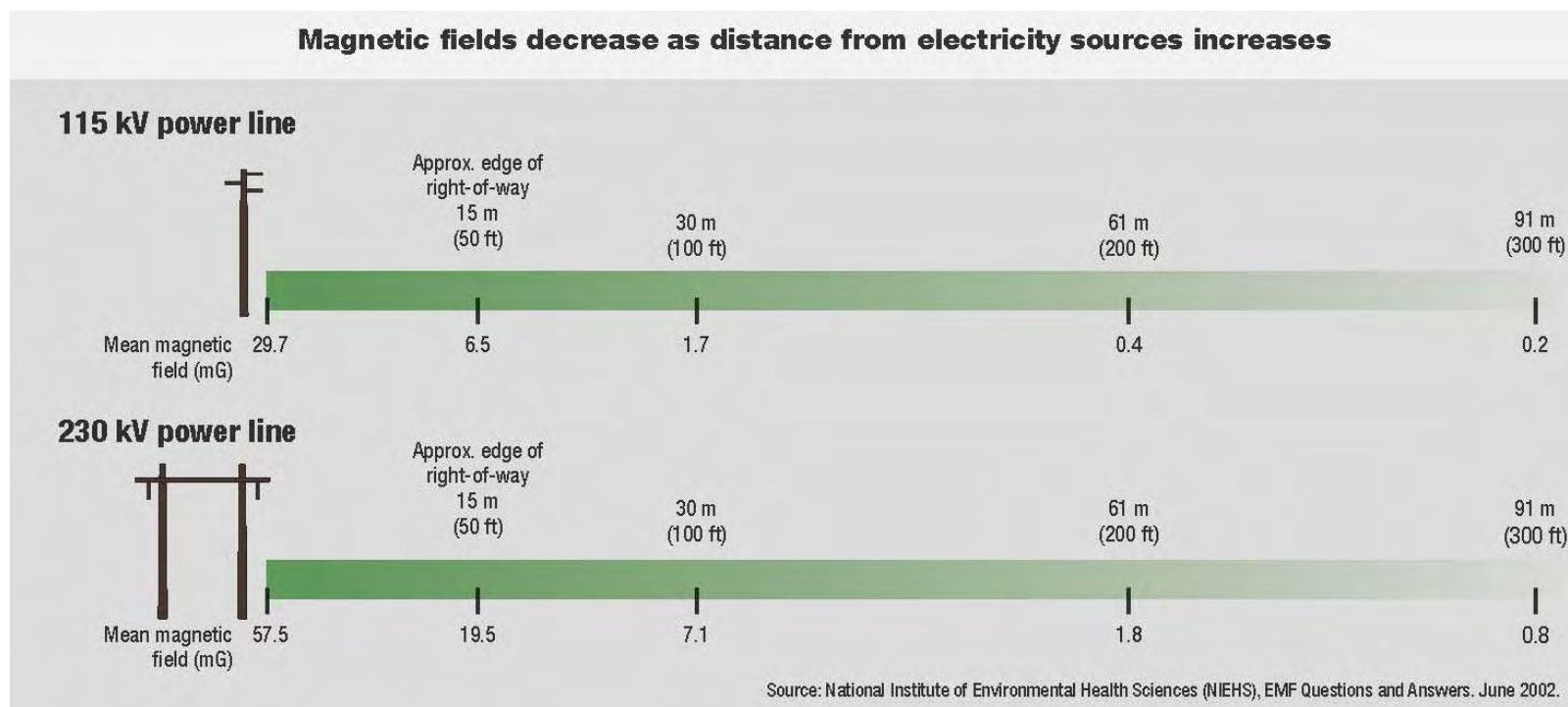
- Epidemiology – the study of exposures to humans
- Animal and laboratory studies
- Is there a plausible biological explanation?

Public health summary

- EMF is a consequence of using power in our lives
- WHO concludes that magnetic fields and health risks are not established nor are they supported by laboratory studies
- The international guideline for public exposure is 2,000 mG
 - 50 feet from a 115 kV line the exposure is 6.5 mG
 - 1 foot from a video screen the exposure is 5 mG
- There are no federal or state magnetic fields limits simply because the risks have not been proven



EMF and transmission lines





Electric fields

- An object placed in an electric field becomes “charged”
- The strength of the charge depends on:
 - Strength of the electric field
 - Surface area of the object
 - Distance between the source and the object
- If a charged object touches a grounded object, the charge will discharge into the ground. To prevent an object from becoming energized by an electric field, simply ground the object.



Public meeting notifications

- Public meetings
 - Tentatively planned for December 2011 and February 2012
 - Notifications will include:
 - Postcards mailed to project area residents and landowners
 - Advertisements in local newspapers
 - Email to project email list
 - Project webpage
 - Blog/email post for AG members to inform their communities
 - City communications tools



Chapter 1: Response to information requests

Chapter 2: Review past route options

Chapter 3: Project routing model overview

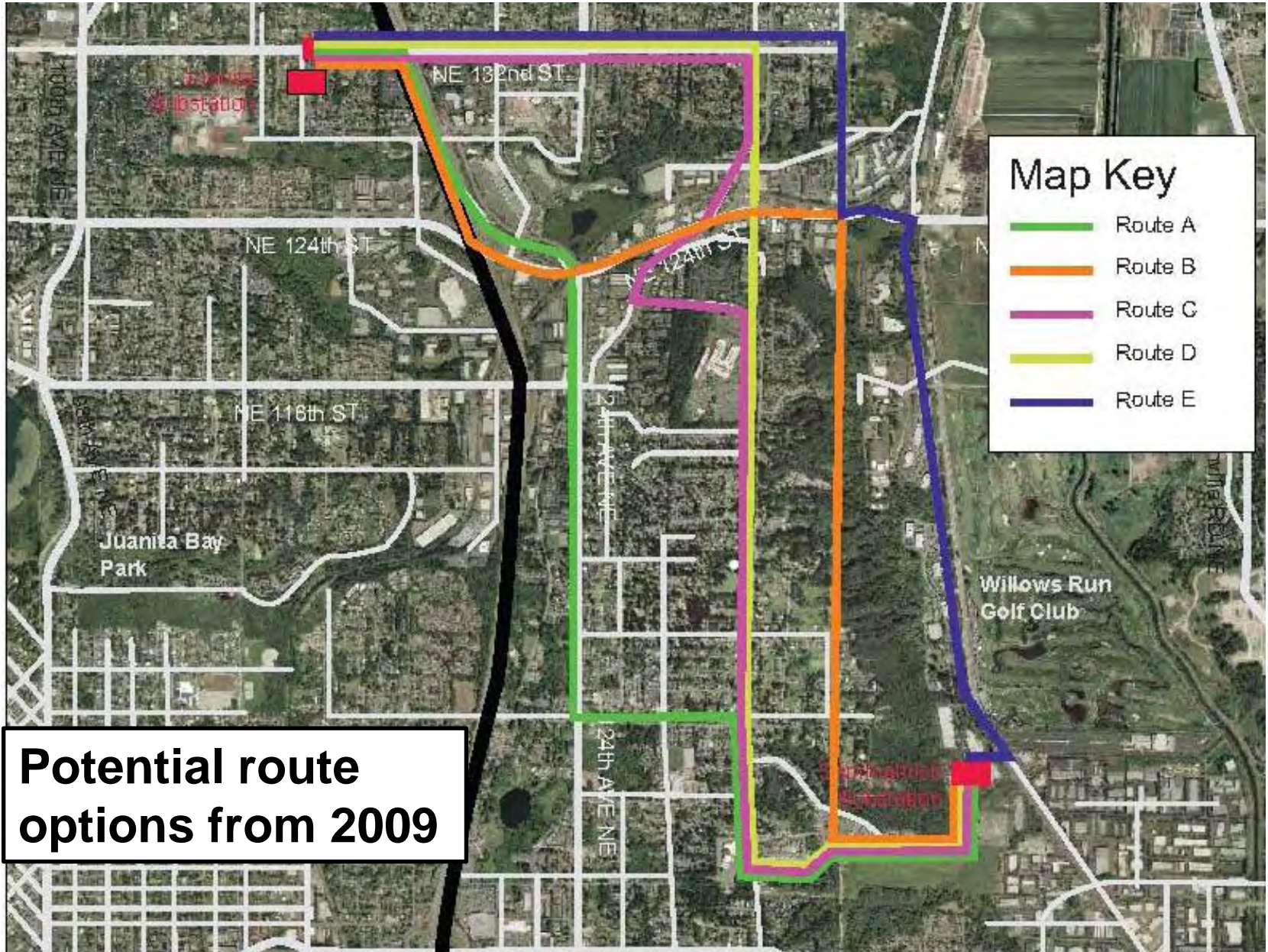


General transmission line siting considerations

- Access
- Community development plans
- Constructability
- Environmental impacts
- Existing utilities
- Land use regulations
- Maintenance and operation
- Permitting
- Public input
- Reliability
- Rights of way
- Straight, direct route
- Topographic features
- Types of property
- Vegetation



Chapter 2: Past routing





Public feedback on 2009 potential route options

- Public meeting with 42 attendees
- We heard these routing themes:
 - Use existing rights of way
 - Route through commercial / industrial areas rather than residential areas
 - Use existing distribution poles



A fresh approach for the project...

- Using what we heard to inform development of alternatives
- Using a siting model methodology by Ian McHarg
- The siting model will:
 - Incorporate PSE's and community's siting criteria
 - Develop route alternatives, which may or may not result in similar routes as from 2009
- Need advisory group's help to:
 - Confirm model criteria
 - Consider how to weight different criteria
 - Review route alternatives



BREAK

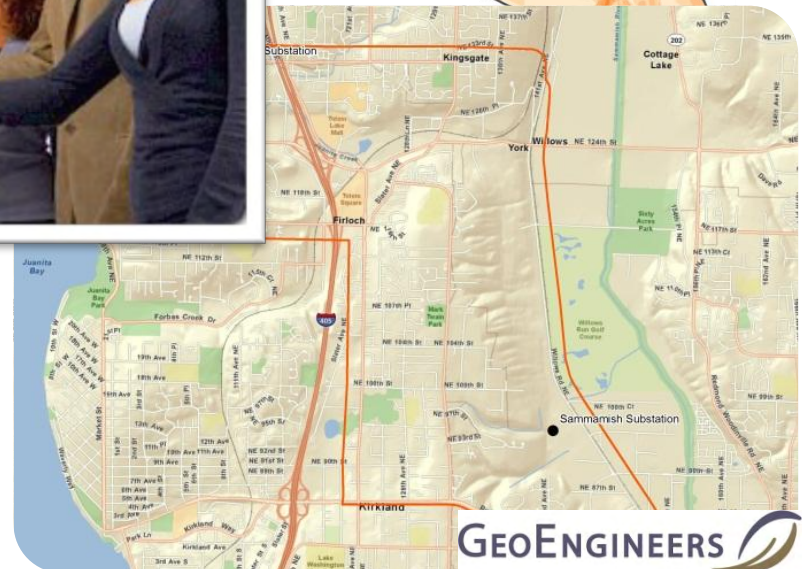
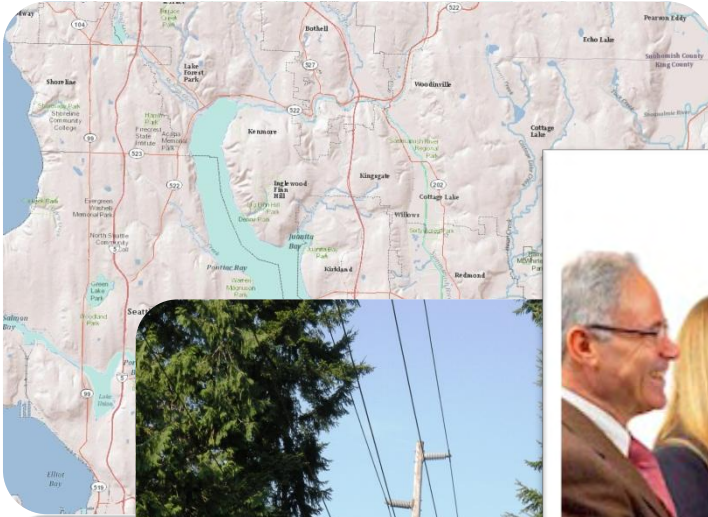


Chapter 1: Response to information requests

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Chapter 3: GeoRoute Selection Model



- Challenging siting with complex issues
- Promotes discussion of alternative scenarios
- Identify a route the SAG and PSE can support



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People make decisions NOT models

- Balance values of the community
- Priority of the data used in the model
- How to interpret/ use the results



GEOENGINEERS Geo Route

115 kV Transmission Line Route Study
Sammamish – Juanita

Locating a route for a 115 kV transmission line that is compatible with:

- Sensitive Land Uses
- Sensitive Natural Features
- Engineering Design and Safety Standards
- Community Values

AVOIDANCE AREAS

IDENTIFY, WEIGHT, & MAP

Built Environment Layers

- Parks and Open Spaces (10%)
- Ferrous Sites (<5 Acres) (25%)
- Schools
- Major Events Prohibition Areas
- Scenic View Corridors
- Interstate Right-of-Way
- Zoning-Single Family
- Zoning-Multi Family

Natural Environment Layers

- Priority Habitats-Fresh (15%)
- Priority Habitats-Marine (10%)
- Strategic Management Areas (10%)
- Shoreline
- Flood Zones
- Lakes
- Streams of the State
- Local Wetlands
- Wetlands
- Salmon Habitat
- Creston Wetlands

WEIGHTED AVOIDANCE AREAS
COMMUNITY INPUT

MAP IT

OPPORTUNITIES

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY AREAS
COMMUNITY INPUT

- Railroad Right-of-Way (15%)
- Existing Right-of-Way (15%)
- Abandoned Services (20%)
- Zoning-Industrial/Commercial
- Ferrous Sites (>10 Acres)

MAP IT

COMBINED OPPORTUNITIES & AVOIDANCE AREAS

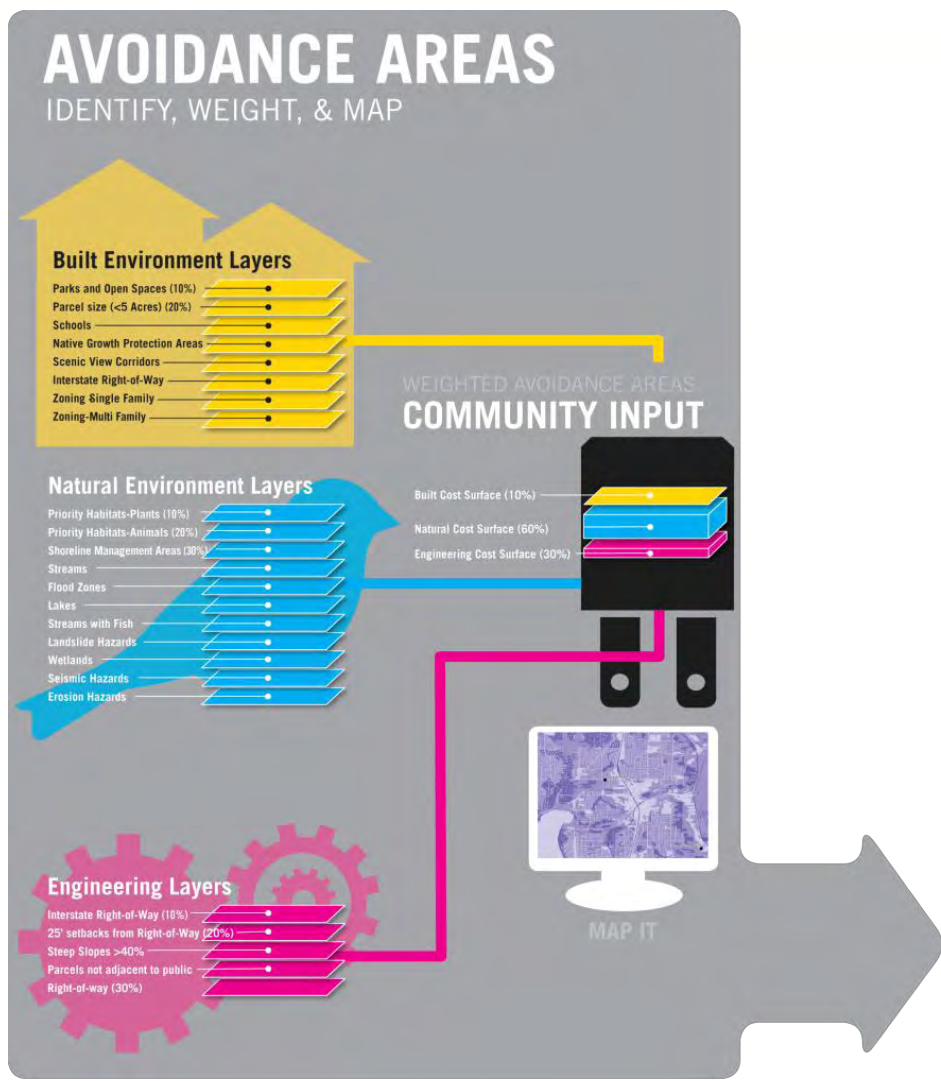
IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY & AVOIDANCE AREAS
COMMUNITY INPUT

- Proximity (10%)
- Opportunities (10%)



**OUTPUT:
MAP OF ROUTE**





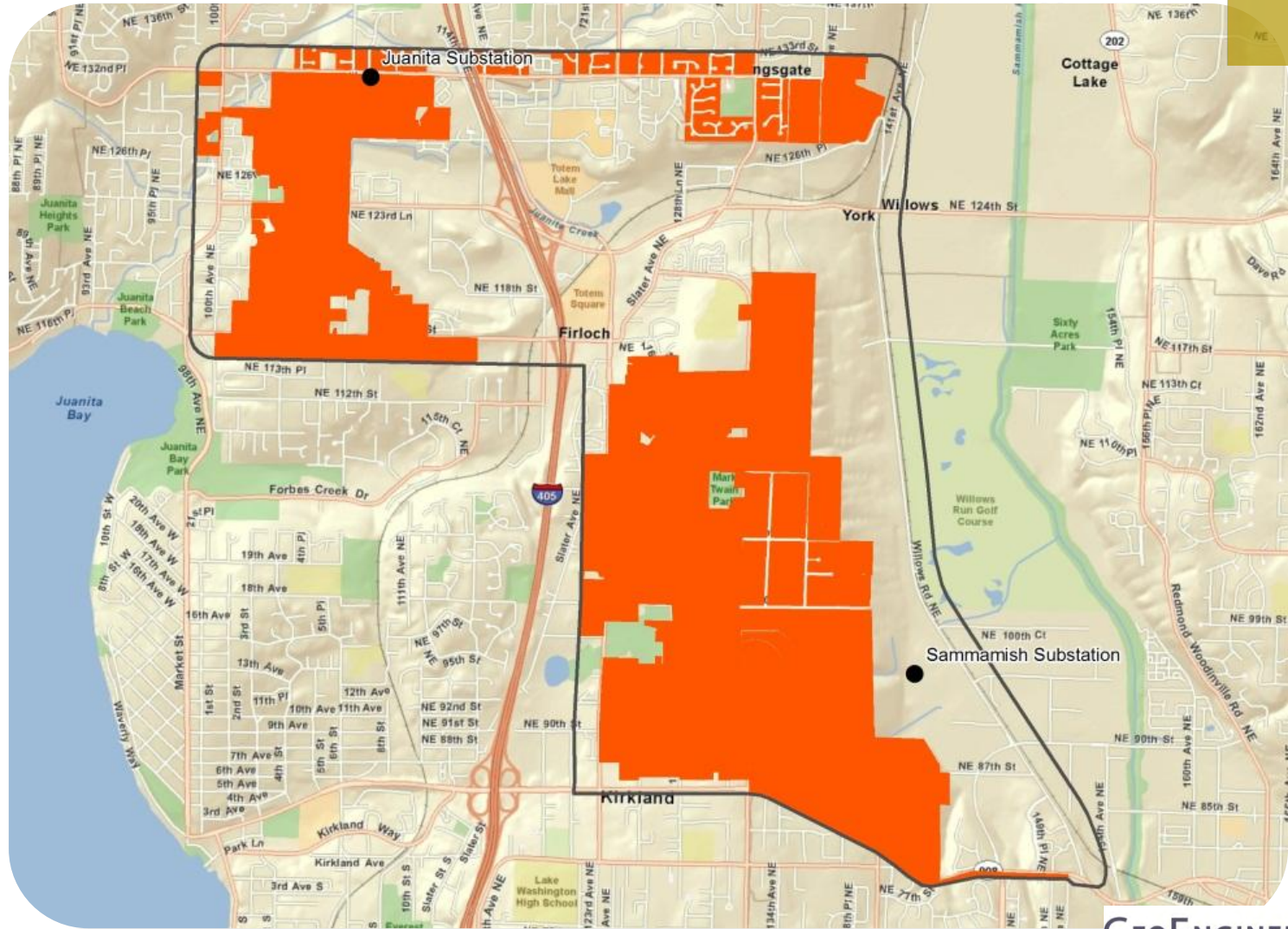
**Built
Environment**

■ Built Environment Data Layers

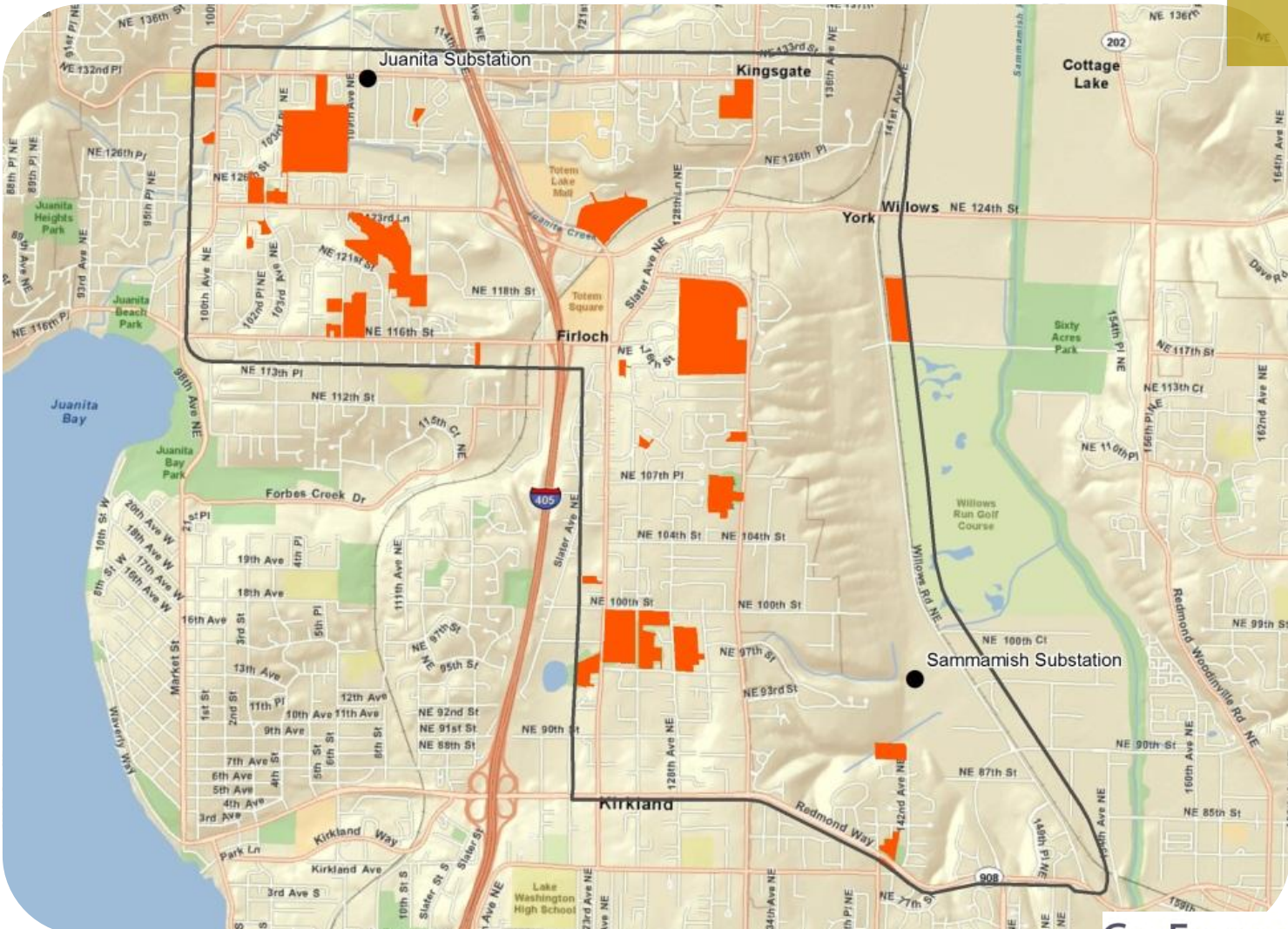


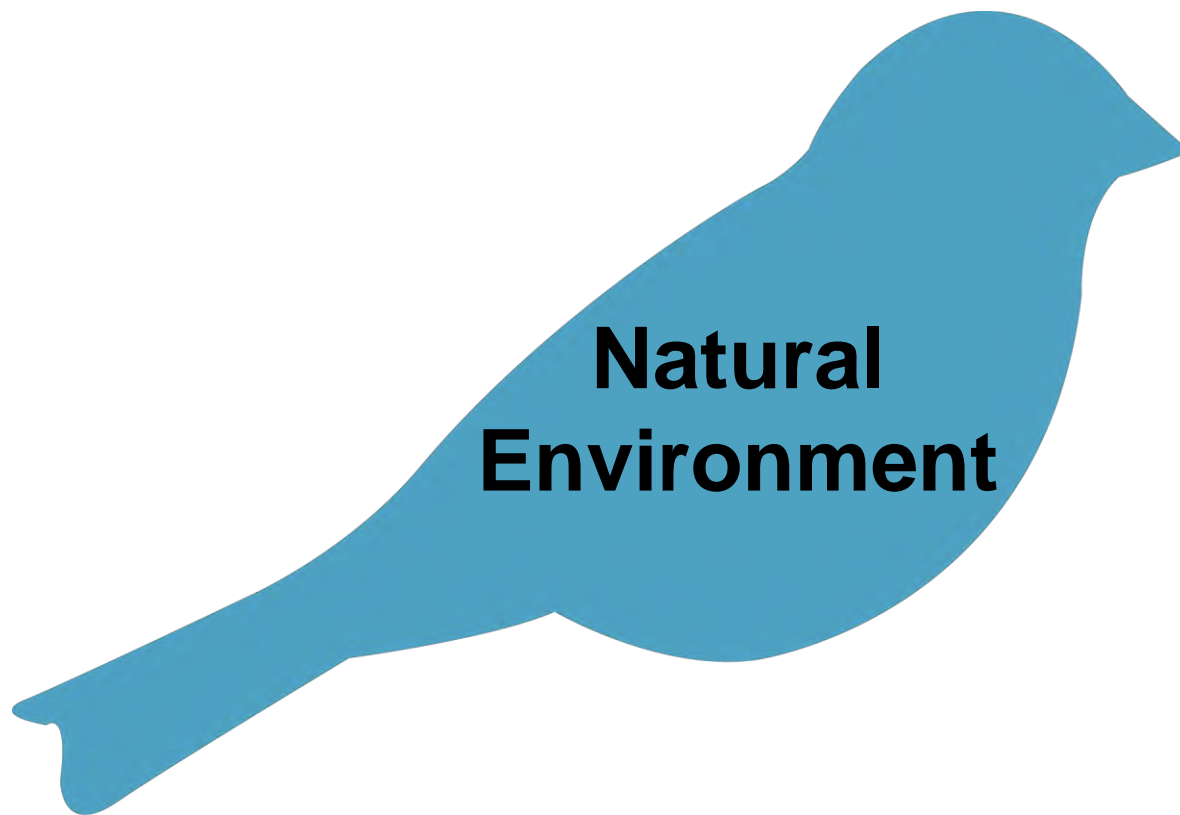
Data Reviewed, Within Study Area	Data Reviewed, Not Within Study Area
Single Family Residential Zoning	Cultural/Historic Resources
Multi Family Residential Zoning	Areas of property disputes
Urban Recreation Zoning	Open space taxation parcels
Parcel Size < 5 acres	Airports
Local Parks	Scenic Highways
Native Growth Protection Areas	Surface Mining
View Corridors (Redmond)	Parcels Fronting Local Access Streets

Single Family Residences



Schools and Parks



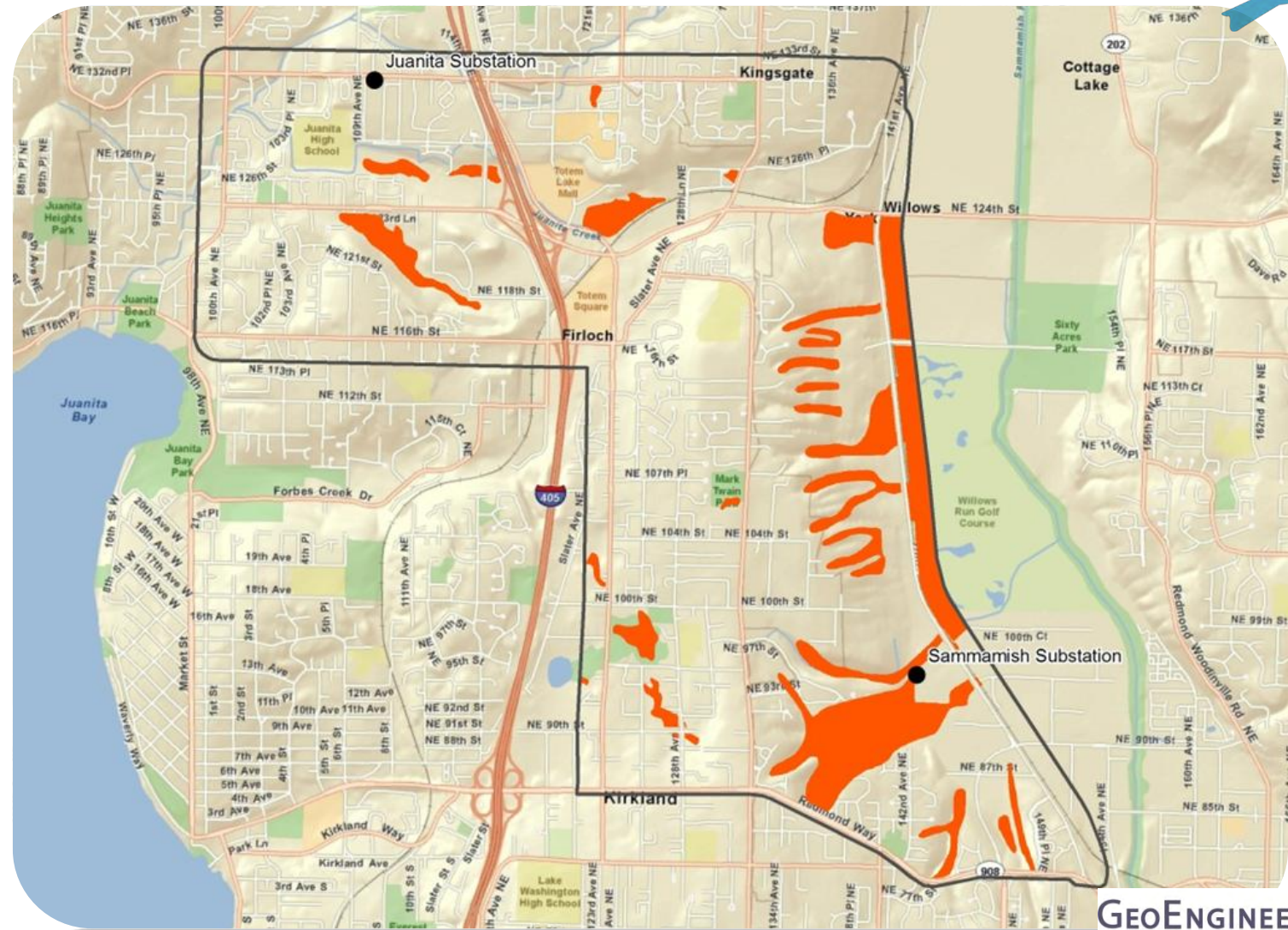




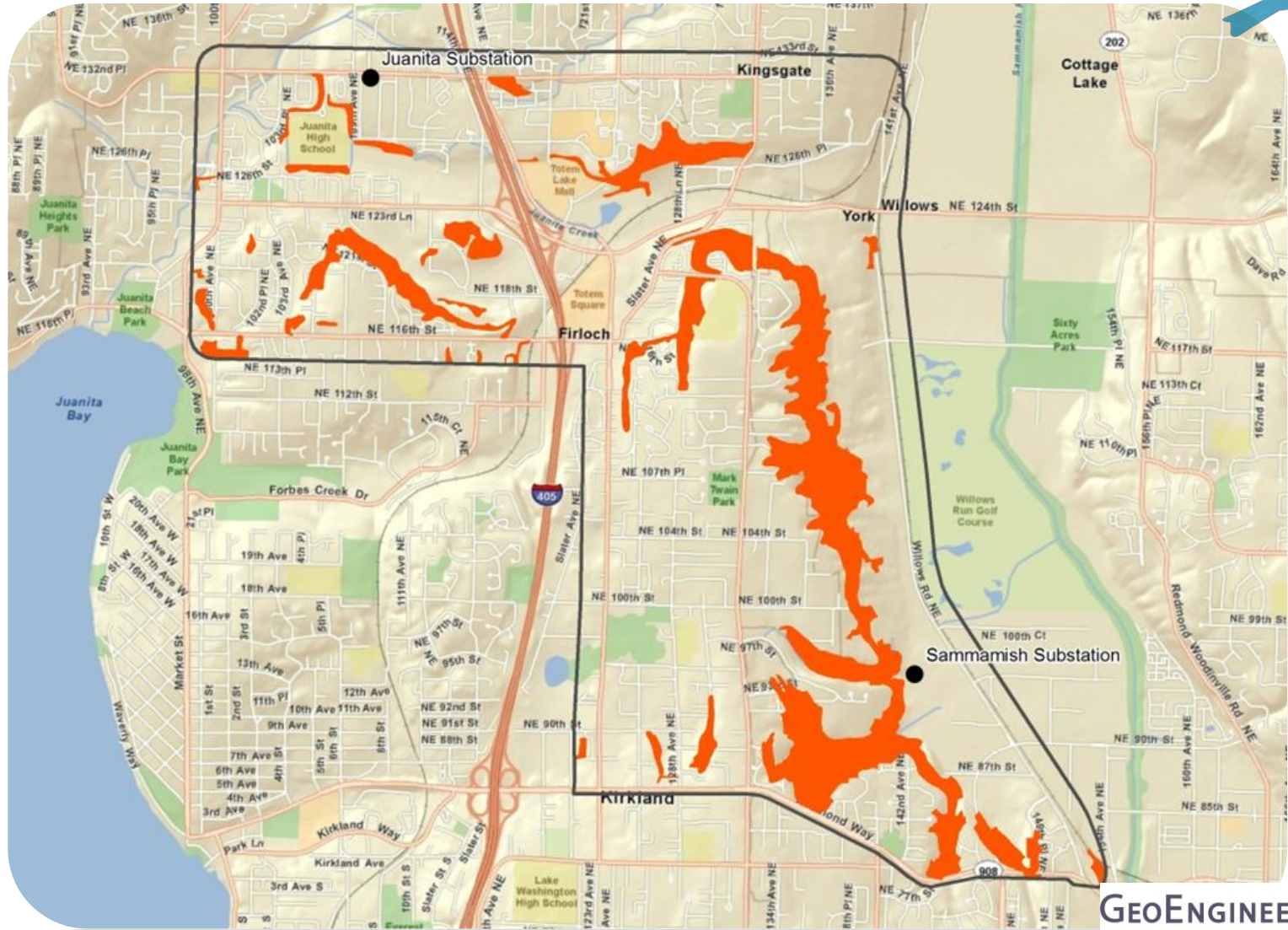
■ Natural Environment Data Layers

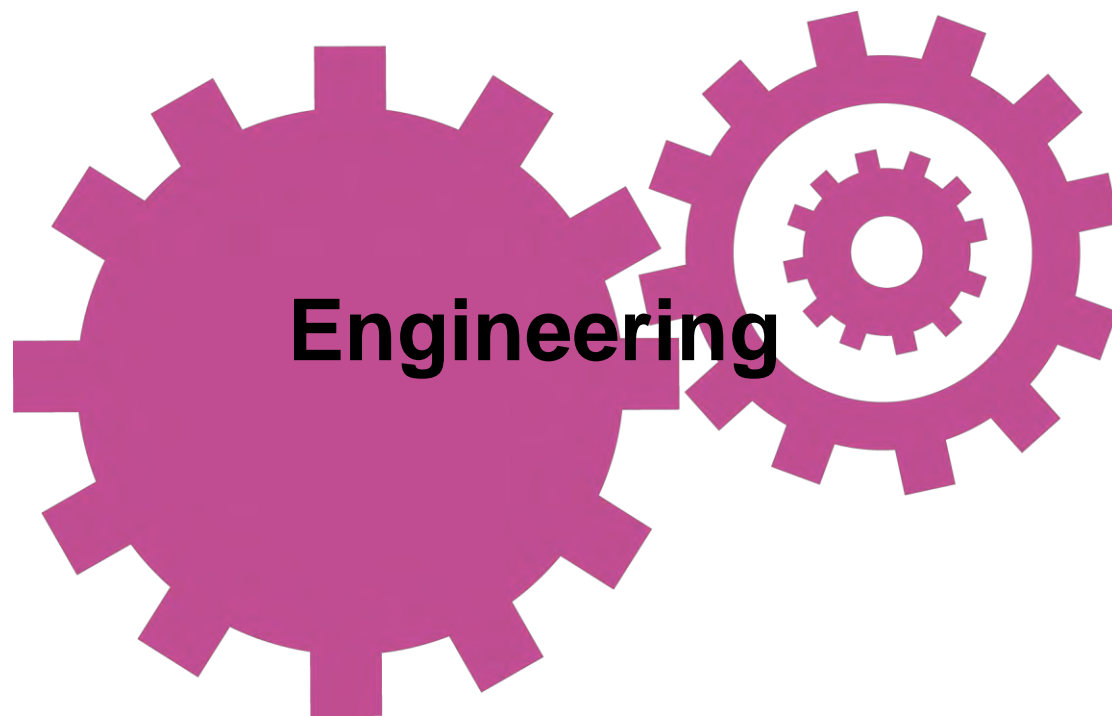
Data Reviewed, Within Study Area		Data Reviewed, Not within Study Area
Wetlands	Shoreline Jurisdiction	WA Natural Heritage Program areas
Landslide Hazards	Lakes	
Seismic Hazards	100 year floodplain	
Erosion Hazards	Contiguous Tree Canopy	
Streams		
Steep Slopes >40%		
Sensitive Species (WDFW)		

Wetlands



Landslide Hazards



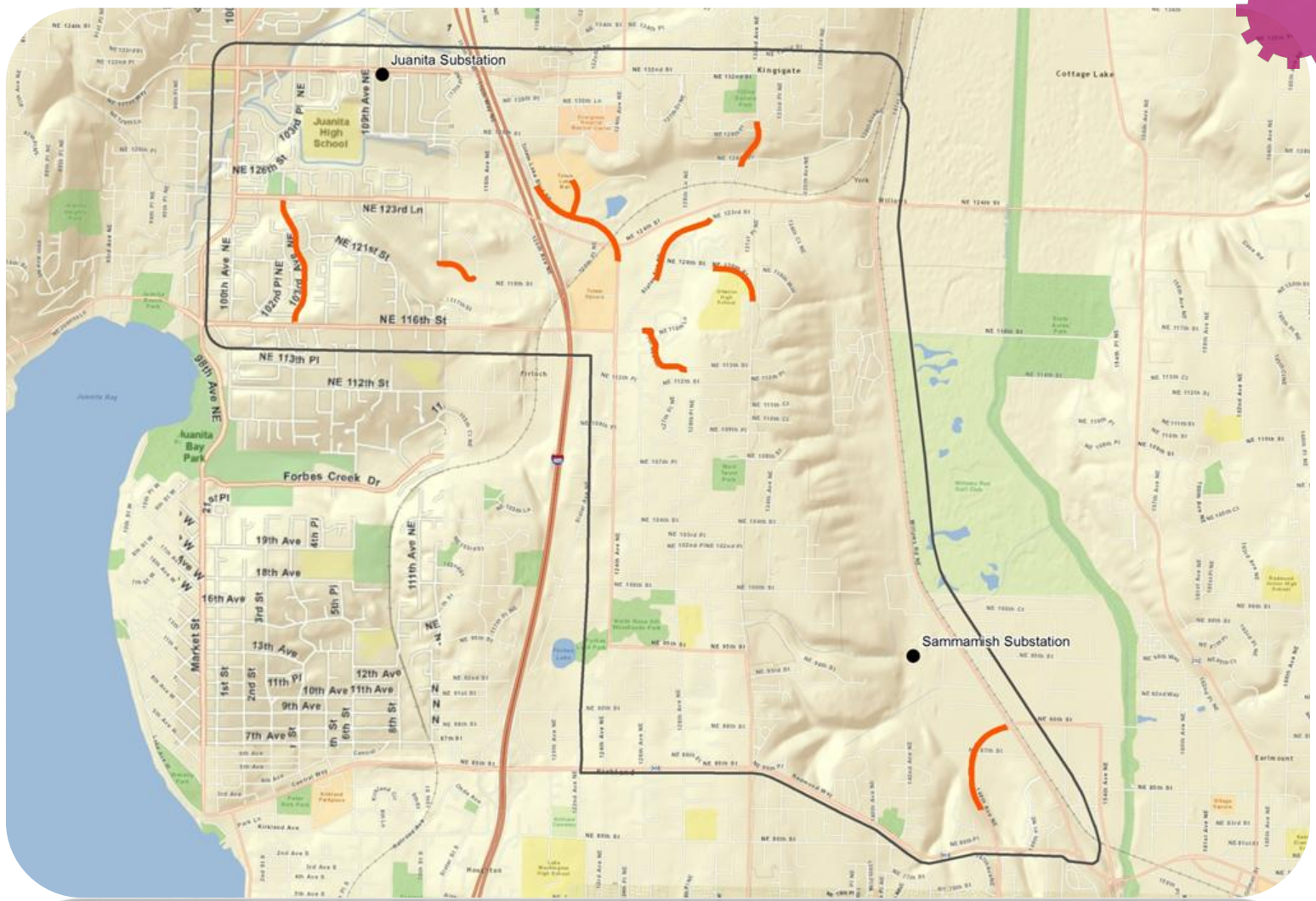


- Engineering Data Layers

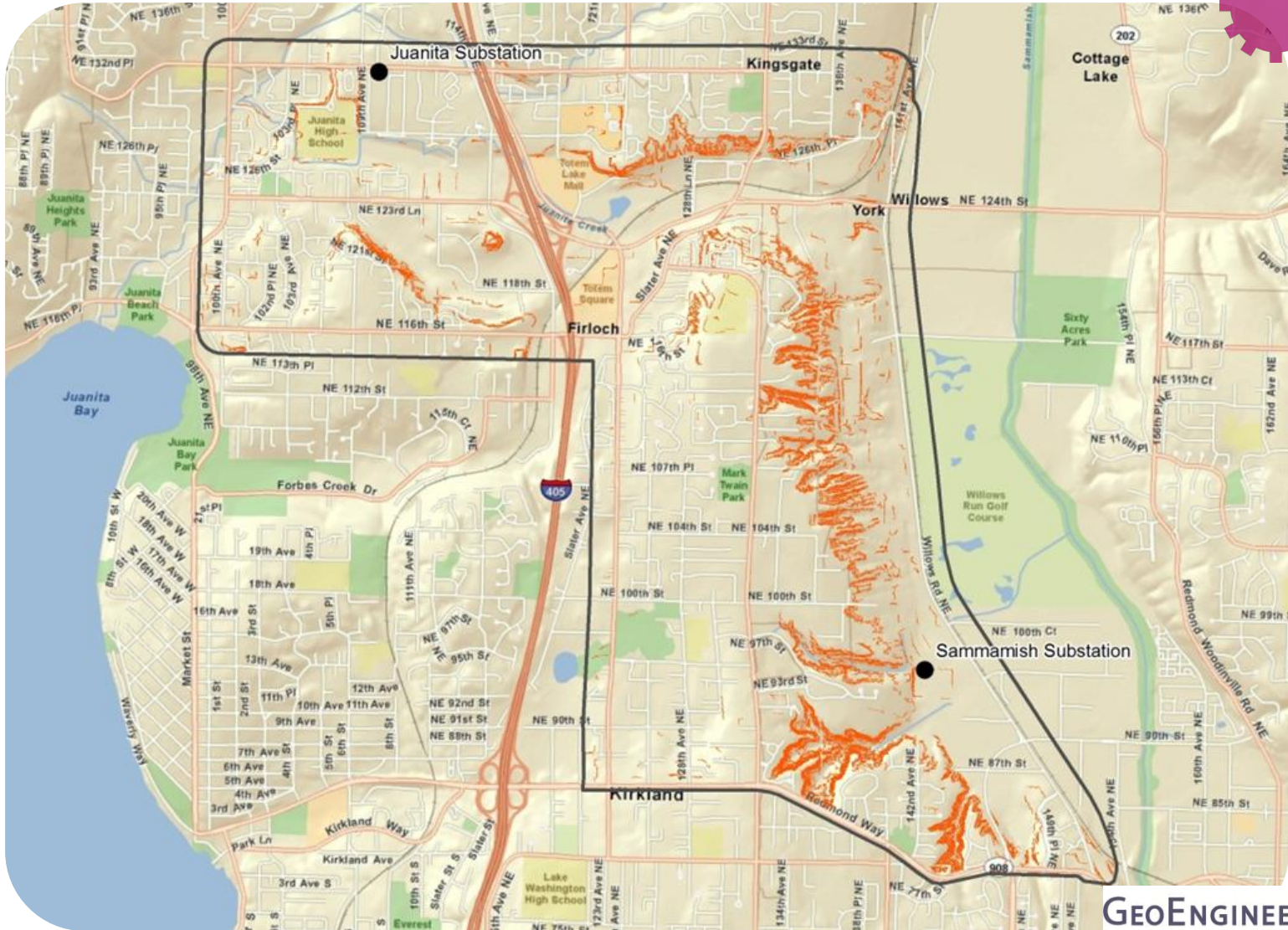


Data Reviewed, Within Study Area	Data Reviewed, Not Within Study Area
Curved Streets	BPA Crossing
Structures within 15' of R/W	Future WSDOT Improvement areas
Parcels not adjacent to Public R/W	
Interstate Highway Crossing	
Steep Slopes >40%	

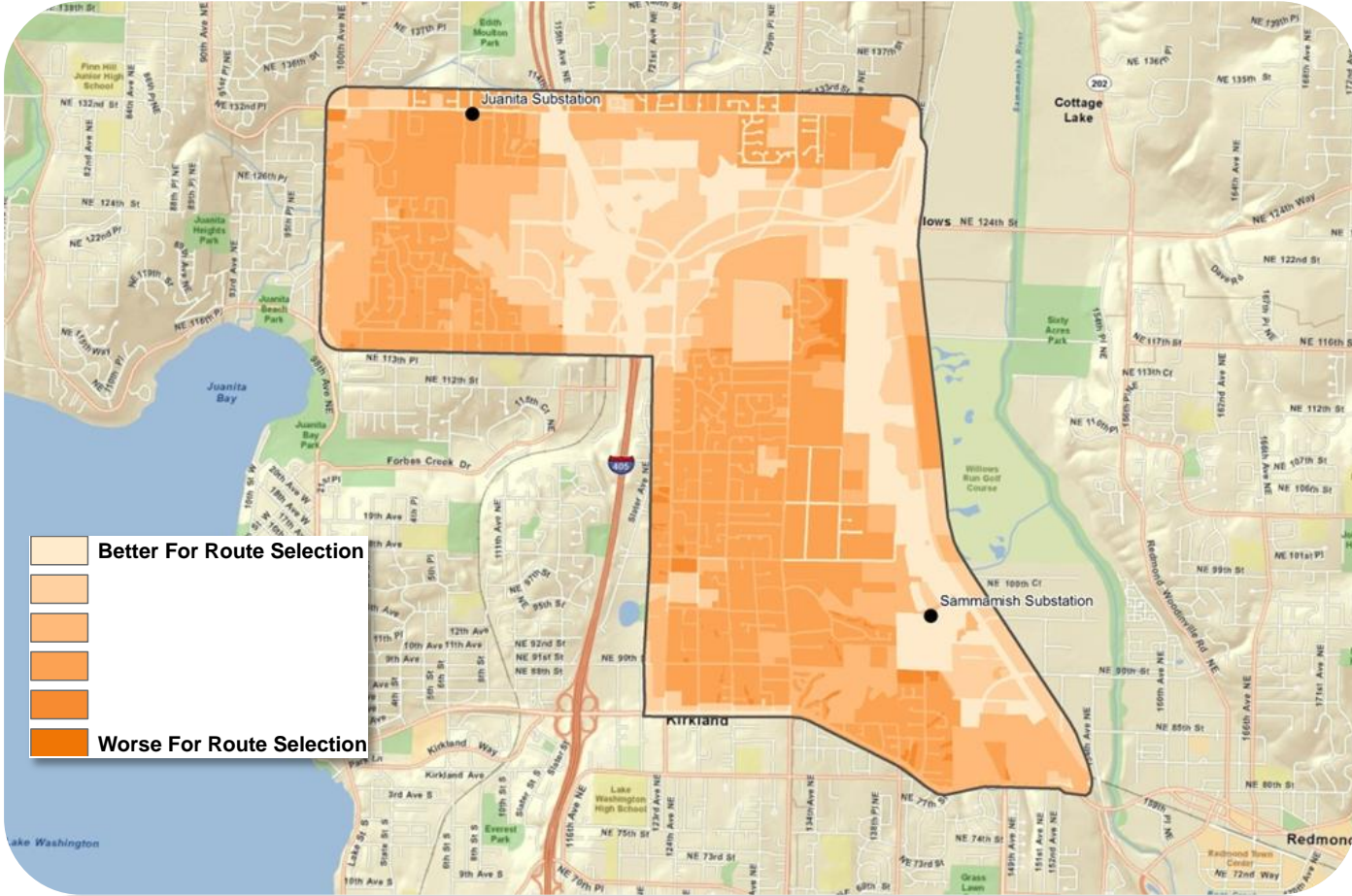
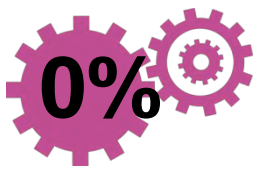
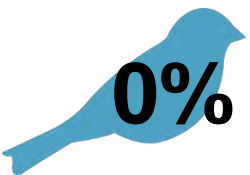
Street Curves



Steep Slopes >40%



Built Environment Criteria Most Important

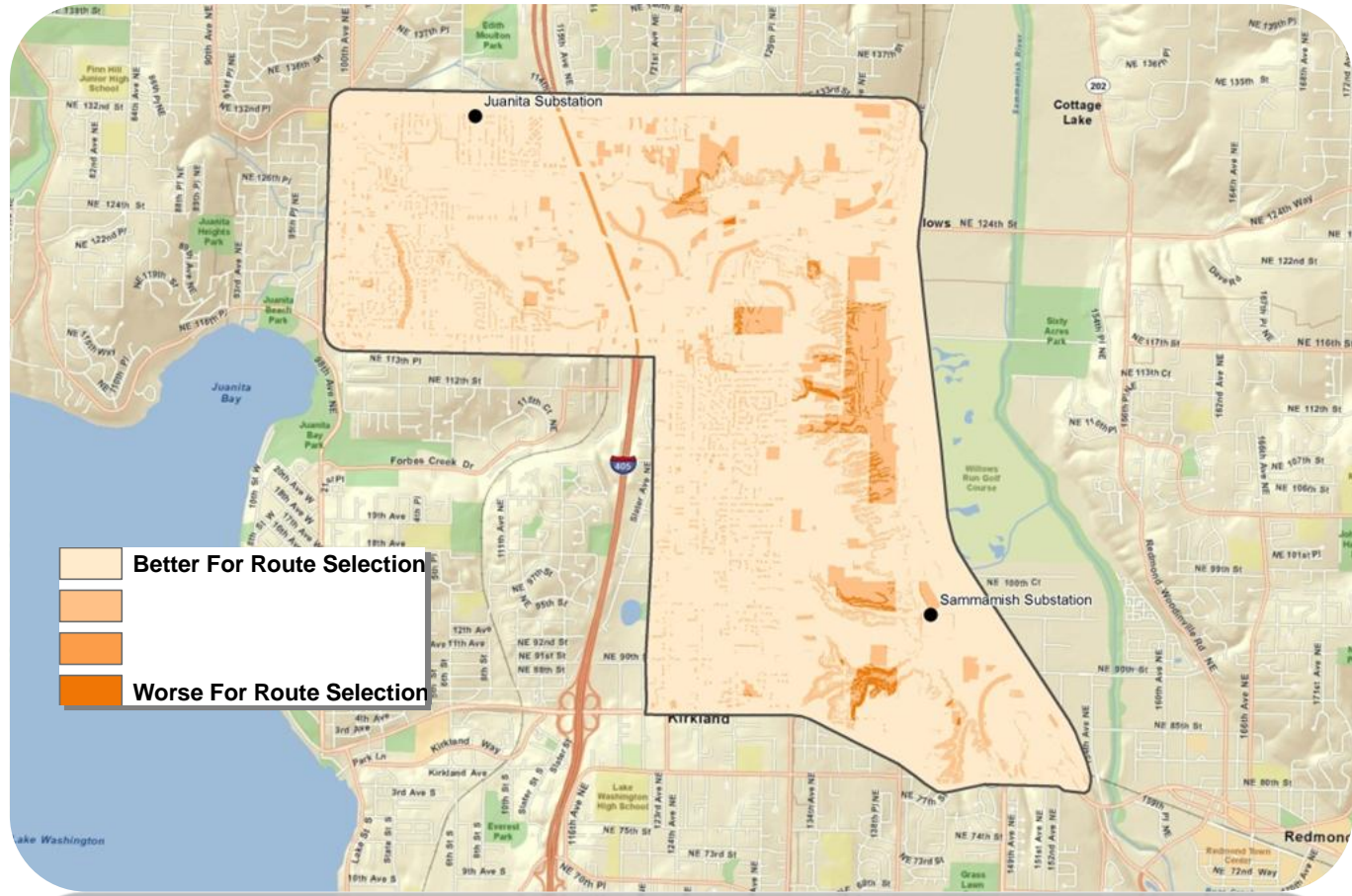


■ Engineering Criteria Most Important

0%

0%

100%





GEOENGINEERS Geo Route

115 kV Transmission Line Route Study
Sammamish – Juanita

Locating a route for a 115 kV transmission line that is compatible with:

- Sensitive Land Uses
- Sensitive Natural Features
- Engineering Design and Safety Standards
- Community Values

AVOIDANCE AREAS

IDENTIFY, WEIGHT, & MAP

Built Environment Layers

- Parks and Open Spaces (20%)
- Farmland (>5 Acres) (20%)
- Schools
- Native Forest Preserves Areas
- Scenic View Corridors
- Interstate Right-of-Way
- Zoning-Single Family
- Zoning-Multi Family

Natural Environment Layers

- Priority Habitat-Forest (15%)
- Priority Habitat-Wetlands (15%)
- Shoreline Management Areas (20%)
- Streams
- Flood Zones
- Lakes
- Streams with Risk
- Landfill Sites
- Wetlands
- Historic Resources
- Cultural Resources

Engineering Layers

- Interstate Right-of-Way (20%)
- SR corridors from Right-of-Way (20%)
- Steep Slopes (>4%)
- Facilities not adjacent to public Right-of-way (20%)

WEIGHTED AVOIDANCE AREAS
COMMUNITY INPUT

- Build Out Orders (10%)
- Material/Coal Surface (20%)
- Engineering Cost Orders (10%)



OPPORTUNITIES

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY AREAS
COMMUNITY INPUT

- Railroad Right-of-Way (10%)
- Existing Right-of-Way (20%)
- Arterial Streets (20%)
- Zoning-Industrial/Commercial
- Forest Size (>50 Acres)



COMBINED OPPORTUNITIES & AVOIDANCE AREAS

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY & AVOIDANCE AREAS
COMMUNITY INPUT

- Avoidances (20%)
- Opportunities (10%)



OUTPUT:
MAP OF ROUTE



OPPORTUNITIES

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY AREAS

COMMUNITY INPUT

- Railroad Right-of-Way (10%)
- Existing Right-of-Way (20%)
- Arterial Streets (30%)
- Zoning-Industrial/Commercial
- Parcel Size (>20 Acres)



MAP IT

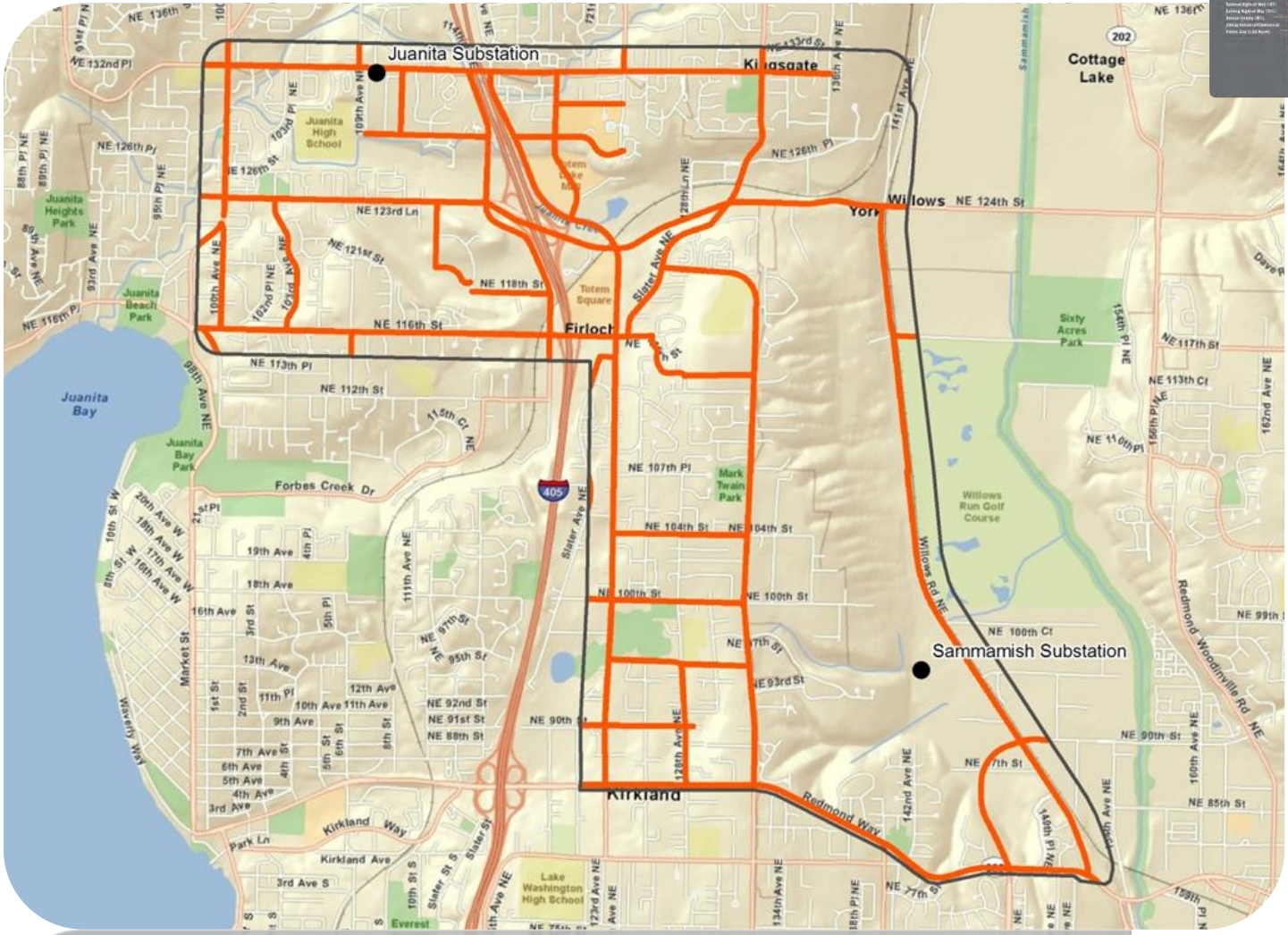


Opportunities Data Layers



Data Reviewed, Used for Modeling	Data Reviewed, Not Used for Modeling
Commercial/Industrial Zoning	Open Vegetative Cover
Arterial Street	Community Plan Compatibility
Trails R/W	
Railroad R/W	
Parcel size > 5 acres	
Existing PSE Rights-of-Way	

Arterial Streets

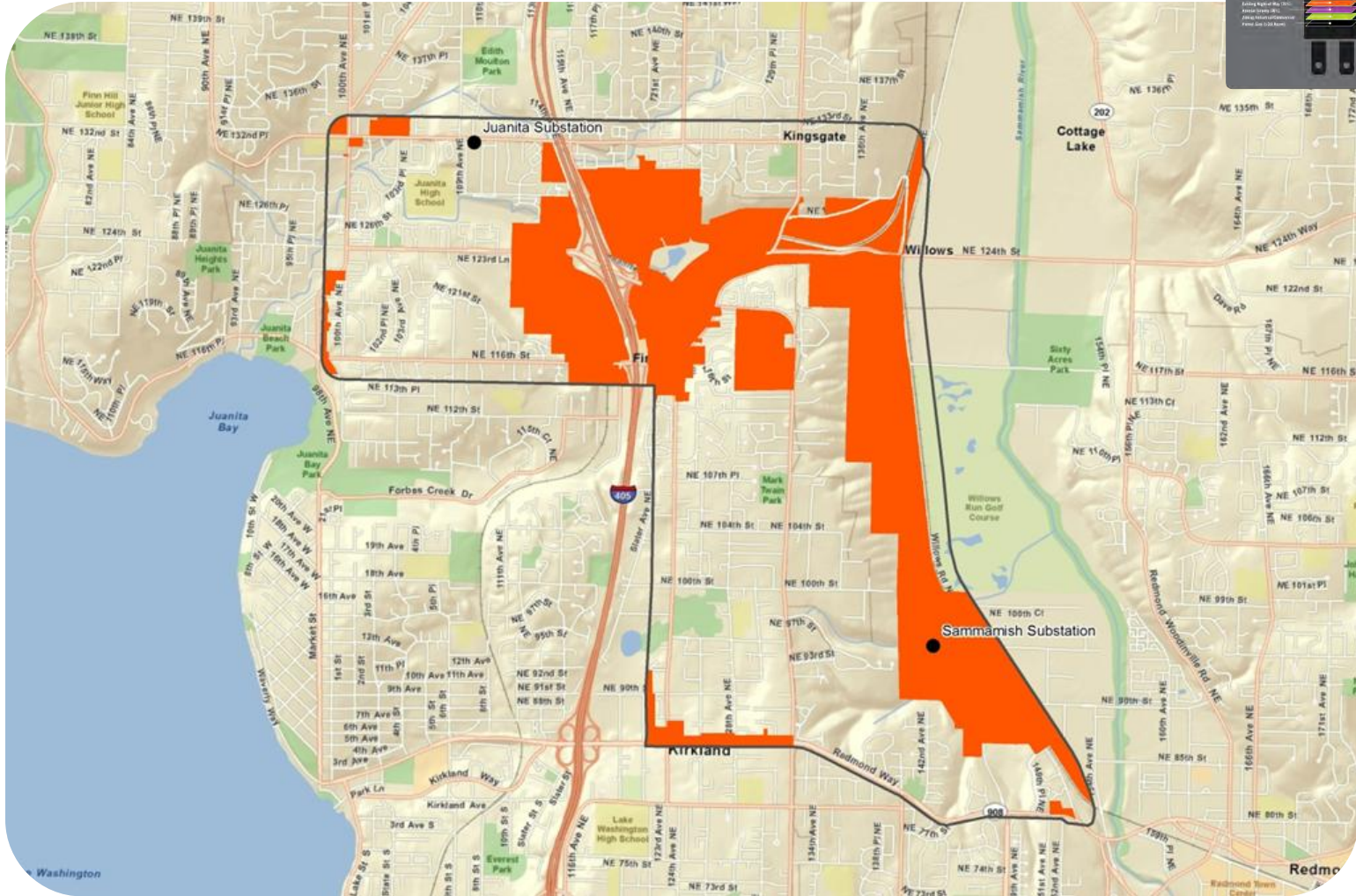


OPPORTUNITIES
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WEIGHTED OPPORTUNITY AREAS
COMMUNITY INPUT



Industrial/Commercial Zoning



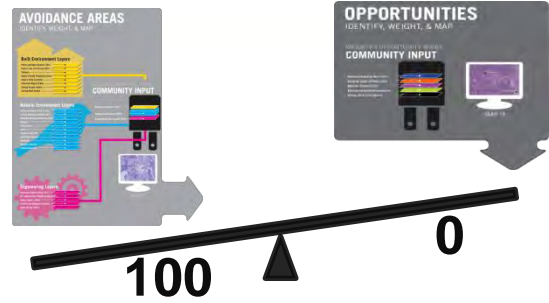
OPPORTUNITIES
IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY AREAS
COMMUNITY INPUT

MAP IT



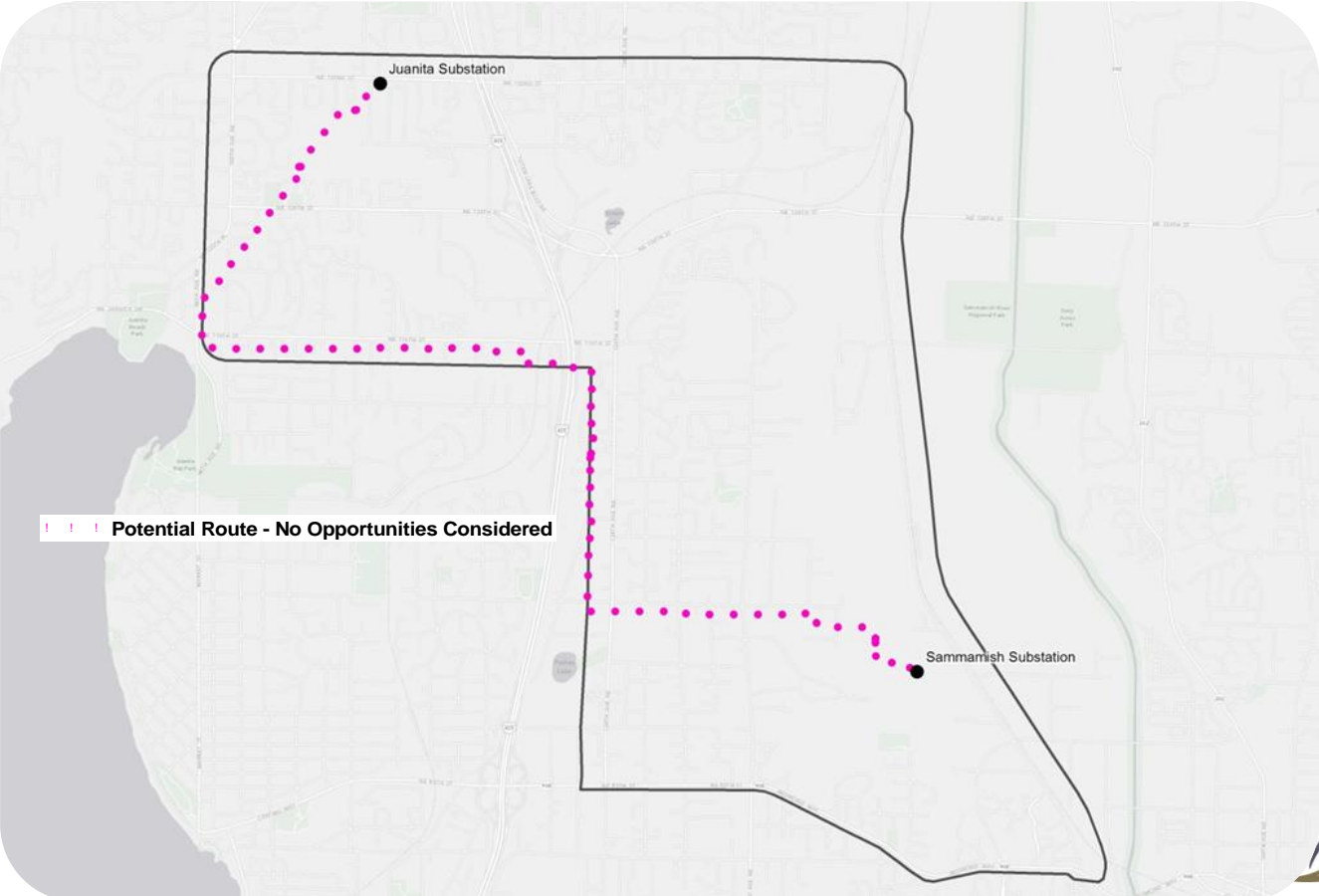
Engineering Criteria Most Important, No Opportunities Considered



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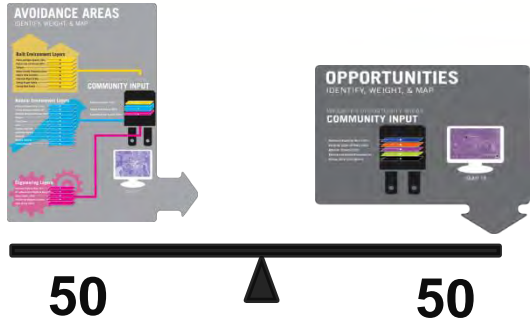
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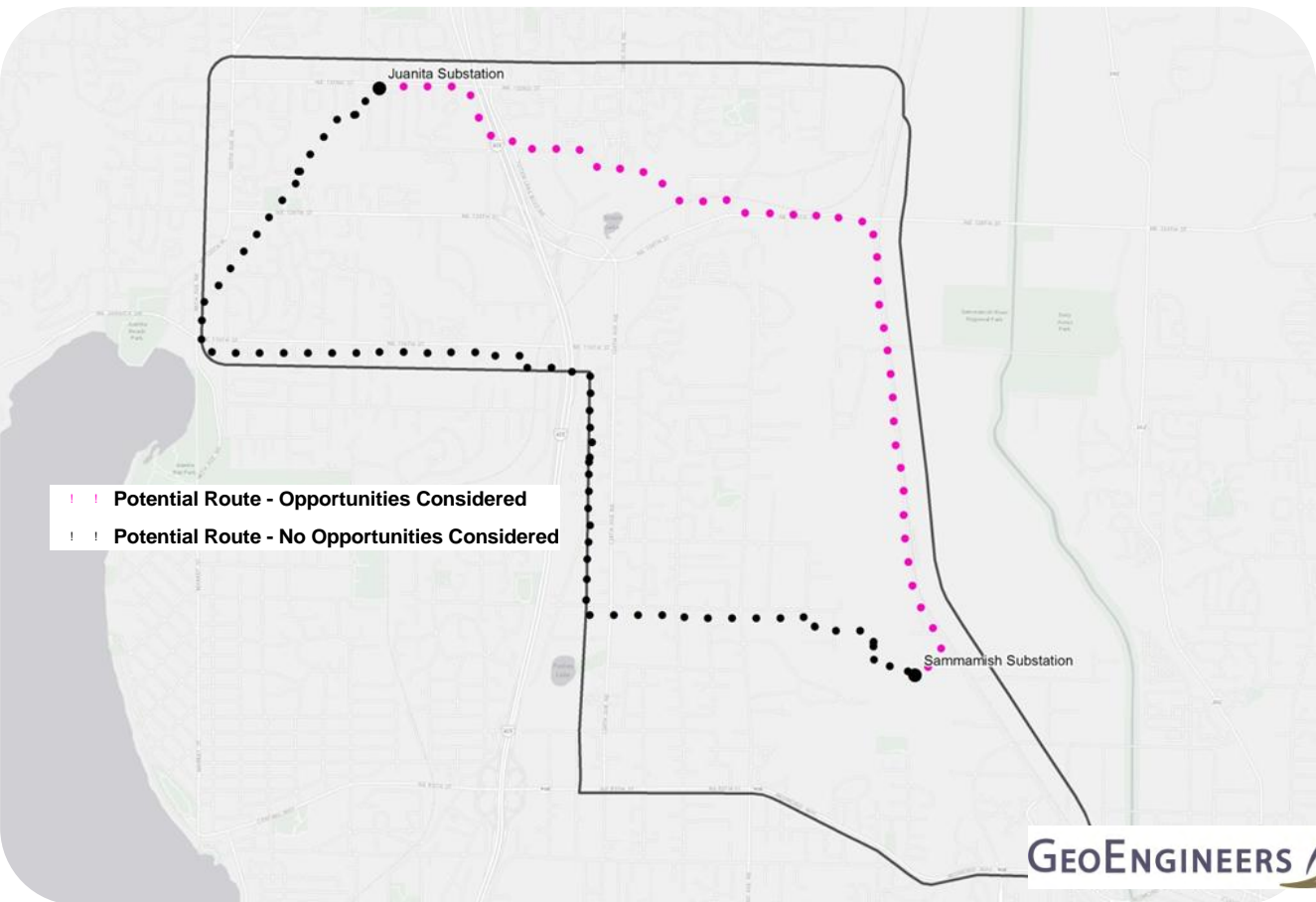
Engineering Criteria Most Important, Opportunities Considered



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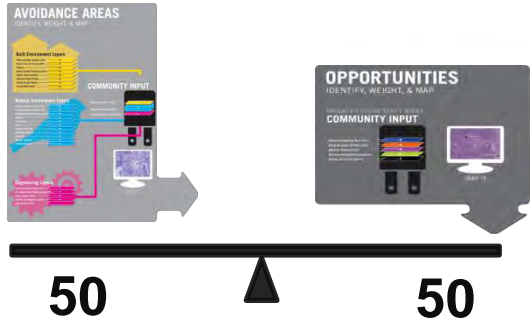
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Natural Environment Criteria Most Important, Opportunities Considered



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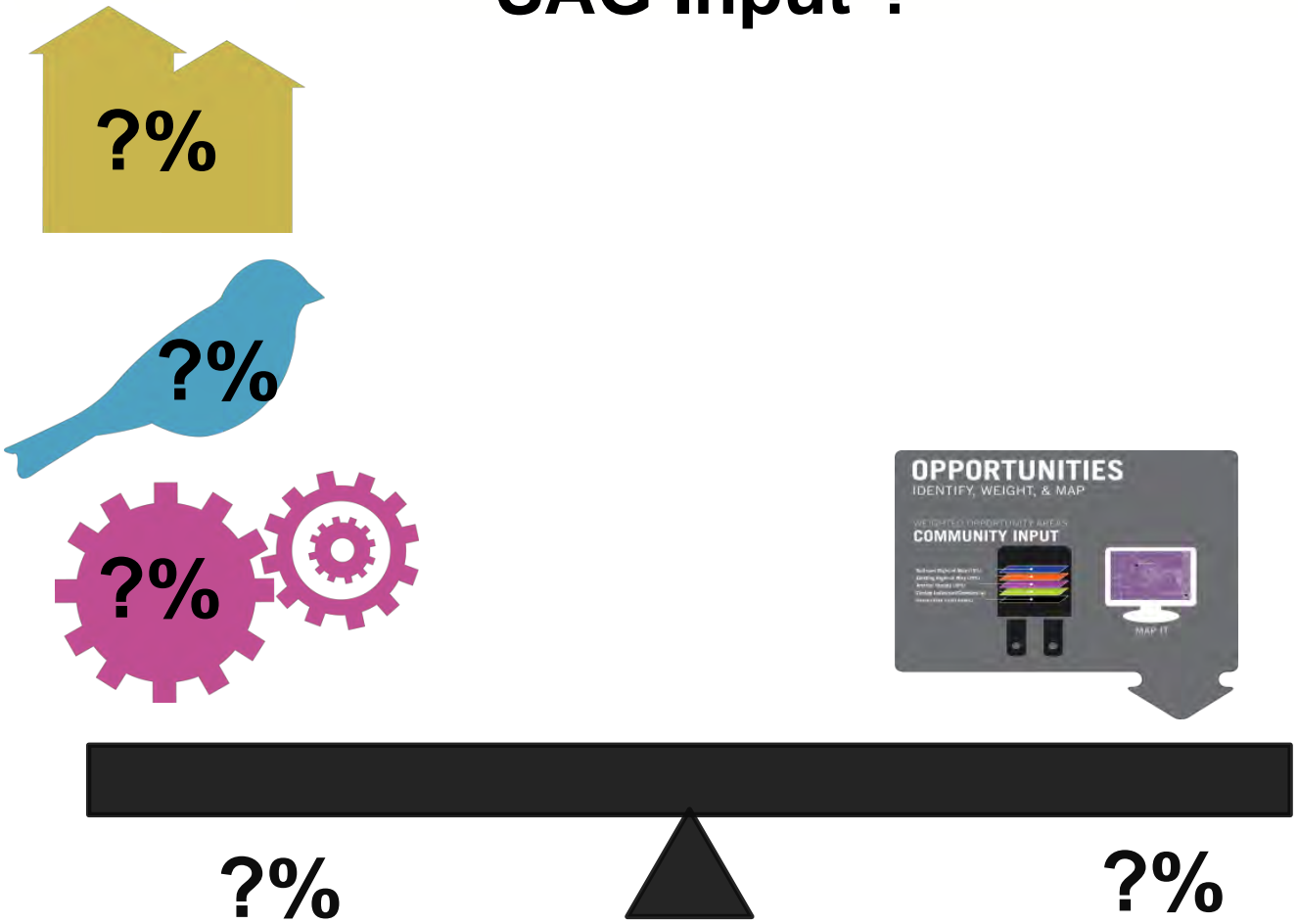
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SAG Input ?





Next steps

- Over the next two months PSE and the Advisory Group will:
 - Validate the model weighting and criteria
 - Develop and discuss possible alternatives
 - Narrow the alternatives to three potential alternatives for public review
- PSE will host an open house later this fall to ask the public for feedback on three potential route alternatives



Public comment from audience



Next meeting

- Before the meeting:
 - Review the criteria list and advise PSE if you think there are missing criteria that should be mapped
- During the Nov. 3 meeting, we will:
 - Discuss and validate the model's criteria and weights
 - Run the model to develop possible alternatives
 - Begin discussing alternatives



Mark your calendars for...

- Advisory group meetings
 - November 3
 - November 17

- Project area bus tour
 - October 28 from 2:00 p.m. to 4:00 p.m.
 - October 29 from 9:00 a.m. to 11:00 a.m.



Questions?

- **Sammamish-Juanita Project Contacts:**

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Thank You!