

Alternative Use of Highway Rights-of-Way

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Opening Letter

Dear House and Senate Transportation Committees,

ESHB 2134, Section 214 (7), appropriated funds to the Washington State Department of Transportation (WSDOT) “solely for the purpose of the WSDOT to study alternative uses of the right of way”. The proviso directed WSDOT to explore specific activities as follows:

“(7)(a) \$500,000 of the multimodal transportation account—state appropriation is provided solely for the department to explore 27 alternative uses of the state's highway rights-of-way to address pressing public needs relating to climate change, equitable communications, renewable energy generation, electrical transmission and distribution projects, broadband projects, vegetation management, inductive charging in travel lanes, alternative fueling facilities, and other appropriate uses. In exploring alternative uses of the state's highway rights-of-way, the department shall:

(i) Review the utility accommodation policy and make recommendations to update the policy to include clean energy and connectivity projects under 23 C.F.R. Part 645. At a minimum, the recommendations for updated clean energy and connectivity projects must include renewable energy and electrical transmission and distribution;

(ii) Review and update the department's integrated roadside vegetation management plans to maximize carbon sequestration and develop habitat and forage for native pollinators, Monarch butterflies, and honeybees through plantings of native noninvasive flowering plants and grasses on the state highways rights-of-way and at safety rest areas;

(iii) Assess the state highways rights-of-way land areas most suitable for solar development by considering slope, elevation, vegetative cover, and solar radiation; and

(iv) Identify existing highway rights-of-way suitable as designated energy corridors for electric transmission and distribution and other energy infrastructure.

(b) In carrying out the requirements in (a) of this subsection, the department may consult with an organization that uses an advanced rights-of-way solar mapping tool that uses ArcGIS Pro software for faster and more precise analysis of rights-of-way solar using the state's full spatial rights-of-way data sets.

(c) The department must report its findings, recommendations, and status of its updates to the transportation committees of the legislature by January 15, 2025.”

WSDOT has engaged internal, as well as consultant, resources to support multi-faceted explorations of such alternative ROW alternative uses, including our utilities, railroad, and agreements manager; our state landscape architect; our state roadside landscape asset manager; our real estate services program administrator; and solar development and energy corridor specialists at The Ray, a non-profit transportation infrastructure organization. WSDOT also engaged a State of Washington certified women-owned small business, Communication Resources Northwest, to provide technical writing services to support the delivery of this report.

WSDOT is submitting this Alternative Use of the Highway Rights-of-Way Legislative Report summarizing our efforts to date, all of which are ongoing. In this report, we highlight the several initiatives undertaken in response to the proviso. These include an analysis of options for amending the utility accommodation policy, our ongoing vegetation management strategies, new pollinator and carbon sequestration demonstration projects that will inform future vegetation management strategies, suitability analyses for solar development and energy corridors, and plans to increase the robustness of our GIS datasets to support the future development and success of these initiatives.

WSDOT is submitting an interim draft of this report, which will be revised and submitted again by July 15, 2025. This final report will summarize the culmination of the Agency's efforts and findings related to the requirements of the Alternative Use of the Highway Rights-of-Way proviso.

Sincerely,

A handwritten signature in blue ink that reads "Mark A. Gaines".

Mark Gaines
WSDOT State Design Engineer
Director, Development Division

Table of Contents

Opening Letter	1
Table of Contents	3
List of Abbreviations	4
Executive Summary	5
Utility Accommodation Policy Amendment	5
Vegetation Management to Maximize Carbon Sequestration and Pollinator Habitat	5
Solar Development and Energy Corridor Suitability	6
Technical Writing Support	6
Utility Accommodation Policy	7
RCW Amendment Required to Enable Legal Update of Utility Accommodation Policy	7
Enabling Clean Energy and Connectivity Projects Under 23 CFR Part 710	8
Vegetation Management Plans, Carbon Sequestration, and Habitat Development for Native Pollinators, Monarch Butterflies, and Honeybees	9
Integrated Roadside Vegetation Management Plans	9
Pollinator Demonstration and Carbon Sequestration Enhancement Projects	11
Solar Development and Energy Corridor Suitability	19
Solar Development Suitability Analysis	19
Energy Corridor Suitability Analysis	22
Future Implementation Planning for Solar Development and Energy Corridor Designation	22
GIS Mapping of WSDOT Real Estate Inventory	23
Status of Work	23
Value of GIS Mapping	24
Ongoing GIS Map Development and Maintenance	24
Conclusion	24

List of Abbreviations

BSA	Biotic Soil Amendments
CFR	Code of Federal Regulations
DEM	Digital Elevation Model
DSM	Digital Surface Model
FHWA	Federal Highway Administration
GIS	Geographic Information Systems
HATS	Highway Activities Tracking System
HECP	Hydraulic Erosion Control Products
IRVM	Integrated Roadside Vegetation Management
NHS	National Highway System
PV4EV	Photovoltaic for Electric Vehicle
RCW	Revised Code of Washington
ROW	Right-of-Way
WSDOT	Washington State Department of Transportation
WSTC	Washington State Transportation Commission

Executive Summary

WSDOT initiated several efforts in response to the proviso, all of which are currently in progress and will continue in 2025. WSDOT anticipates that the findings of these initiatives, once complete, will enable us to propose practical and effective directions and strategies for future alternative uses of the right-of-way.

Utility Accommodation Policy Amendment

RCW 47.44.010(1) does not include clean energy and connectivity infrastructure as a utility. An amendment to this RCW will enable WSDOT to update its utility accommodation policy. While WSDOT cannot accommodate clean energy and connectivity projects under 23 CFR Part 645 until the RCW is amended, WSDOT can pursue lease agreements under 23 CFR 710.405, Right-of-Way Use Agreements and additional FHWA guidance to facilitate clean energy and connectivity projects.

Vegetation Management to Maximize Carbon Sequestration and Pollinator Habitat

WSDOT's 2024 Integrated Roadside Vegetation Management (IRVM) plans identified high priority planned work for areas with maximum benefit to pollinator and carbon sequestration efforts in each of WSDOT's 24 maintenance areas. Due to a budget shortfall this biennium, restoration work involving pollinator habitat and carbon sequestration was prioritized when it contributed to safety, fire prevention, and noxious weed control.

WSDOT desires to enhance its geographic information systems (GIS) mapping data in its statewide Highway Activities Tracking System (HATS) database to support pollinator and carbon sequestration restoration opportunities with present and accurate data. As funding allows, WSDOT can prioritize further integration of pollinator/carbon sequestration restoration efforts.

In addition to pollinator and carbon sequestration efforts included in WSDOT's annual IRVM plans, WSDOT allocated approximately \$150,000 of the proviso funding to initiate pollinator demonstration and carbon sequestration enhancement projects on I-5 in the vicinity of the Scatter Creek Safety Rest Area in south Thurston County. WSDOT created a public demonstration "lab" of restored habitat and integrated pollinator habitat to test new strategies, products and technologies, and theories using common construction methods to support repeatable strategies and costs that will inform long-term vegetation management approaches. WSDOT is also planting native Oregon white oak (Garry oak) and giant sequoia and coastal redwoods to expand carbon sequestration and climate resiliency opportunities.

Solar Development and Energy Corridor Suitability

WSDOT's consultant partner, The Ray, is using customized Esri GIS toolsets to conduct statewide suitability analyses for solar and energy transmission developments. To date, their analysis has identified more than 3,000 acres of ROW land, with 685 distinct parcels, as highly suitable for solar development. With future funding, WSDOT may be able to conduct more detailed site analyses and other planning, design, and engineering work necessary to further develop solar and energy corridor designation implementation plans.

To support this work, WSDOT allocated approximately \$300,000 of the proviso funding to engage consultant support to create GIS datasets of WSDOT real estate parcels, prioritizing research and mapping of parcels identified as highly suitable for solar development and energy corridors. **Due to [Governor's Directive 24-19](#) freezing service contracts, this work is currently on hold.** If the freeze is lifted soon, WSDOT plans to proceed with finalizing a consultant contract and initiating planned work to geo-rectify digital assets of WSDOT's Right-of-Way Plans and Maps to create highly useable and informative GIS datasets that will support further implementation planning for solar and energy corridor developments.

Collaboration with The Ray

The Ray is a national, 501(c)(3) non-profit organization working with state and local partners, including the U.S. Department of Transportation as part of the Thriving Communities Program. The organization's mission is to transform transportation infrastructure to achieve a future of zero deaths, zero waste, zero carbon, and zero impact on U.S. highways. The Ray has worked with more than 50 state departments of transportation, local partners, and networked communities.

WSDOT formed a partnership with The Ray in July 2023 focused on facilitating, executing, and promoting innovative projects that prioritize road safety, improve infrastructure resiliency, protect, and restore the environment.

The Ray is supporting several aspects of work related to the Alternative Use of the Highway Rights-of-Way proviso, and leading the solar development and energy corridor suitability analyses. The Ray is providing its consulting services to WSDOT at no charge.

Technical Writing Support

WSDOT allocated approximately \$50,000 of the proviso funding to engage a State of Washington certified women-owned small business, Communication Resources Northwest, to provide technical writing services to support the delivery of the interim and final legislative reports. Their team worked closely with subject matter experts within WSDOT and The Ray to document the initiatives undertaken in response to this proviso.

Utility Accommodation Policy

(i) Review the utility accommodation policy and make recommendations to update the policy to include clean energy and connectivity projects under 23 C.F.R. Part 645. At a minimum, the recommendations for updated clean energy and connectivity projects must include renewable energy and electrical transmission and distribution;

RCW Amendment Required to Enable Legal Update of Utility Accommodation Policy

The Federal Highway Administration (FHWA) memo, "[State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance](#)" dated April 27, 2021, provides guidance to State DOTs on ways to use highway rights-of-way "for pressing public needs relating to climate change, equitable communications access, and energy reliability" including "renewable energy generation, electrical transmission and distribution projects..."

The memo recommends language in State DOT Utility Accommodation Policies "acknowledging renewable energy generation as a utility facility when consistent with State law..."

Currently, WSDOT cannot legally update its utility accommodation policy to include clean energy and connectivity projects, as clean energy and connectivity infrastructure is not included in RCW 47.44.010(1), which defines the structures and facilities for which the department of transportation may grant franchises.

An amendment to RCW 47.44.010(1) will enable WSDOT to update its utility accommodation policy to classify clean energy and connectivity infrastructure as a utility and remain consistent with Washington State law.

Recent Precedent for RCW Amendment

In 2021, the State legislature passed [Engrossed Substitute House Bill \(ESHB\) 1457](#), which amended [RCW 47.52.001](#) to "...accommodate the deployment of broadband facilities..." and added [Chapter 160 to RCW 47.44](#) to "...enable collaboration between broadband facility owners and the department to identify opportunities for the installation of broadband facilities..." ESHB 1457 also amended RCW 47.44.010 to specifically identify "fiber optic" as a utility authorizing WSDOT to grant franchises for occupation of highway right-of-way (ROW).

Before enacting this legislation, WSDOT was only able to accommodate such infrastructure through a lease instead of a franchise. While the authorizations for a lease and a franchise both allow for a third-party facility owner to occupy the highway ROW, a lease requires WSDOT to base lease fees on fair market value, which has a financial impact to the facility owner. "State DOTs are not required to charge fair market rent or other fees for use of the ROW if accommodating the facility as a utility." ([State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance](#)).

A similar approach of amendment as ESHB 1457 may be beneficial to facilitate the coordinated installation of clean energy infrastructure, with similar benefits to the highway system as noted in RCW 47.44.160, including (a) Reducing future traffic impacts to the traveling public on the roadway.

Enabling Clean Energy and Connectivity Projects Under 23 CFR Part 710

Under current Washington State law and WSDOT's utility accommodation policy, WSDOT cannot accommodate clean energy and connectivity projects under 23 CFR Part 645. However, WSDOT can accommodate them through lease agreements under [23 CFR 710.405](#), Right-of-Way Use Agreements, and additional FHWA guidance.

The FHWA's "[Quick Guide: Federal Highway Administration \(FHWA\) Requirements for Renewable Energy Projects in Highway Right-of-Way \(ROW\)](#)" summarizes requirements for meeting relevant FHWA requirements when pursuing renewable energy projects in the right-of-way:

- To pursue a ROW use agreement for clean energy and connectivity projects, WSDOT must first receive "a determination by FHWA that such use is in the public interest; is consistent with the continued use, operations, maintenance, and safety of the facility; and such use does not impair the highway or interfere with the free and safe flow of traffic." WSDOT "must include planning and design details about the project, including provisions for maintenance access, terms of use, maps, plans, and sketches" ([23 CFR 710.405](#)) to support the FHWA's determination and its approval of the ROW use agreement.
- WSDOT must also seek the following approvals:
 - FHWA must approve each use/project. "For non-Interstate projects, FHWA may assign approval authority to the State" ([23 U.S.C. 106\(c\)](#), [23 CFR 710.405](#)).
 - If the RCWs are amended and WSDOT can legally update its utility accommodation policy, the FHWA can give programmatic approval of the utility accommodation policy and not require project-by-project approval.
 - For use agreements involving interstate highways, FHWA must approve any temporary or permanent modification of access control in writing ([23 U.S.C. 111\(a\)](#), [23 CFR 710.403](#)).
 - For use agreements involving National Highway System (NHS) highways, the approving authority designated in the FHWA-State DOT Stewardship and Oversight Agreement must approve any temporary or permanent modification of access control.
 - For use agreements involving non-NHS highways, WSDOT may approve access control modifications.
- WSDOT must charge a fee based on fair market value for use of the ROW "unless there is an applicable exception or justification that the project is in the public interest based on social, environmental, and economic considerations, in which case an exception may be approved" ([23 CFR 710.403](#)). If Title 23 funds were used to acquire the ROW, WSDOT must charge a fair market rent fee and "the Federal share of the net income must be used for Title 23-eligible purposes" ([23 U.S.C. 156\(c\)](#)).
 - If the RCWs are amended and WSDOT can legally update its utility accommodation policy, charging a fee is at Washington State's discretion under RCW 47.44.020.

Vegetation Management Plans, Carbon Sequestration, and Habitat Development for Native Pollinators, Monarch Butterflies, and Honeybees

(ii) Review and update the department's integrated roadside vegetation management plans to maximize carbon sequestration and develop habitat and forage for native pollinators, Monarch butterflies, and honeybees through plantings of native noninvasive flowering plants and grasses on the state highways rights-of-way and at safety rest areas;

Integrated Roadside Vegetation Management Plans

WSDOT Headquarters' Maintenance updates the Integrated Roadside Vegetation Management (IRVM) plans annually as part of an established and funded process. In 2024, updates included identification of high priority planned work for areas with maximum benefit to pollinator and carbon sequestration efforts in each of WSDOT's 24 maintenance areas. This list of focus areas included any new construction (e.g., fish passage, system expansion, and urban mobility) and areas of recent roadside restoration efforts (e.g., encampment cleanup). Following new construction or restoration/encampment cleanup, newly planted or renovated sites require seasonally scheduled routine monitoring and weed control for eight to ten years. Future IRVM plans will account for these efforts.

WSDOT maintains a statewide Highway Activities Tracking System (HATS) database in which Maintenance staff document daily work activities in the field. To support pollinator and carbon sequestration restoration opportunities with present and accurate data, WSDOT desires to enhance its geographic information systems (GIS) mapping data in HATS, including all new project design and construction and areas that include roadside restoration and areas where Maintenance removed invasive species and restored native vegetation.

Roadside vegetation management treatments are recorded in HATS as lines, points, and polygons to identify planned work locations. HATS provides a clearer understanding of asset conditions and enables WSDOT to track maintenance work as it is performed. WSDOT initiated the HATS program in 2015 and has been recording roadside vegetation management efforts since 2017.



Figure 1: WSDOT Maintenance staff use digital global positioning tablets to reference work plans and record data daily in the HATS database.

Status of Work

Maintenance is experiencing a budget shortfall this biennium. With limited available maintenance funding, WSDOT focused its statewide efforts on roadside vegetation management activities that address highway safety concerns and legally required noxious weed control. Restoration work involving pollinator habitat and carbon sequestration was prioritized when it contributed to safety, fire prevention, and noxious weed control.

2025 IRVM plans include priorities to expand Maintenance efforts on combined fire prevention/safety, pollinator, and carbon restoration work in Eastern Washington, and complete planting and plant establishment for the Western Washington demonstration project.

WSDOT will document the Pollinator Demonstration and Carbon Sequestration Enhancement projects in HATS with GIS polygons and record restoration activities, including backdated work for site preparation that began in 2010. Maintenance will prioritize this area for ongoing weed control and plant establishment throughout the next decade. GIS data for all new construction projects and dedicated restoration sites will also be updated in HATS in 2025. WSDOT will continue such mapping and activity tracking efforts for all new construction and focused long-term restoration efforts throughout the state.

Value of Vegetation Management

A proactive and data-driven IRVM planning process enables WSDOT to intentionally implement a lifecycle strategy for the treatment of highway roadsides. Gathering data and documenting a comprehensive record in HATS enables WSDOT to “tell the story” of the roadside’s life, health, and evolution, and accurately define funding and resource requirements needed to adequately address roadside restoration and maintenance.

For the past 15 years, Maintenance has used a stretch of the I-5 corridor in the vicinity of the Scatter Creek Safety Rest Area as a model for planning and documenting a long-term vegetation management strategy that restores the roadside to a state of good repair. The Pollinator Demonstration and Carbon Sequestration Enhancement project furthers these efforts and will help WSDOT establish a business model for managing vegetation and soil health by identifying best practices and understanding the long-term cost requirements and benefits of restoring and maintaining native vegetation for pollinator habitat and carbon sequestration on the highway right-of-way. This will inform future Maintenance activities and HATS recordkeeping needs, including GIS mapping, that will support appropriate and effective long-term management.

Ongoing Vegetation Management

WSDOT will maintain its annual IRVM planning process with ongoing weed control and vegetation maintenance efforts. The current budget shortfall this biennium will require that Maintenance continue to focus its statewide efforts on addressing safety concerns and legally required noxious weed control. As funding allows, WSDOT can prioritize further integration of pollinator/carbon sequestration restoration efforts.

Pollinator Demonstration and Carbon Sequestration Enhancement Projects

In addition to the high-priority pollinator and carbon sequestration efforts included in WSDOT's annual IRVM plans, WSDOT allocated approximately \$150,000 of the proviso funding to support further research at its pollinator demonstration and carbon sequestration enhancement projects located on I-5 in the vicinity of the Scatter Creek Safety Rest Area in south Thurston County. These projects are a joint effort between the Design Office, the Environmental Services Office, and Maintenance Operations.

WSDOT created an approximately one-acre public demonstration "lab" of restored habitat south of the restrooms to establish and integrate pollinator habitat to expand management approaches by testing new strategies, products and technologies, and theories using common construction methods to support repeatable strategies and costs.

WSDOT will also expand carbon sequestration and climate resiliency opportunities by planting native Oregon white oak (Garry oak), which increases natural prairie habitat, and planting giant sequoia and coastal redwoods, which tests theories of assisted species migration. The trees will be planted north of the Grand Mound Interchange along the I-5 corridor, within the southbound and northbound ROWs, and in key areas for public education and interpretation. The Grand Mound Interchange was most recently reconstructed and planted in 2012.



Figure 2: Pollinator Demonstration and Carbon Sequestration Enhancement project areas.

WSDOT divided the acre space into two half-acre test areas east and west of the restroom pathway. The West area incorporates biotic soil amendments (BSA) while the East area does not, enabling WSDOT to determine variability differences between use of BSA in seeding applications.

Each half-acre is subdivided into four equal plots to test different soil amendments. Each study plot is semi-isolated by split-rail wood fencing for ease of long-term maintenance delineation and to limit public encroachment.

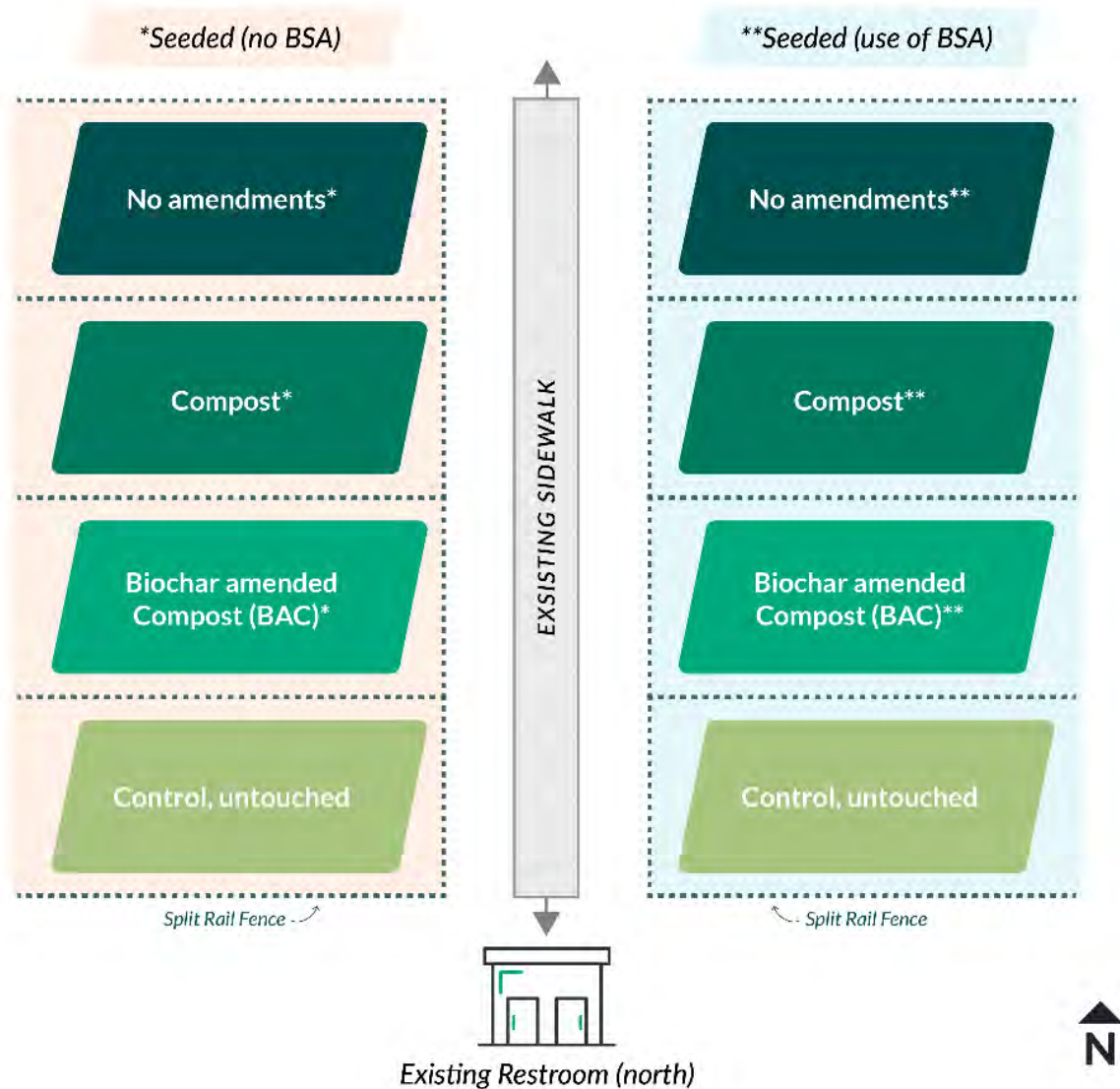


Figure 3: WSDOT identified eight test plots in its pollinator lab area.

- **Plot 1: Unamended:** An unamended plot is used as a control for comparison.
- **Plot 2: Compost Amended:** WSDOT is the largest end user of compost in the State, actively contributing to landfill diversion efforts. WSDOT commonly uses compost in current construction restorations practice either for soil amendment or erosion control. Using compost in the pollinator lab enables WSDOT to determine any variables in success between other methods.
- **Plot 3: Biochar + Compost Amended:** Use of biochar as a soil amendment is relatively untested in the WSDOT roadside restoration environment. Biochar has garnered national attention as an effective element in carbon sequestration initiatives. Using biochar in the pollinator lab will determine levels of success in outcome in comparison to other known uses.
- **Plot 4: Unaltered:** A plot of the existing condition will remain in place (centered) to test potential natural recruitment from the newly restored plots.



Figure 4: All compost used material was derived from the same source and meets WSDOT submittal requirements. The biochar mix is a 15% biochar to 85% compost amended blend, and seems to be richer and darker in color, with a more earthy smell than the compost's typical "manure" smell.

WSDOT plans to produce and install interpretive signage near the pollinator plot areas to engage public education. The plaques will highlight the demonstration project, current efforts, and expected outcomes as well as information about the importance of pollinators, carbon sequestration, and protected species like the pocket gophers present on this site. The signage will also include a QR code linking to a website that will provide project updates.

Budget

Pollinator Demonstration

Cost includes site prep, procurement of native seed, soil amendments including biochar, compost and biotic soil amendment, and a landscape sub-contractor to perform the work if maintenance staff is unable to perform the work.

- Materials and Soil Amendments (soil testing, compost, biochar amended compost, mulch, fertilizer, BSA Pollinator seed mix): Approx. \$14,000
- Labor, equipment, mobilization and tax (grading, compost application, seeding work): Approx. \$25,000
- Public Education (interpretative signs, website/ public outreach updates): Approx. \$10,000
- Monitoring equipment: Approx. \$16,000 to \$17,000
- Fence installation \$18,680

Carbon Sequestration:

Cost includes site prep, procurement of trees, bark mulch, watering, and a landscape sub-contractor to perform the work if maintenance staff is unable to perform the work.

- Materials (coastal redwoods, giant sequoias, Garry oaks, bark mulch): Approx. \$25,000 - \$30,000
- Planting (about 530 trees): Approx. \$19,000

Status of Work

Pollinator Demonstration

WSDOT's state landscape architect developed the pollinator lab plan in August and September 2024, then engaged a women-owned landscaping business in September 2024 to execute the work. Ground clearing and seeding in the lab area was executed October 1-4, 2024, at the beginning of the seeding window to support effective germination.

- Each half acre area was cleared and grubbed (minus the unaltered plot) to reset the area with a bare soil condition for research comparison purposes. Care was taken to avoid disturbance of pocket gopher habitat; the State biologist was onsite to monitor work and crews minimized compaction and kept the dump truck on the grass as much as possible. Pocket gophers are listed as an endangered species and WSDOT's efforts to develop pollinator habitat and implement carbon sequestration include strategies to ensure they remained unharmed.



Figure 5-6: Cleared and grubbed land.

- Soil amendments were blown on in the designated plots with consistent coverage and depth.



Figures 7-8: Applied soil amendments.

- The cleared areas were hydroseeded with a long-term hydraulic erosion control product (HECP) following standard specifications using both canons and hoses for access and minimized disturbance to the prepped areas. The seed was applied at 40 pounds per acre using an identical pollinator seed mix.



Figures 9-10: Hydroseed land.

The seedlings are now dormant for winter and visible growth is anticipated in the Spring.

- Installation of the split-rail fencing along each side of the pathway between the east and west lab areas was completed on November 6, 2024:



Figure 11-12: Installed split-rail fence within the pollinator lab area.

WSDOT is currently engaged in the public procurement and contracting process to engage contractor support for content development for the interpretive signage and to produce and install the interpretive signage for public engagement.

Carbon Sequestration Enhancement

Planned to begin in February 2025, the Garry oaks, sequoia, and redwoods will be planted at strategic locations around the demonstration area and along a four-mile stretch of the I-5 corridor within historical and ecological locations of the Scatter Creek riparian corridor and Puget Sound Prairie ecosystem. Planting location strategies accounted for pocket gopher habitat protection.

WSDOT plans to procure a total of 25 giant sequoias and coastal redwoods, and has successfully procured 507 Garry oaks. The trees will be field located and planted at approximately 20-feet on center in natural group masses, where appropriate, with adequate soil volume and long-term maintenance management.

Trees will also be mapped in WSDOT's HATS system for long-term maintenance management.

Value of the Projects

There are significant cultural and ecological benefits from these projects. The results will inform a long-term management approach that enables WSDOT to best develop and sustain habitat and forage for native pollinators, Monarch butterflies, and honeybees on WSDOT roadsides and safety rest areas. They will also help WSDOT create a model for native roadside restoration in one of the most threatened and endangered ecosystems in the state, the South Puget Sound prairies.

WSDOT's use of typical construction methods, practices, and readily available materials in the pollinator demonstration will provide insight on repeatable methods and processes, average costs, and ranges of success for the development of habitat and forage for native pollinators, Monarch butterflies, and honeybees in future real-world project applications.

Informing fire resilience is another important benefit of this project. This stretch of I-5 routinely experiences roadside fire starts. When fires occur, WSDOT will use the event as an opportunity to apply lessons learned from these demonstration projects for successfully restoring burned areas with native and/or successfully migrated species.

The public visibility of the pollinator lab has already garnered public interest and support. The interpretive signage will provide further information about the value and importance of pollinator habitat and carbon sequestration efforts to climate resilience in Washington state.

Ongoing Development and Sustainability

Using annually appropriated IRVM funds, WSDOT plans to monitor both the pollinator demonstration project area and the carbon sequestration enhancement efforts for five years:

- In years 1, 3, and 5, WSDOT Environmental Services will investigate the pollinator demonstration project for success measures of overall coverage, species diversity, weeds observed, and native pollinators (e.g., butterflies and bees) and issue a formal memo or report.

WSDOT’s Design Office will similarly investigate the carbon sequestration efforts for success measures of overall establishment, weeds observed, adaptive management, or replanting efforts and issue a formal memo or report.

- In years 2 and 4, WSDOT will conduct a site visit for general observation and any management needs for both projects.

WSDOT plans to use \$16,000 of the proviso funding to invest in the PheNode monitoring system, which enables multi-faceted automated data collection and will support WSDOT in efficiently following up on soil tests, coverage inspections, species diversity, recruitment, and pollinator presence with minimal labor investment. Collecting data with the PheNode system is part of WSDOT’s larger data-driven IRVM strategy. WSDOT plans to document PheNode data in HATS along with all maintenance actions that will be required over time, to inform an effective and appropriate vegetation management approach.



Figure 13-14: The PheNode system enables monitoring of soil moisture, soil temperature, and electrical connectivity; data collection of wind speed/direction, gusts, rainfall, air temperature, relative humidity, air pressure, and vapor pressure; and takes photos.

Example Pilot Projects

WSDOT's efforts are inspired and informed by similar and successful pilot projects implemented by other state Departments of Transportation working with The Ray, such as the Georgia Department of Transportation. Key WSDOT personnel, Washington State Transportation Commission (WSTC) personnel, and members of the Washington State legislature visited Atlanta in May 2024 to tour The Ray, an 18-mile stretch "living lab" along I-85 that includes a visitor information center and demonstrates several innovative measures and technologies intended to improve the safety, ecology, and beauty of highway rights-of-way.



Figure 15: A one-megawatt solar array in the ROW at Exit 14 on I-85 leveraging 2,600 high-efficiency solar panels, with native, pollinator-friendly wildflowers planted under and around the solar panels.

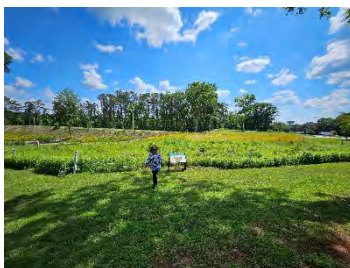


Figure 16: The Pollinator Meadow, which demonstrates the beauty and ecological benefits of planting wildflowers along the roadside instead of turf grass.



Figure 17: The Landscape Laboratory, which tests plantings that support slope stabilization, non-chemical weed/invasive species control, and wildflower seed mixes for viability and seasonal blooms.



Figure 18: Georgia's first solar-powered photovoltaic for electric vehicle (PV4EV) charging station at The Ray's Visitor Center.

Solar Development and Energy Corridor Suitability

(iii) Assess the state highways rights-of-way land areas most suitable for solar development by considering slope, elevation, vegetative cover, and solar radiation; and

(iv) Identify existing highway rights-of-way suitable as designated energy corridors for electric transmission and distribution and other energy infrastructure.

WSDOT's consultant partner, The Ray, is leading statewide suitability analyses for solar and transmission developments, including designated energy corridors for electric transmission and distribution and other energy infrastructure.

Solar Development Suitability Analysis

The Ray is using a customized Esri GIS toolset and implementing a three-step process to conduct each analysis:

- Develop inclusion and exclusion criteria to narrow down state ROW and identify possible solar installation sites.
- Analyze multiple factors, including solar radiation, slope, and aspect of the potential installation sites identified by inclusion criteria to determine highly suitable potential installation sites and calculate solar potential electricity values for such sites.
- Create 3D models of select ROW parcels identified as highly suitable for potential solar installation. Models will enable WSDOT to visualize solar panel arrays and calculate potential energy generation and carbon reduction values.

Status of Work

To date, The Ray has completed the first and second steps of the analysis process:

Step 1: Inclusion/Exclusion Analysis

The Ray and WSDOT personnel collaboratively developed the inclusion and exclusion criteria to determine the study areas. Study areas are:

- Within five miles of a transmission line or substation
- Outside of protected areas
- Outside of national parks and forests
- Outside of flood zones, wetlands, and waterbodies
- Outside of railroad lines by at least 20 feet.
- Outside of transmission lines by at least 50 feet.
- Outside of natural gas, HGL, petroleum, and crude oil pipelines by at least 500 meters.
- Outside of road clear zones by at least 40 feet.

The Ray used publicly available assessor's data to determine which state and federal highways and interstates met this criterion. Of the identified areas, The Ray and WSDOT further refined study areas to those being a minimum 1.15 acres and at least 60-foot wide, which is the minimum footprint recommended by solar engineers for solar infrastructure.

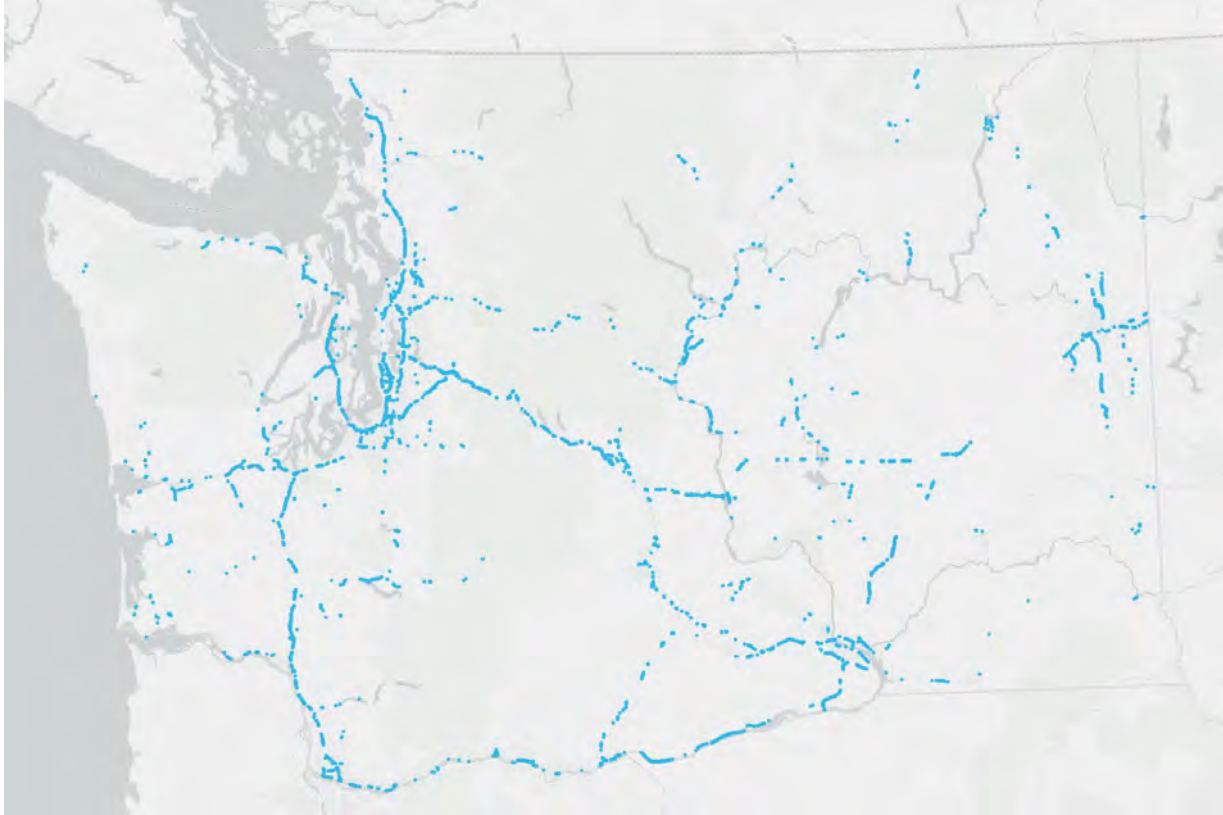


Figure 19: Land suitable for solar installation sites along Washington state and federal highways and interstates based on the inclusion/exclusion criteria.

The Ray determined that more than 11,000 acres of WSDOT ROW are suitable for potential solar installations. This represents an area with an energy generation capacity of 2,743 megawatts, with the solar potential for 3,944 gigawatt-hours per year. This equates to an electricity value of \$419 million annually.

Step 2: Analysis of Suitable Land

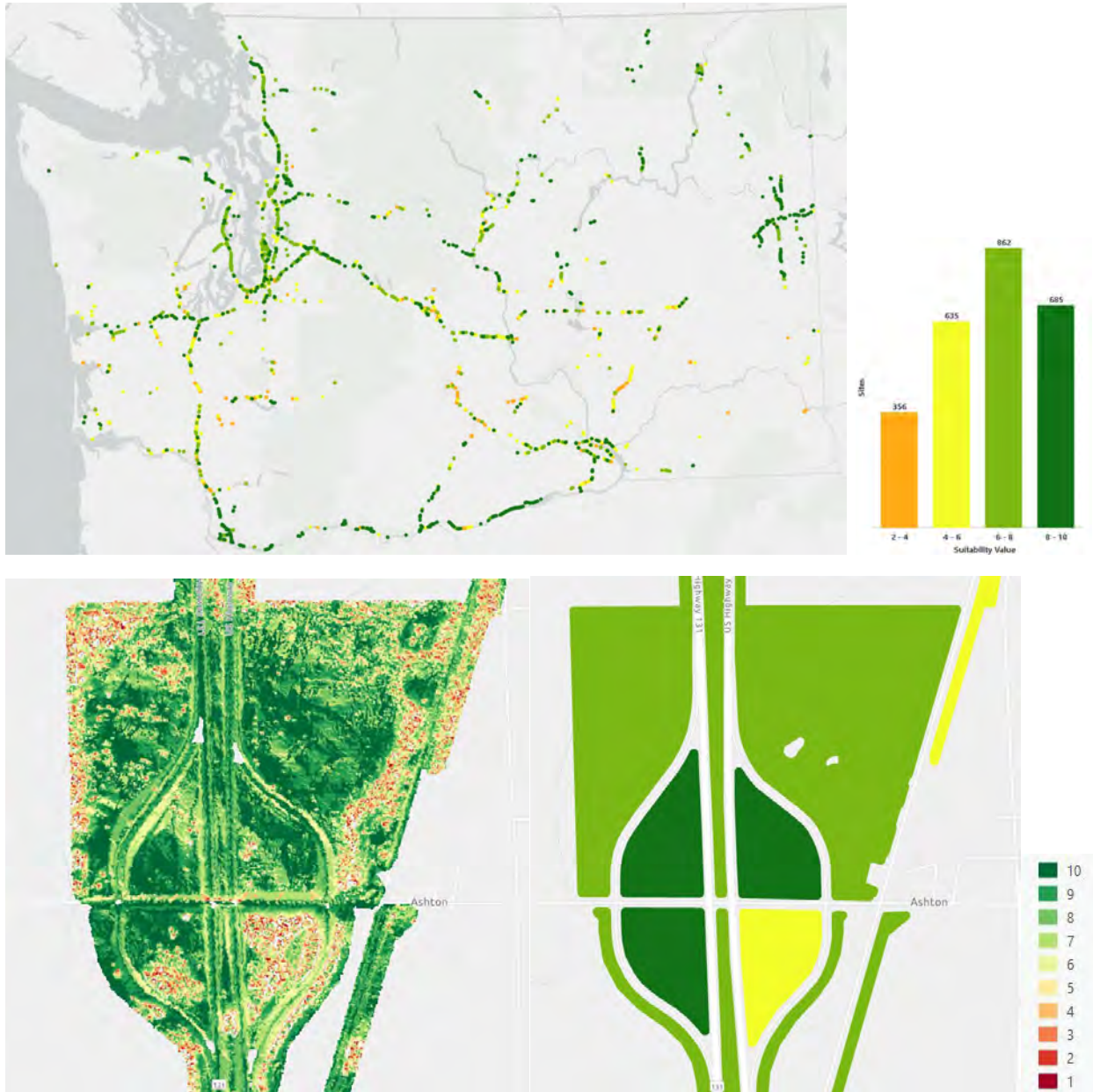
The Ray used digital surface model (DSM) and digital elevation model (DEM) datasets to further analyze the solar suitability of the identified land by solar radiation coverage (i.e., incoming solar radiation on the terrain), aspect (i.e., the directional orientation of a hillside in the terrain), and slope (i.e., the steepness of a hillside the terrain).

Land with high solar radiation coverage, a southern-facing aspect, and a slope that isn't too steep to access for installation and maintenance is optimal for solar infrastructure.

The Ray prioritized the use of DSM data in its analysis of solar radiation, aspect, and slope. DSM includes information about objects within the area, namely trees, while DEM does not. Using DSM data where available enabled The Ray to deprioritize further analysis of heavily treed areas, which are not conducive to solar radiation coverage nor installation and maintenance access. DEM data was used when DSM data was not available.

The Ray combined the solar radiation, aspect, and slope data to determine an overall suitability ranking for the identified land. The analysis assigned a percentage value of 35% to solar radiation, 25% to aspect, and 20% to slope in calculating the ranking. Land was ranked on a scale of one to 10, with a ranking of 8-10 being highly suitable for solar development.

This analysis identified more than 3,000 acres of ROW land, with 685 distinct parcels, as highly suitable for solar development.



Figures 20-22: Land identified and ranked by suitability for solar development.

Step 3: 3D Modeling

In early 2025, The Ray will begin developing 3D models of the land identified as highly suitable for solar development. This work will be further prioritized by the results of WSDOT's GIS mapping efforts, described in the next section of this report, which will accurately validate WSDOT's ownership of the highly suitable parcels and identify any encumbrances that may affect the feasibility of further pursuing solar and other energy developments on each site.

Completion of this step is anticipated in February 2025.

Energy Corridor Suitability Analysis

Status of Work

The Ray will begin its transmission suitability analysis in early 2025. Similar to the solar development suitability analysis, this work will also use an Esri GIS toolset and multi-step analysis process. The Esri toolset currently analyzes underground transmission opportunities, and The Ray is currently collaborating with Esri on a toolset to analyze overhead transmission. The overhead transmission tool is not anticipated to be ready for use within the timeline of WSDOT's proviso initiatives.

The intent of this analysis is to identify optimal pathways for energy transmission infrastructure, such as underground powerlines and to calculate the costs of installing the infrastructure in those pathways.

The analysis will study two pathway scales—large-scale pathways across two points in the state (e.g., Seattle to Tacoma) and small-scale pathways between local energy facilities and infrastructure (e.g., between a local powerplant and distribution infrastructure).

Cost calculations take into account logistical opportunities and constraints of the geography of those pathways (e.g., sediment layers, rock features, and water that promote or inhibit infrastructure installation). Infrastructure and installation considerations included in the cost calculations include major components, such as vaults and trenching and boring requirements.

Future Implementation Planning for Solar Development and Energy Corridor Designation

The results of The Ray's ROW Solar Analysis are general information suitable for pre-planning purposes only. They are not intended nor able to replace or substitute site analysis and other planning, design, and engineering work that must be completed to confirm suitability of a given parcel for solar development or designation as an energy corridor. All information is provided "as is" with no guarantee of completeness or accuracy and without any warranties, representations or guarantees, either express or implied, or arising by operation of law, that any particular parcel is suitable for solar development or designation as an energy corridor.

With future funding, WSDOT may be able to conduct more detailed site analyses and other planning, design, and engineering work necessary to further develop solar and energy corridor designation implementation plans.

GIS Mapping of WSDOT Real Estate Inventory

(b) In carrying out the requirements in (a) of this subsection, the department may consult with an organization that uses an advanced rights-of-way solar mapping tool that uses ArcGIS Pro software for faster and more precise analysis of rights-of-way solar using the state's full spatial rights-of-way data sets.

WSDOT maintains a library of Right-of-Way Plans and Right-of-Way Maps for its real estate assets dating back decades, with multiple maps and plans for each parcel. The Agency does not currently maintain a geo-rectified digital inventory or GIS datasets and the Real Estate Services group does not currently have in-house GIS mapping capability.

WSDOT plans to use approximately \$300,000 of the funding of this proviso to engage right-of-way consultant Commonstreet Consulting to create GIS datasets of WSDOT real estate parcels. The scope of work will prioritize research and mapping of parcels identified by The Ray as highly suitable for solar development and energy corridors.

Commonstreet is a Seattle-based right-of-way consulting firm specializing in GIS mapping. Its key personnel include two industry experts who previously worked for WSDOT Real Estate Services as headquarters property management program leaders. Their decades of institutional knowledge of WSDOT's real estate assets will support efficient data gathering to inform development of accurate and current GIS metadata.

Status of Work

This work is currently on hold due to Governor's Directive 24-19 freezing service contracts. WSDOT solicited consulting support in the Fall and selected Commonstreet in late November 2024, but was not able to execute the contract prior to the freeze that was announced in early-December. If the freeze is lifted soon, WSDOT plans to proceed with finalizing its contract with Commonstreet and initiating the planned work.

In early December, WSDOT and The Ray met to review the WSDOT-owned parcels identified based on available assessor data as highly suitable for potential solar development and develop ranking criteria with which to prioritize areas for further research and documentation. This prioritization will enable WSDOT to efficiently use the time and available funding to meet the requirements of the proviso.

If the contracting freeze is lifted soon and WSDOT can finalize its contract with Commonstreet, Commonstreet's research and digitization effort will begin with gathering WSDOT's Right-of-Way Plans and Maps formats for areas designated as highly suitable for solar development and energy corridors, then geo-rectifying parcel information to create "shapefiles" with multi-layered metadata, including property acquisition files, deeds, permits, easements, and other information. This information will be superimposed with aerial imagery of WSDOT parcels to create highly useable and informative digital datasets that will support further implementation planning for solar and energy corridor developments.

Value of GIS Mapping

The GIS mapping effort is directly necessary and beneficial to efficiently and accurately achieving the objectives of the proviso. GIS maps will enable WSDOT to efficiently validate The Ray's findings and further explore the implementation of solar development, electric transmission and distribution, and energy infrastructure installations in suitable WSDOT rights of way.

By comprehensively identifying and geo-rectifying available property information for each parcel, WSDOT will be able to accurately validate ownership and identify any encumbrances that may affect the feasibility of further pursuing solar and other energy developments on each site, such as underground utility pipelines and whether FHWA approval will be needed for properties involving federal funds. This data will enable Real Estate Services to collaborate effectively with other WSDOT disciplines, such as Roads, Engineering, and Traffic Control, to further explore implementation of solar development and other energy installations within the right-of-way. A coordinated effort will be needed to further investigate project feasibility, technical requirements, safety and maintenance considerations, and other factors.

GIS mapping will also support ongoing efficiency for WSDOT's Real Estate Program property management teams, expanding the benefit of this exercise. The research and geo-rectification of WSDOT property inventory and creation of GIS datasets will enable WSDOT teams to record, accurately categorize, and memorialize property data for ongoing use, minimizing efforts and improving accuracy for future WSDOT right-of-way projects.

Ongoing GIS Map Development and Maintenance

WSDOT intends to continue an ongoing GIS mapping effort as funding and resourcing allow. We would work first to complete mapping of parcels identified by The Ray as highly suitable for solar development and energy corridors then continue by mapping properties on Washington's Eastside, where climate conditions are most favorable for solar development. We would then eventually map the Agency's entire property inventory to promote efficient and accurate data management as part of WSDOT's Real Estate Services property management program.

WSDOT Real Estate Services is currently hiring for a GIS Manager, who would manage ongoing development and maintenance of GIS datasets for WSDOT's real estate inventory.

Conclusion

WSDOT anticipates that the findings of these initiatives, once complete, will support future planning for potential integrations of pollinator habitat and carbon sequestration efforts in our vegetation management strategies and future solar and energy corridor developments as part of ongoing efforts to explore alternative uses of the right-of-way.