Sammamish-Juanita 115 kV Project

About the GeoRoute Model

PUGET SOUND ENERGY

Non-narrated presentation shown on loop

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%)
- Parcel size (<5 Acres) (15%)
- Schools
- Native Growth Protection Areas
- Scenic View Corridors
- Interstate Right-of-Way
- Zoning-Single Family
- Zoning-Multi Family

Natural Environment Layers

- Priority Habitats-Plants (15%)
- Priority Habitats-Animals (15%)
- Shoreline Management Areas (10%)
- Streams
- Flood Zones
- Lakes
- Streams with Fish
- Landslide Hazards
- Wetlands
- Seismic Hazards
- Erosion Hazards

Engineering Layers

- Interstate Right-of-Way (10%)
- 200' setbacks from Right-of-Way (20%)
- Steep Slopes >40%
- Parcels not adjacent to public Right-of-way (30%)

WEIGHTED AVOIDANCE AREAS

COMMUNITY INPUT

- Built Cost Surface (10%)
- Natural Cost Surface (90%)
- Engineering Cost Surface (10%)

MAP IT

OPPORTUNITIES

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY AREAS

COMMUNITY INPUT

- Railroad Right-of-Way (15%)
- Existing Right-of-Way (25%)
- Arterial Streets (35%)
- Zoning-Industrial/Commercial
- Parcel Size (>10 Acres)

MAP IT

COMBINED OPPORTUNITIES & AVOIDANCE AREAS

IDENTIFY, WEIGHT, & MAP

WEIGHTED OPPORTUNITY & AVOIDANCE AREAS

COMMUNITY INPUT

- Avoidance (60%)
- Opportunities (40%)

OUTPUT: MAP OF ROUTE

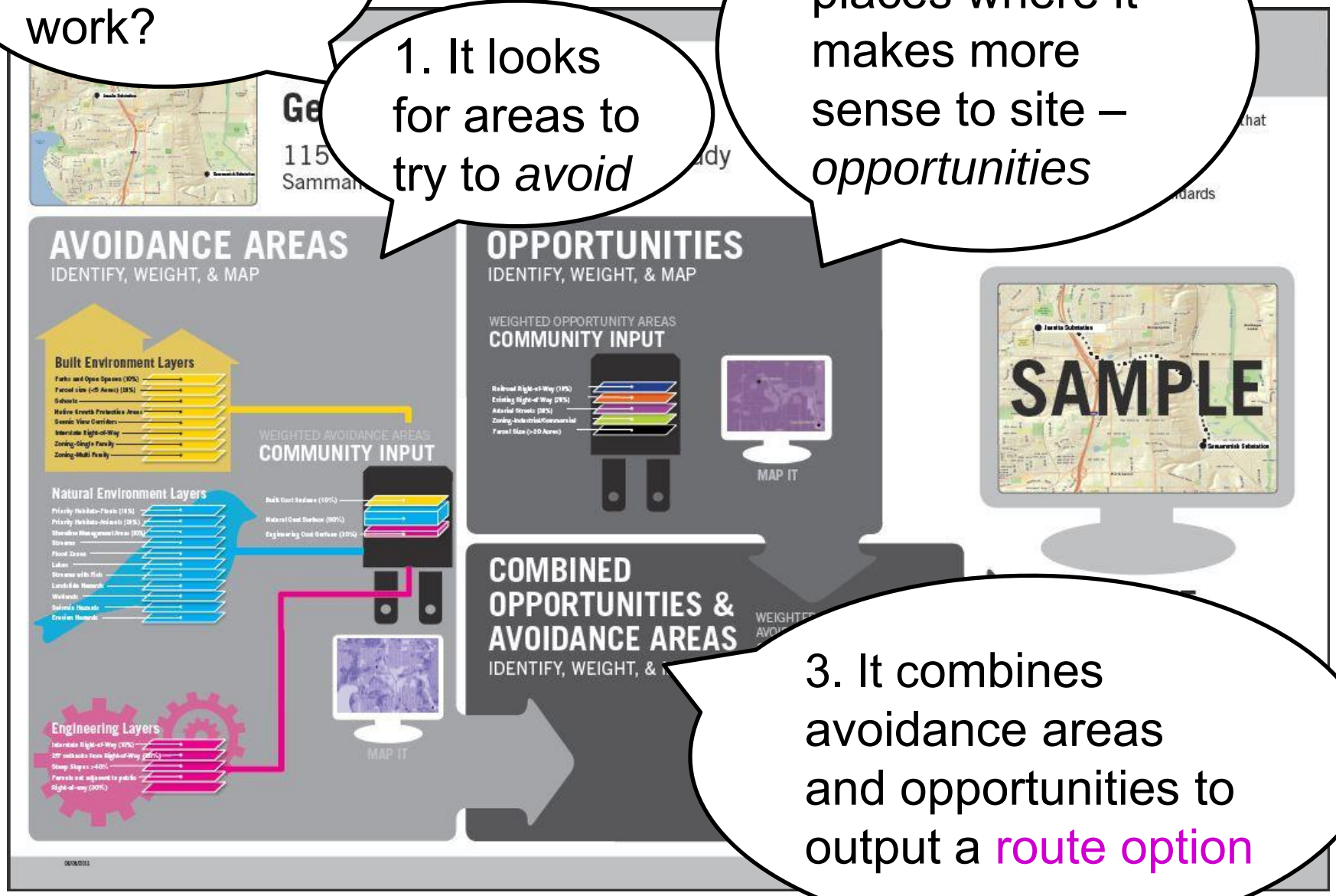
08/08/2011

PUGET SOUND ENERGY

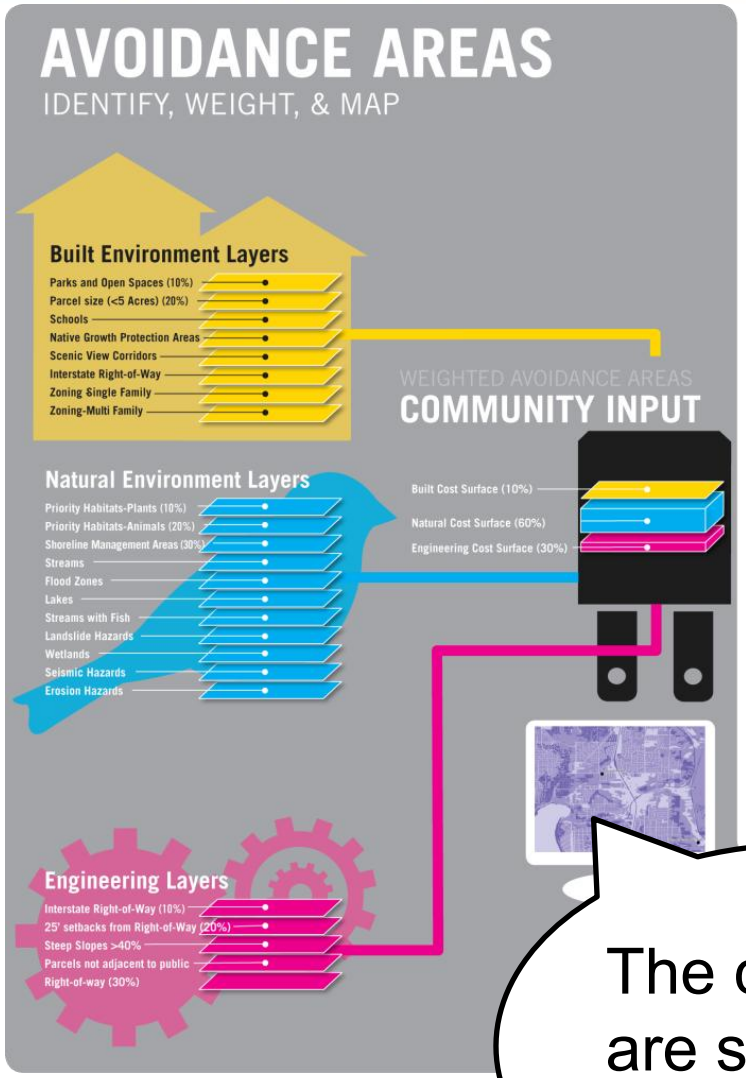
How does a siting model work?

1. It looks for areas to try to *avoid*

2. It considers places where it makes more sense to site – *opportunities*



3. It combines avoidance areas and opportunities to output a route option

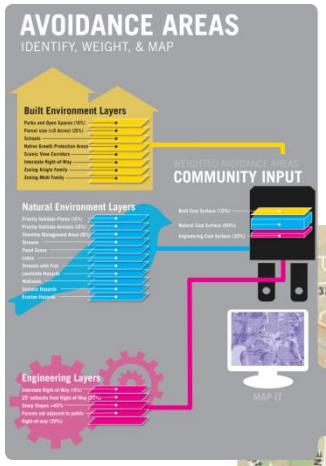


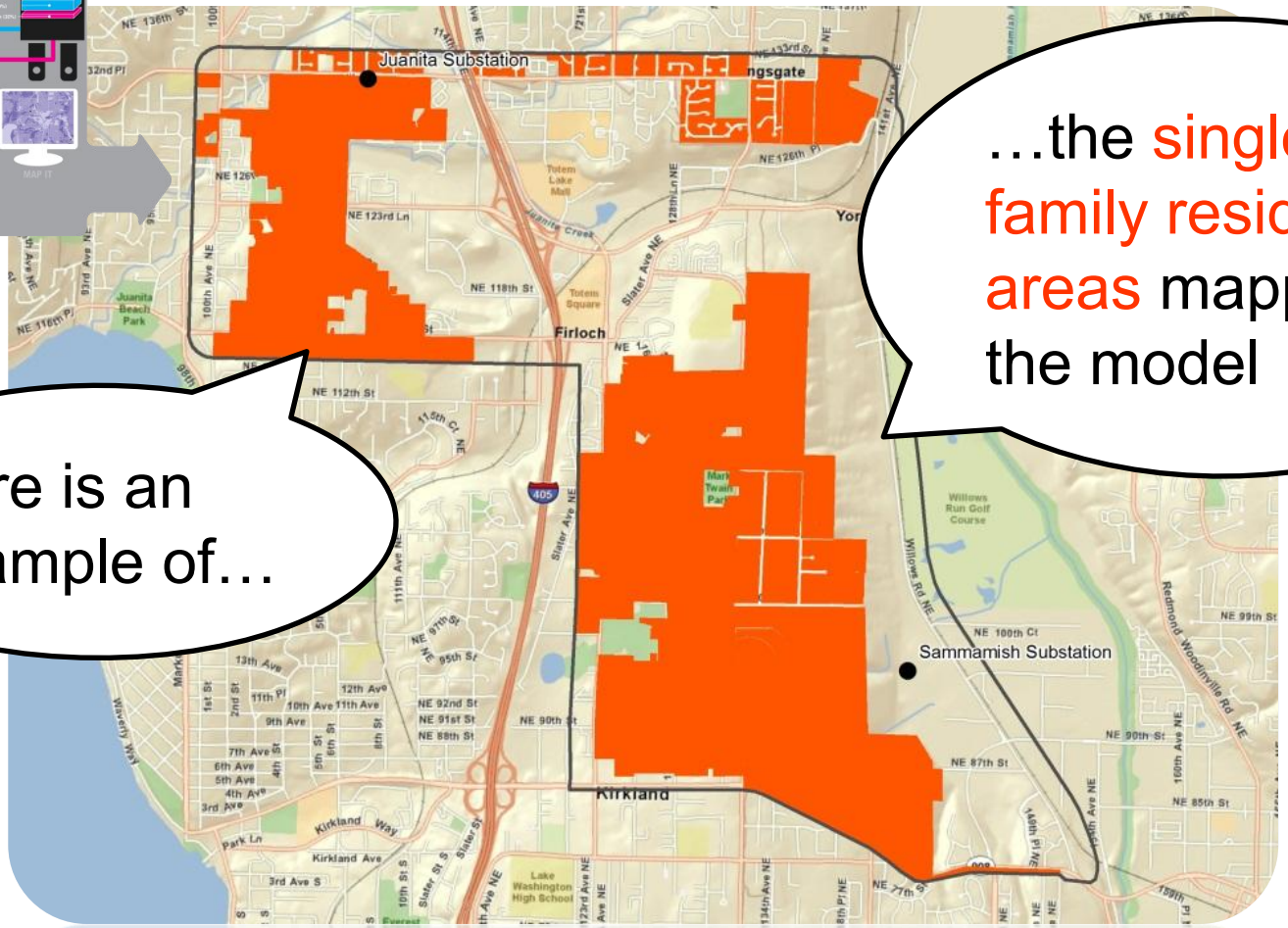
- Avoidance areas are:
  - Built environment criteria
    - single family residential, schools, parks, etc
  - Natural environment criteria
    - wetlands, contiguous tree canopy, etc
  - Engineering criteria
    - curved streets, steep slopes, etc

The criteria are shown as layers of data

Non-narrated presentation shown on loop

Mapping Avoidance Areas:
Single Family Residential





Here is an example of…

…the single family residential areas mapped in the model

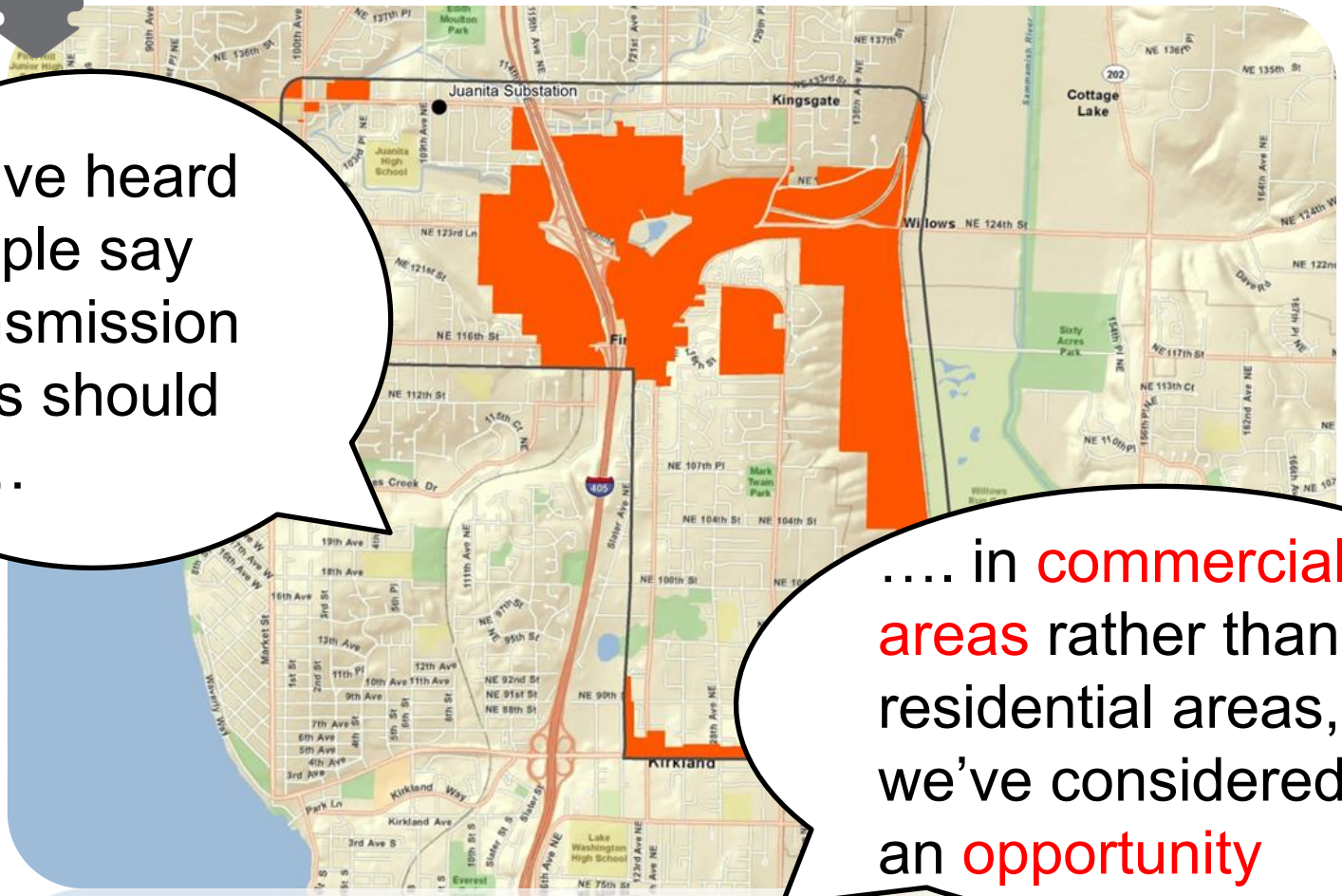
Non-narrated presentation shown on loop

- Opportunity areas include:
  - PSE-owned rights of way
  - Commercial / industrial areas
  - Parcels > 20 acres

Opportunities are also mapped as layers

Mapping Opportunities:
Commercial / Industrial Zoning

We've heard people say transmission lines should be…



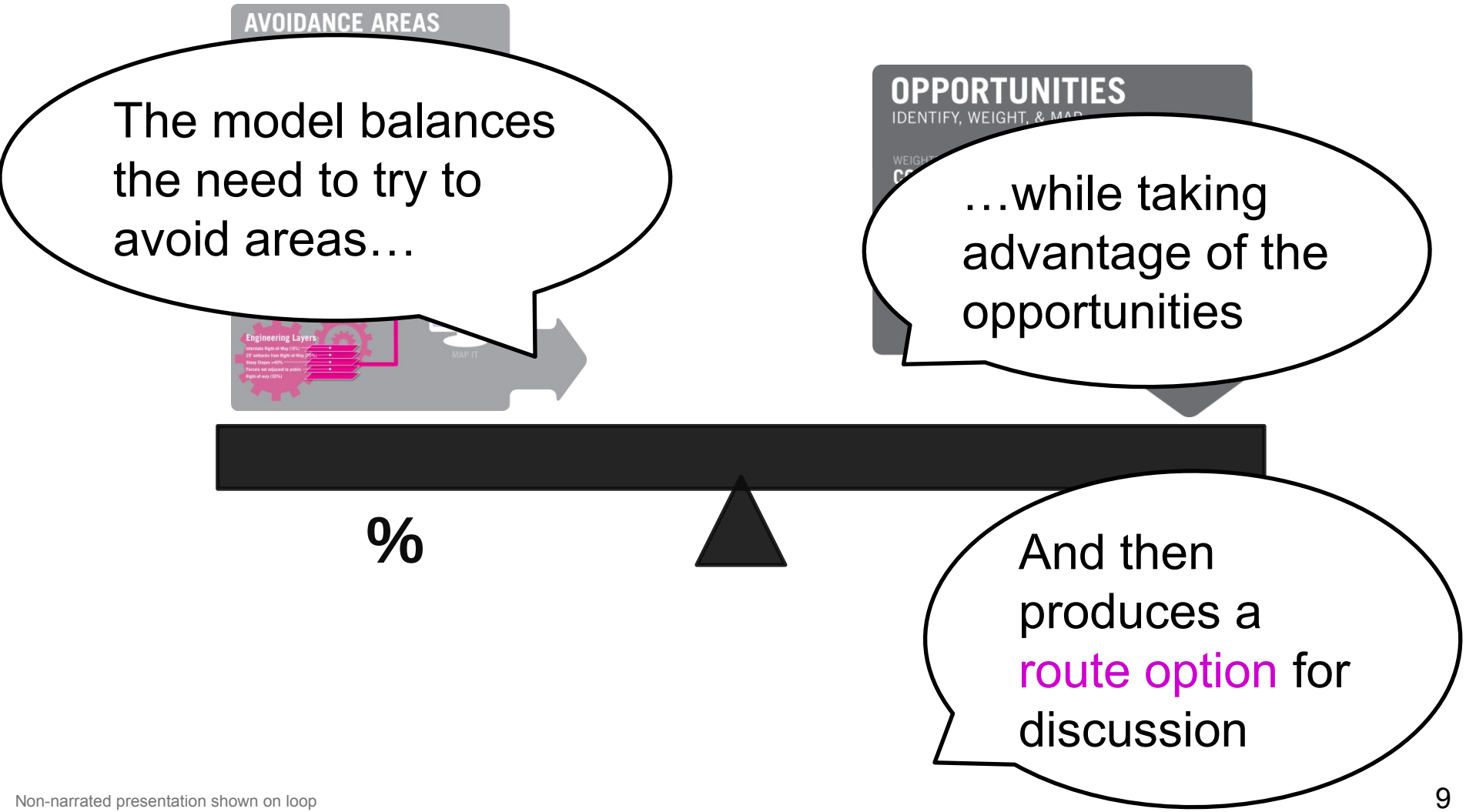
…. in commercial areas rather than residential areas, so we've considered it an opportunity

Non-narrated presentation shown on loop

Putting it all together…

Non-narrated presentation shown on loop

Putting it all together…



Using the model outputs…

- It is up to the advisory group and PSE to:
  - Interpret the model outputs
  - Consider community input
  - Develop possible route alternatives for community review
  - Identify a preferred alternative for community review

People, not the model, select the route

Now watch the model run

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WEIGHTED AVOIDANCE AREAS
COMMUNITY INPUT

- Built Cost Surface (10%)
- Natural Cost Surface (60%)
- Engineering Cost Surface (30%)

MAP IT

Engineering Layers

- Interstate Right-of-Way (10%)
- 25' setbacks from Right-of-Way (20%)
- Steep Slopes >40%
- Parcels not adjacent to public Right-of-way (30%)

OPPORTUNITIES

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WEIGHTED OPPORTUNITY AREAS
COMMUNITY INPUT

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- Zoning-Industrial/Commercial
- Parcel Size (>20 Acres)

MAP IT

COMBINED OPPORTUNITIES & AVOIDANCE AREAS

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WEIGHTED OPPORTUNITY & AVOIDANCE AREAS
COMMUNITY INPUT

- Avoidance (60%)
- Opportunities (40%)

OUTPUT: MAP OF ROUTE

PSE PUGET SOUND ENERGY

GeoRoute Model Criteria and Weightings

Avoidance Areas: Built Environment

Data Reviewed, Within Study Area	Weighting	Data Sources
Single-Family Residential Zoning	20%	Redmond, Kirkland
Multi-Family Residential Zoning	15%	Redmond, Kirkland
Urban Recreation Zoning	10%	Redmond
Native Growth Protection Easement	15%	Redmond, Kirkland
Parcel Size < 5 acres	7%	Redmond, Kirkland
Local Parks	8%	Redmond, Kirkland
Mapped View Corridors	5%	Redmond, Kirkland
Area of known WSDOT Improvements	10%	PSE
School Parcels	10%	Redmond, Kirkland
Total	**100%**	

Avoidance Areas: Natural Environment

Data Reviewed, Within Study Area	Weighting	Data Sources
Wetlands < 1 acre	5%	Redmond, Kirkland
Wetlands > 1 acre	10%	Redmond, Kirkland
Landslide Hazard	10%	Redmond, Kirkland
Erosion Hazard	10%	Redmond, King County
Seismic/Liquefaction Hazard	5%	Redmond, Kirkland
Steep Slopes	10%	LiDAR derived from Puget Sound LiDAR Consortium
Stream, non-fish bearing (PHS)	5%	Redmond, Kirkland, WA Dept F&W
Stream, fish-bearing (PHS)	10%	Redmond, Kirkland, WA Dept F&W
Priority Habitat and Species (PHS) Polygons	15%	WA Dept F&W
Shoreline Jurisdiction	0%	Kirkland, King County
Lakes (included in wetlands)	0%	Redmond, Kirkland
100-yr floodplain	10%	Redmond, Kirkland
Contiguous Tree Canopy >10 acres	10%	Kirkland, digitized from aerial photos
Total	**100%**	

Avoidance Areas: Engineering Considerations

Data Reviewed, Within Study Area	Weighting	Data Sources
Interstate Highway Crossing	30%	King County
Parcel not adjacent to Public R/W	15%	Redmond, Kirkland
Buildings within 15' setback of R/W	20%	Redmond, Kirkland
Steep Slopes	20%	LiDAR derived from Puget Sound LiDAR Consortium
Street Curves	15%	Redmond, Kirkland
Total	**100%**	

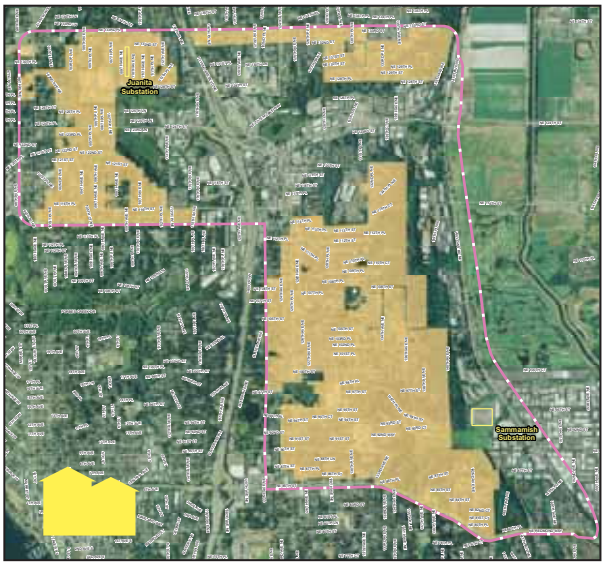
Opportunities

Data Reviewed, Used for Modeling	Original Weighting	11/28/11 Weighting	Data Sources
W/in Commercial, Industrial Zoning District	15%	20%	Redmond, Kirkland
Adj. to Arterial Street	25%	25%	Redmond, Kirkland
Adj. or w/in Regional Trail Rights of Way	10%	0%	Redmond, Kirkland
Adj. to Railroad Rights of Way	10%	10%	Redmond, Kirkland
Parcel Size > 20 acres	10%	10%	Redmond, Kirkland
PSE Ownership/Rights of Way	15%	15%	Redmond, Kirkland
Overhead Distribution	15%	20%	Redmond, Kirkland
Total	**100%**	**100%**	

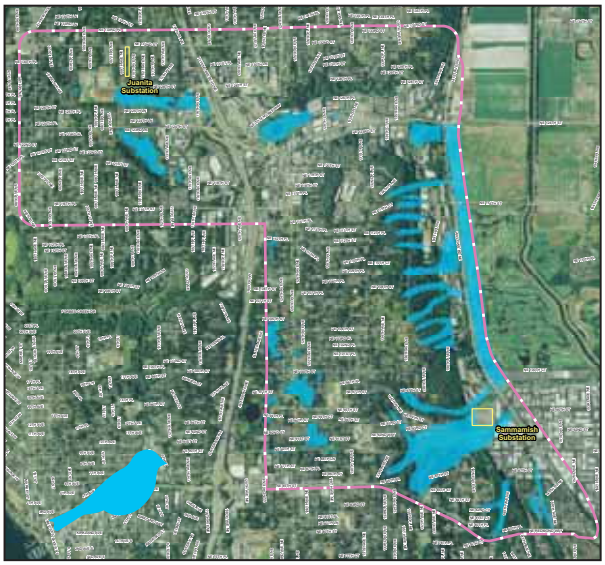
PSE PUGET SOUND ENERGY

Example Layers in GeoRoute Model

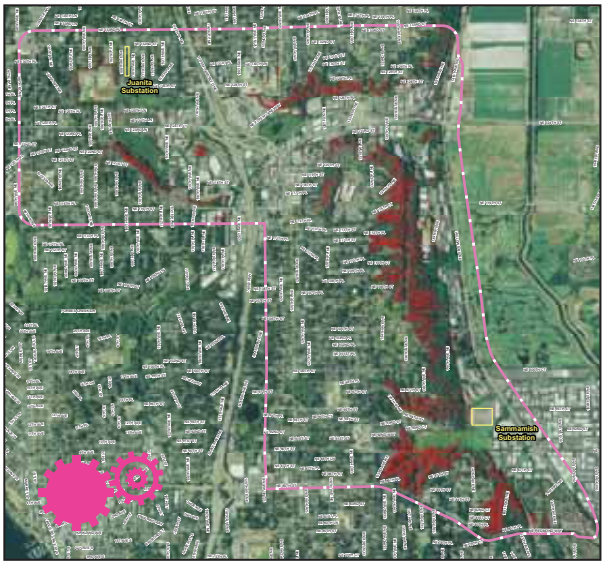
Single Family Residences:



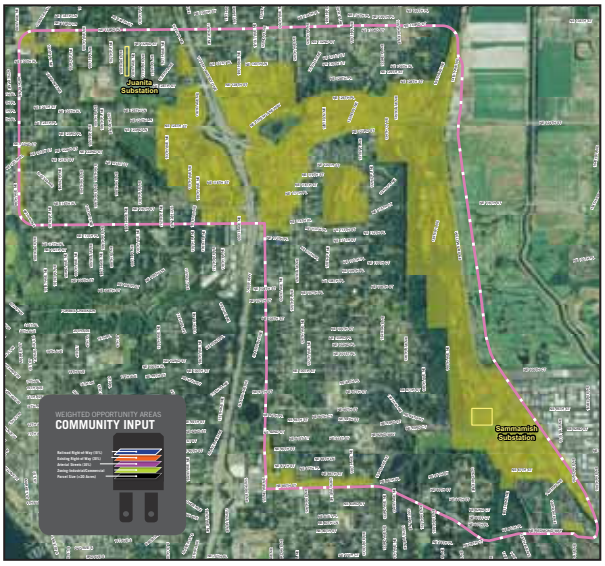
Wetlands:



Steep Slopes:



Commercial and Industrial:



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