Potential Route Segments

Fall 2013

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PSE PUGET SOUND ENERGY

PUGET SOUND ENERGY

Community Advisory Group Process

- Community Advisory Group
- Sub-Area Committees
- Community Meetings
- Puget Sound Energy

1 Education

Learn about electric system and project need

Feedback on project need, potential segments and route selection process

- Discuss community concerns
- Learn about the factors involved in developing the route segments
- Bus tour of project area

2 Identify route options

Develop sub-area segment combinations for full Community Advisory Group discussion

Develop potential route options based on input from sub-area committees

Feedback on potential route options

3 Recommended route

- Weight community values for evaluation process
- Narrow route options to one recommended route

Feedback on Community Advisory Group recommended route

Consider public input and validate recommended route

4 Preferred route

- Further evaluate requirements and constraints
- Select the preferred route to move forward for final design, environmental review and permitting

Community Advisory Group and Sub-Area Committee Process

Community Advisory Group

- Looks across the entire project area for system-wide issues and concerns
- Relies on Sub-Area Committees for recommendations on geographic, neighborhood-specific issues and concerns
- Uses input to recommend route to PSE

Sub-Area Committee: Redmond/Kirkland

Sub-Area Committee: Bellevue

Sub-Area Committee: Newcastle/Renton

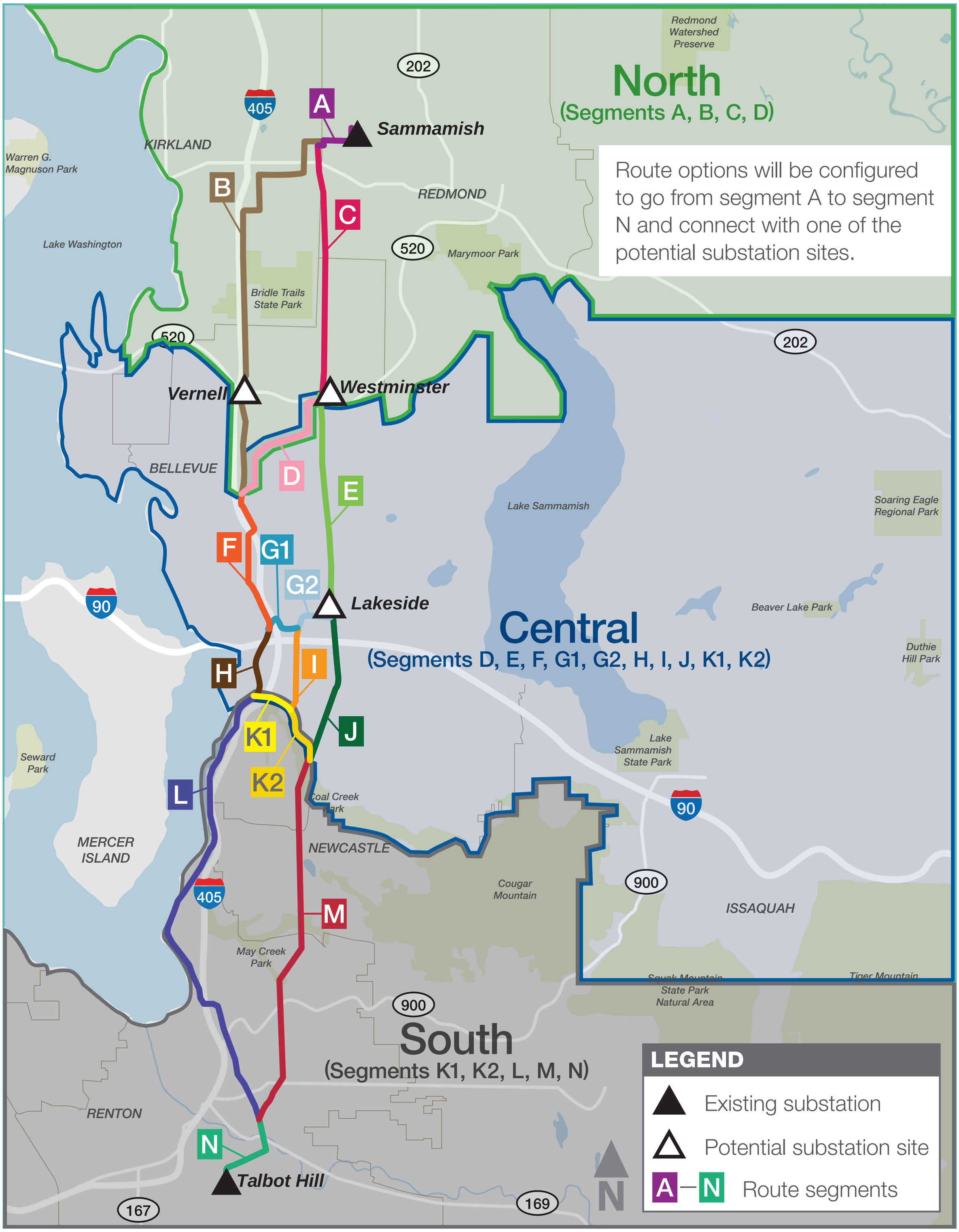
Sub-Area Committees

- Provides recommendations to the Community Advisory Group
- Includes a **representative from each neighborhood affected by a route segment**

Public Input

Community Advisory Group

Sub-Area Committee Geographic Locations



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WHAT IS THE CHALLENGE?

The Eastside is growing faster than any other region in Washington. Communities and businesses have grown and prospered, and this good fortune is straining the Eastside's electric transmission system.

As soon as 2017, demand for electricity on the Eastside will exceed the existing system's capacity. The lights won't go out – but without upgrades, the possibility of outages will increase for as many as 60,000 customers.

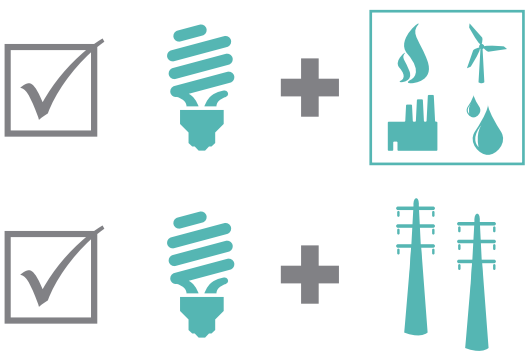
PROCESS TO IDENTIFY A SOLUTION AND ROUTE OPTIONS

1 WHAT ARE THE POTENTIAL APPROACHES TO MEET THE EASTSIDE'S ELECTRICITY NEEDS?

PSE evaluated the potential of several approaches – conservation, local generation and new infrastructure – to meet the Eastside's electricity needs.

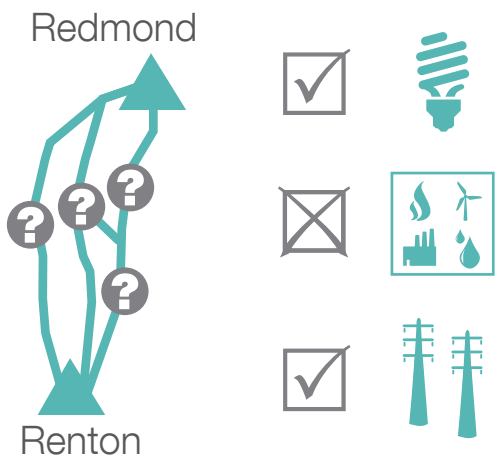
2 WHAT APPROACHES PROVIDE ENOUGH ELECTRICITY TO MEET THE EASTSIDE'S NEEDS?

Engineers reviewed alternatives to each approach, and found that only local generation or new infrastructure located near the center of high electricity demand could meet the Eastside's needs. This includes meeting PSE's already significant conservation goals for the Eastside.



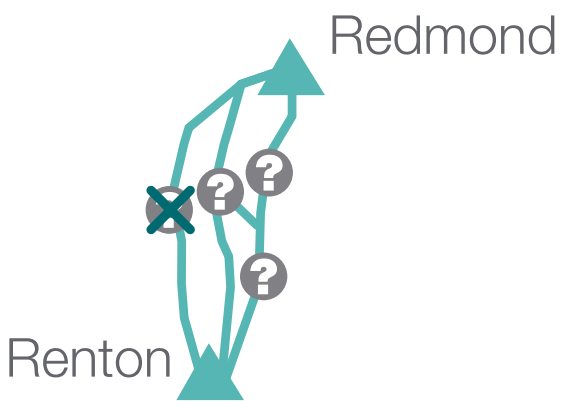
3 WHAT SOLUTIONS BEST DELIVER ELECTRICITY TO THE EASTSIDE?

Engineers reviewed different generation and electric infrastructure alternatives based on system performance, flexibility and longevity. Generation was eliminated. New infrastructure that connects substations in Redmond and Renton to a new substation in the center of high electricity demand was identified as the best solution to meet the Eastside's electricity needs.



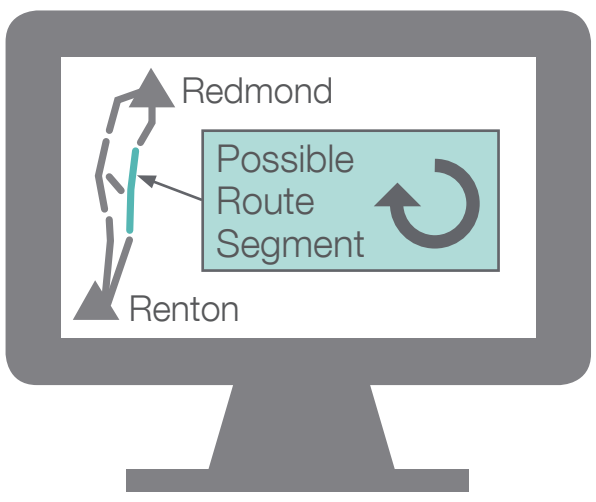
4 WHAT SOLUTIONS CAN PSE MOVE FORWARD WITH?

PSE eliminated a Seattle City Light Corridor and a potential Bellevue substation site as possible new infrastructure locations. Neither property is owned by PSE and other viable sites for new infrastructure are available.



5 WHERE COULD PSE BUILD A SOLUTION?

Engineers used a computer-based modeling tool to analyze key criteria like geographic barriers, land uses and impacts to the environment. Based on this analysis, route segments were identified that can be combined into various complete route options that connect to potential substations.



6 WHAT DOES THE PUBLIC THINK?

PSE will ask the public to provide input on the combination of route segments that best serves the Eastside's needs. A robust public process will include a Community Advisory Group (CAG), seeking input through drop-in sessions, community meetings at key milestones and a project website.

ONE SELECTED ROUTE

After collecting feedback from the public, CAG and other stakeholders, PSE will further evaluate requirements and constraints and select the preferred route and substation to move forward for final design, environmental review and permitting.

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Linear Routing Tool GIS Constraints and Opportunities

Constraints

Buildings

- Address point buffers (buildings)
- Apartment (co-op, mixed use, subsidized)
- Art gallery, museum, social service
- Auditorium, assembly building
- Auto showroom and lot
- Bank
- Bowling alley
- Car wash
- Church, welfare, religious service
- Condominium (mixed use)
- Condominium (mobile home park)
- Condominium (office space)
- Condominium (residential)
- Convenience store with gas
- Convenience store without gas
- Daycare center
- Duplex
- Fraternity/sorority house
- Gas station
- Golf course
- Grocery store
- Group home
- Health club
- Hospital
- Hotel/motel
- Medical/dental office
- Mini lube
- Mobile home park
- Movie theater
- Nursing home
- Office building
- Post office/post service
- Quad-plex
- Rehabilitation center
- Residence hall/dorm
- Restaurant (lounge, fast food)
- Retail (store, discount, line, strip)
- Retirement facility townhouse plat
- Rooming house
- School (public, private)
- Service building
- Service station, marina
- Shopping center (community, major retail, neighborhood, regional, specialty)
- Single family (C/I Use, C/I Zone, Residential Use, Residential Zone)
- Tavern/lounge
- Triplex
- Vet/animal control service

Historical

- Historical Register
- Historical Register Districts
- Historic property inventory – named
- Historic property (office, misc.)
- Heritage barns
- Natural Heritage Project – Critically Imperiled Species Of Special Concern (S1)
- Natural Heritage Project – Imperiled Species Of Special Concern (S2)
- Natural Heritage Project – Rare Or Uncommon Species Of Special Concern (S3)
- Natural Heritage Project – Critically Imperiled Species Of Special Concern (S1)

Natural resources

- Coal mine hazards

Open space and recreation

- Open space (timber land, greenbelt, agricultural, current use)
- Park easements, King County
- Parks (private, public, amusement center, zoo, arbor)
- Scenic byways
- Transfer of Development Rights – receiving
- Campground
- Resort/lodge/retreat
- Skating rink (ice, roller)
- Sport facility

Steep slopes

- Landslide potential (Class 1)
- Landslide potential (Class 2)
- Landslide potential (Class 3)
- Slope 20% or greater, unspannable
- Slope 40% or greater, unspannable

Transportation

- Airport
- Airport approach notification zone
- Air terminal and hangers
- Railroads (abandoned)
- Arterial roads (travel lanes)
- Highway polygons created using lane widths

Utility

- Private utility (radio, T.V.)
- BPA transmission corridor
- BPA substation
- WSDOT utility restrictions – restricted
- WSDOT utility restrictions – with exceptions

Water resources

- Floodway, floodplain
- Large lakes
- Shorelines (200 foot buffer)
- Tidelands
- Wetlands
- Water bodies

Wildlife and conservation

- Bald eagle nest buffers
- Heron rookeries
- Native Growth Protection Easement
- Salmonid streams
- Waterfowl habitat
- Reserve/wilderness area

Neutral

Buildings

- Governmental service
- Greenhouse, nursery, horticulture service
- High tech, high flex
- Office park
- Retail (big box)

Natural resources

- Mining, quarry, ore processing

Open space and recreation

- Transfer of Development Rights – sending

Transportation

- Terminal (auto, bus, other)

Opportunities

Agriculture

- Farm

Buildings

- Industrial park, industrial (general purpose, heavy, light), mini warehouse, terminal (rail), vacant (industrial), warehouse
- Mortuary, cemetery, crematory
- Vacant (commercial, multi-family, single-family)

Parking

- Easement, parking (assoc), parking (commercial lot), parking (garage)

Open space and recreation

- Recreational trails

Transportation

- Arterial roads (adjacent)
- Railroads (rail bank)

Utility

- BPA transmission corridor (adjacent)
- High pressure gas line corridor
- PSE 115 kV corridor
- PSE 55 kV corridor
- Right-of-way, utility-road, utility-public

Sample 230 kV Poles and Wire Configurations

Pole height: 95 to 125 feet depending on topography

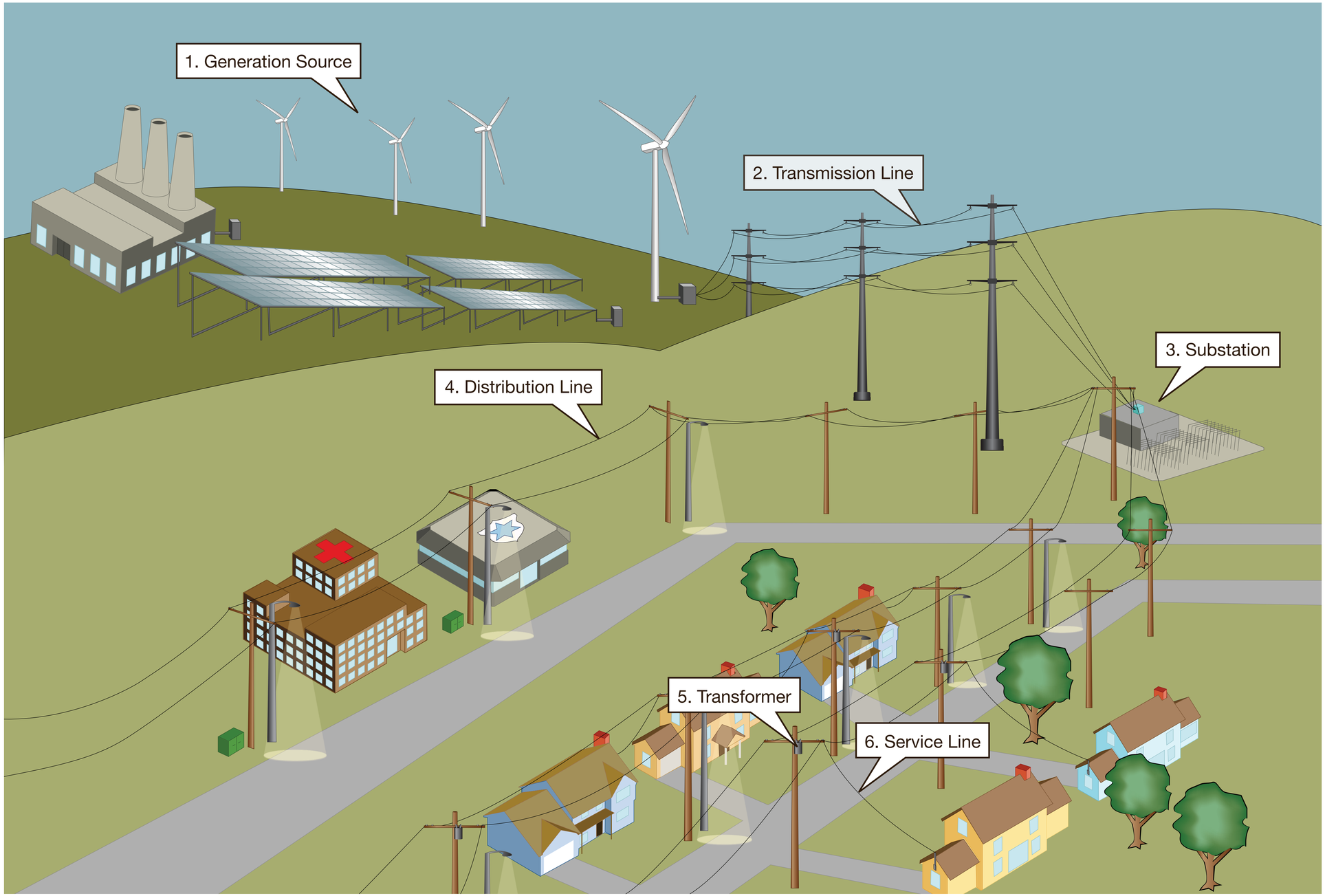
Spans range: 400 to 700 feet depending on topography

Single-circuit 230 kV steel pole

Double-circuit 230 kV steel pole

Pole and Wire Configuration PSE is Not Considering

How Power Gets to You



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Undergrounding Transmission Lines - A Comparison

OVERHEAD

Costs

- $4.3 to $5.6 million per mile to construct
- Costs covered by all PSE ratepayers

Aesthetics

- Visible poles and wires
- Some vegetation can remain near lines

Examples of 230 kV poles

Outage impacts

- More susceptible to storm-related outages
- Repairs typically made within hours

Construction impacts

- Includes setting poles and stringing wire
- Requires removing dirt and trees for pole foundations

230 kV poles under construction

UNDERGROUND

Costs

- $16 to $19 million per mile to construct
- Costs greater than the overhead option must be paid locally

Aesthetics

- No transmission poles, no visible wires
- Steel termination poles are visible
- No deep-rooted vegetation permitted along route
- 20 by 30 by 8 foot access vaults required every quarter to half mile

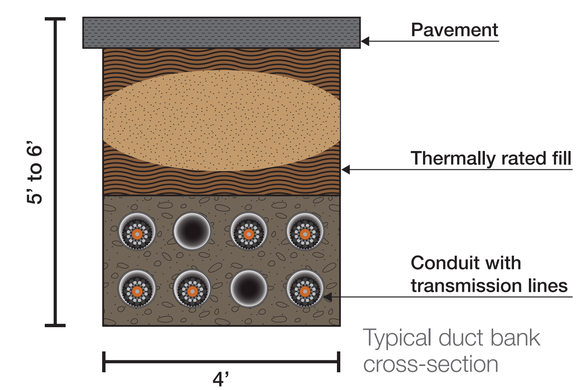
Steel termination pole

Outage impacts

- Outages less frequent
- Repairs may take months

Construction impacts

- Potential relocation of major underground utilities
- Substantial dirt and tree removal required for trenches and vaults



Typical duct bank cross-section

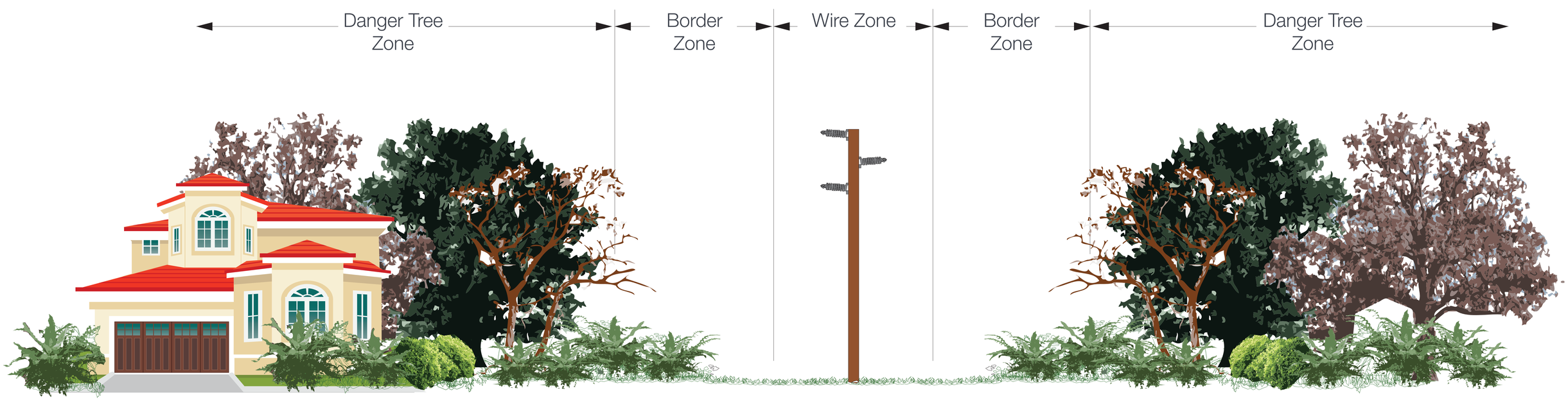
Vegetation Management

- PSE's vegetation management program generally requires that trees located in the wire zone with a mature height of greater than 15 feet be removed, unless terrain conditions allow 30 feet of clearance between the line and the mature height of the tree.
- Trees located within the border zone will typically be trimmed or removed to maintain a clearance of up to 20 feet from the nearest line.

Wire Zone: Section of a utility transmission right-of-way directly under the wires and extending to ten feet on each side.

Border Zone: A section of transmission right-of-way that extends roughly ten feet from the outside transmission wire.

Danger Tree Zone: Outside the border zone. Trees here that are predisposed to falling and likely to come in contact with nearby lines are proactively removed to reduce the likelihood of problems.



potential route segments

overview map winter 2014

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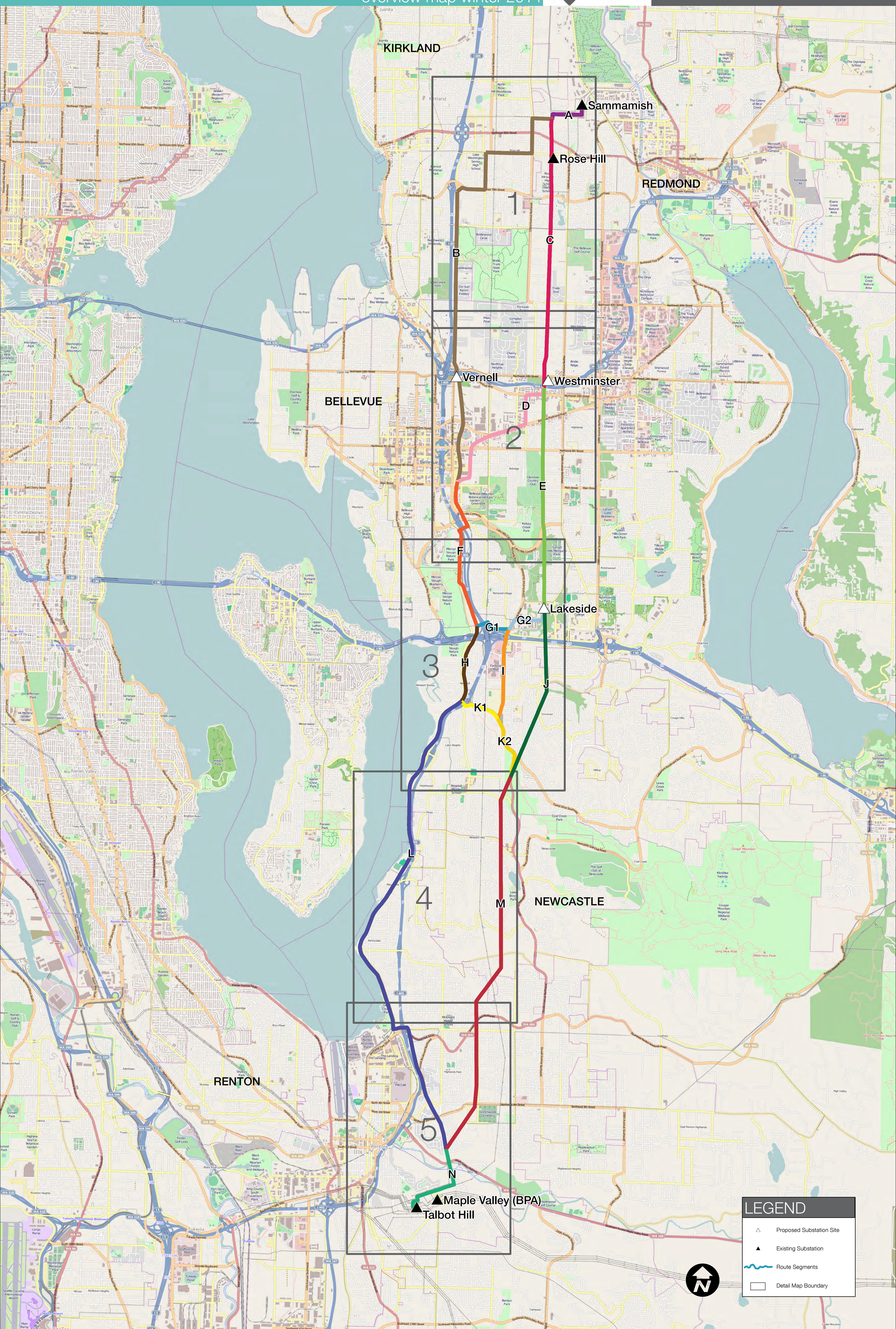

potential route segments

detail map 1

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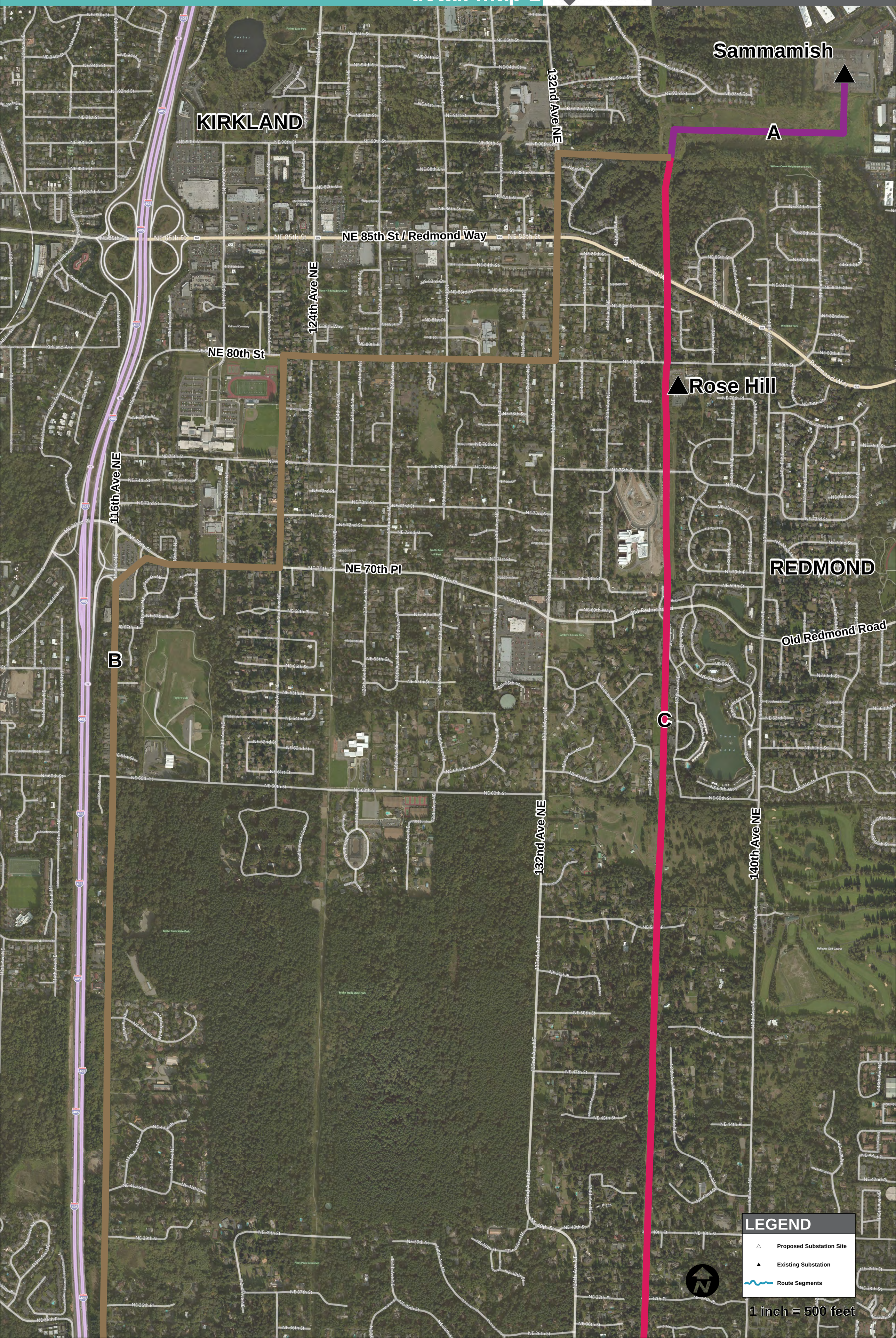

potential route segments

detail map 2

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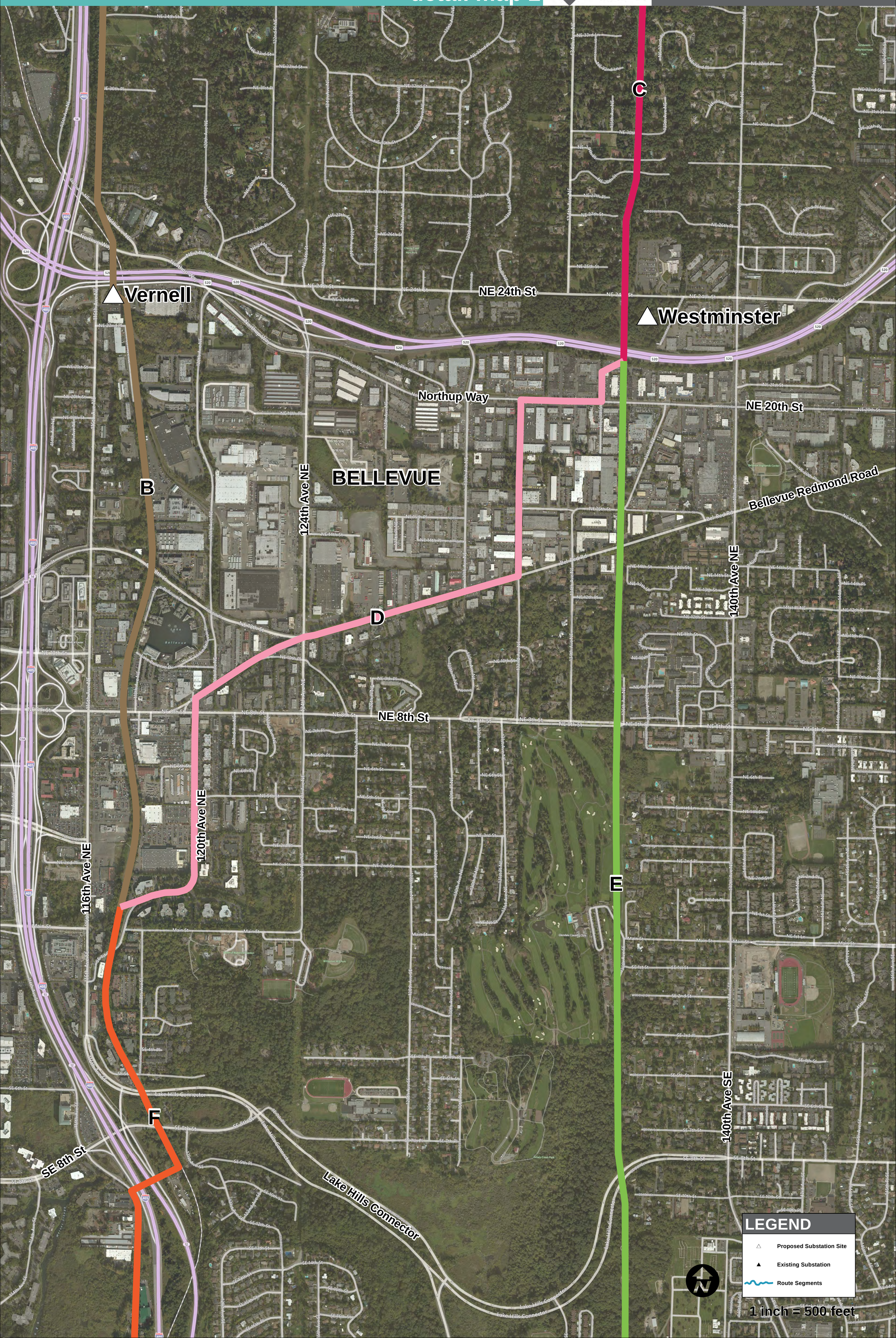

potential route segments

detail map 3

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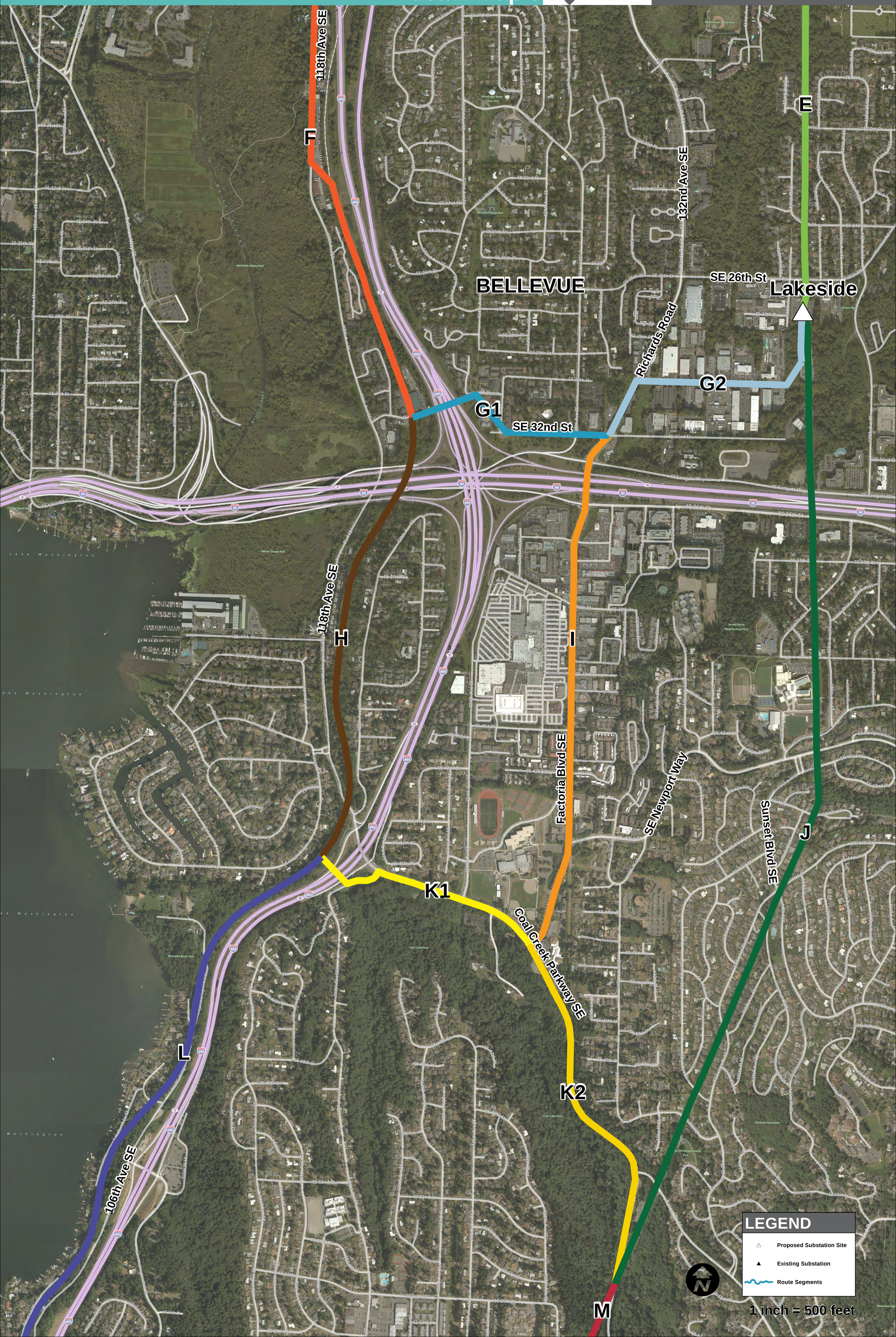

potential route segments

detail map 4

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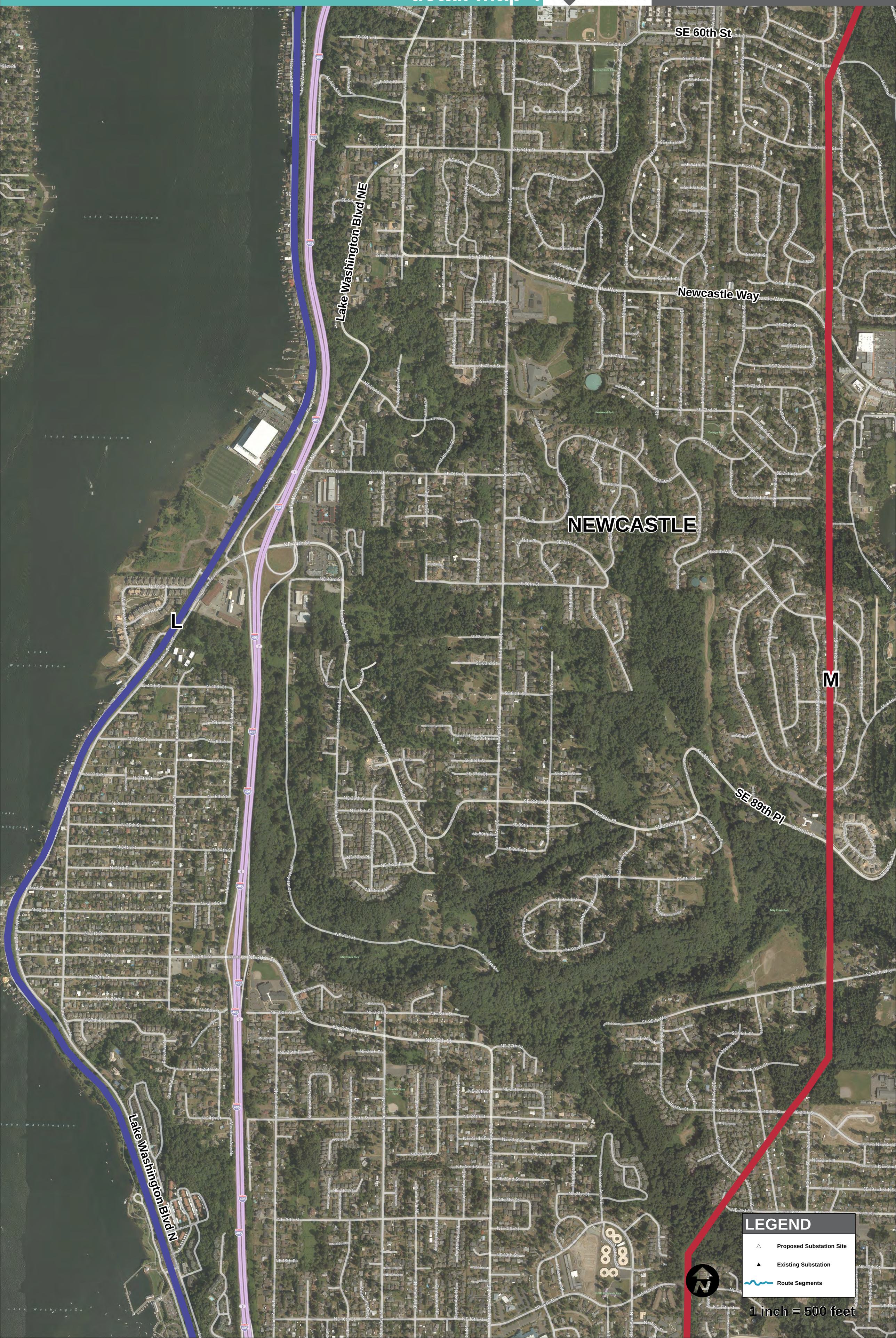

potential route segments

detail map 5

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