

Powering the Future: Mapping Solar Potential Across WSDOT Right-of-Way (ROW)

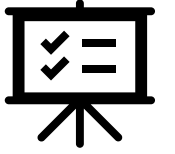
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HQ Real Estate Services
May 21., 2026

Overview

- Legislative background: ESHB 2134 and ROW alternative-use mandate
- Statewide solar suitability analysis (The Ray + WSDOT)
- Multi-step GIS methodology
- Pilot study using communication sites
- Utility permitting + power plant proximity analysis
- Clear zone considerations
- Prioritized sites and next steps



Background & Purpose



- Legislature directed WSDOT to study **alternative uses of highway right-of-way (ROW)**. Goals included assessing ROW for: Solar energy development
- Transmission corridors
- Other clean energy infrastructure
- The Ray partnered with WSDOT to conduct statewide suitability modeling.



Solar Suitability Analysis: Workflow

Three-Step Process

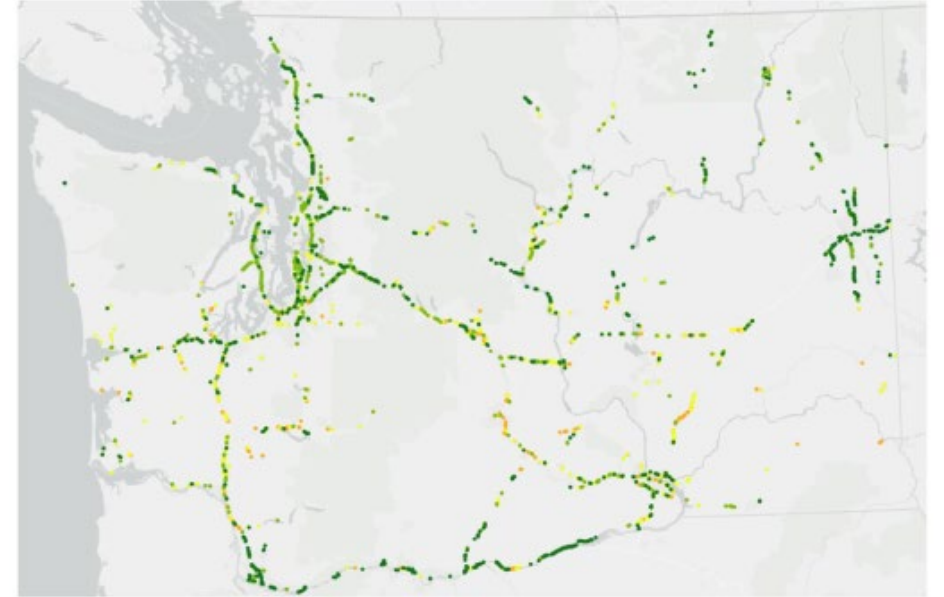
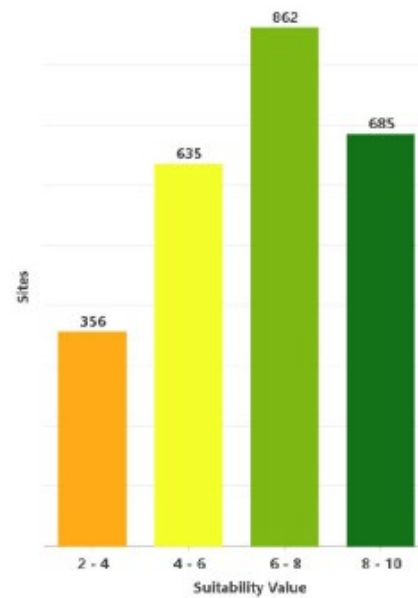
Inclusion/exclusion filtering

Suitability scoring (radiation,
aspect, slope)

3D modeling of selected parcels

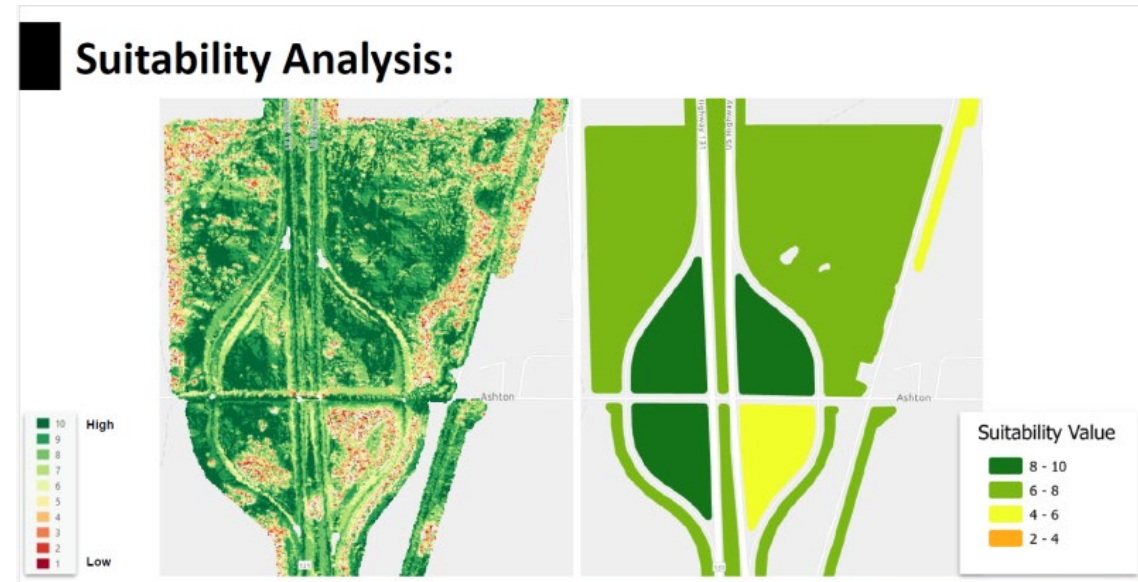
This identifies highly feasible land for
potential solar installations.

Statewide Suitability:



Step 1: Inclusion/Exclusion Criteria

- Land must be:
 - Within 5 miles of transmission/substations
 - Outside protected lands, parks, forests
 - Outside flood zones, wetlands, waterbodies
 - Outside RR lines (20 ft) and transmission lines (50 ft)
 - Outside hazardous pipelines (500 m)
 - Outside road clear zones (40 ft)
 - Minimum usable footprint: **≥1.15 acres, ≥60 ft width**
-
- **Result: > 11,000 acres** suitable across WSDOT ROW.

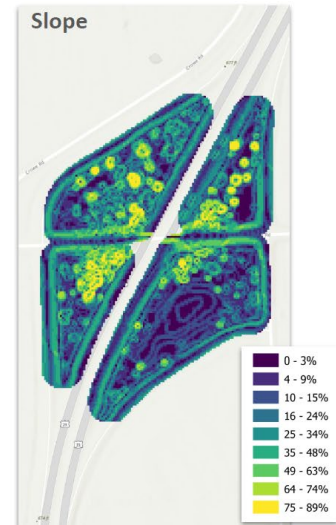
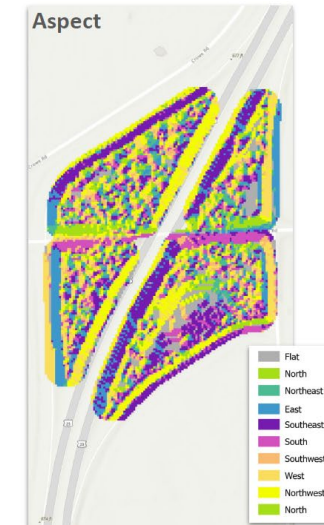
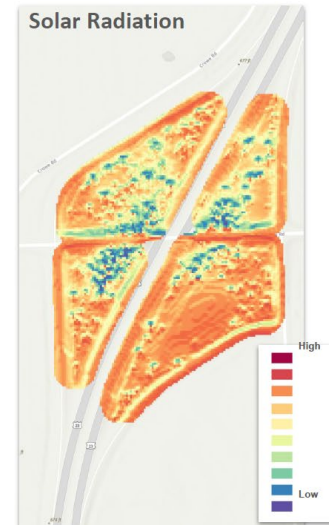


Step 2: Suitability Scoring

- **Data sources:**
 - DSM (preferred) for slope/aspect + tree obstruction
 - DEM where DSM unavailable
 - Weighted scoring:
 - **Solar radiation — 35%**
 - **Aspect — 25%**
 - **Slope — 20%**

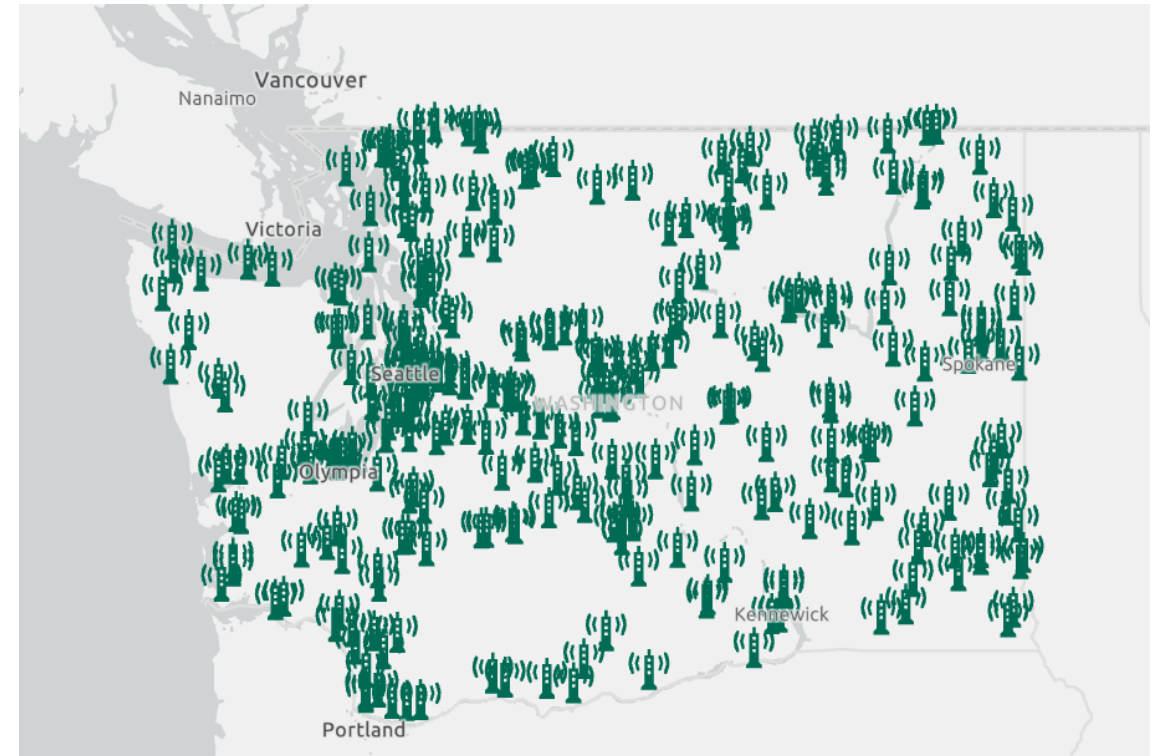
Outcome:

- ~3,000 acres across **685 parcels** score 8–10 (highly suitable).



Pilot Study: Communication Sites

- Objective:
Select 6–10 Communication Sites closest to high-scoring solar sites.
- Data used:
 - 300 Communication Site locations statewide
 - Solar suitability layer
- Proximity analysis (closest facility join)



Pilot Study Questions

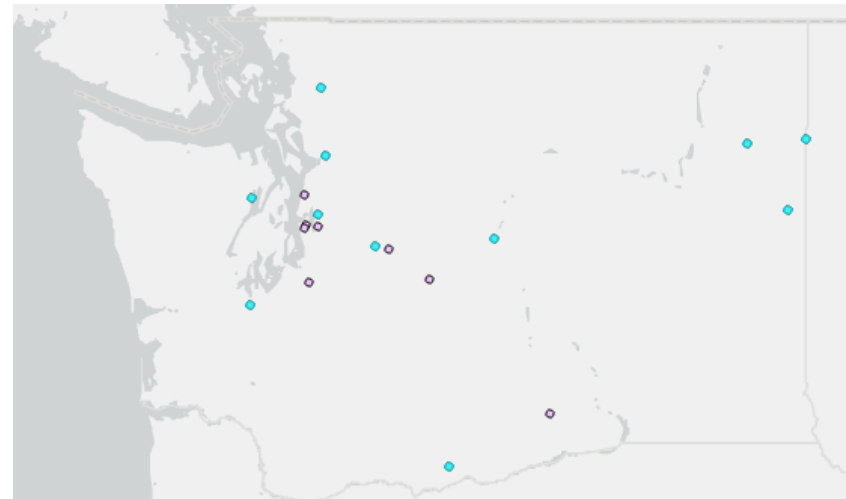
- Which communication sites intersect suitable solar areas?
- If none intersect, which are the closest?
- Where are nearby power plants?
- Can we incorporate utility permitting (UFP) data?
- Does suitability conflict with clear zone areas?



Finding Suitable Communication Sites

- No communication site directly overlapped a suitable solar parcel.
- Conducted **sensitivity analysis** with distance thresholds.
- **800 ft** distance yielded **11** high-value candidate sites (score ≥ 7.5).

Distance (ft)	Total Sites with suitability score > 7.5	Total Communication sites Found	Percent
125	2	4	50%
150	2	4	50%
200	2	6	33%
300	5	10	50%
400	6	11	55%
500	6	12	50%
600	6	14	43%
700	8	16	50%
800	11	19	58%
900	11	21	52%
1000	12	22	55%



	OBJECTID *	Shape *	Join_Count	TARGET_FID	Acres	Composite Score ▼
1	17	Point	1	253	1.912254	9.598726
2	4	Point	1	39	2.162617	8.434783
3	9	Point	1	70	1.885803	8.342657
4	18	Point	1	256	4.713301	8.239884
5	1	Point	1	1	1.24463	8.018616
6	12	Point	1	193	2.135301	7.988232
7	7	Point	1	65	1.281914	7.712766
8	19	Point	1	296	12.545817	7.707027
9	11	Point	1	133	2.597207	7.609375
10	13	Point	1	202	1.246794	7.550562
11	5	Point	1	51	1.688593	7.531746

Top 11 Selected Sites

Sites include:

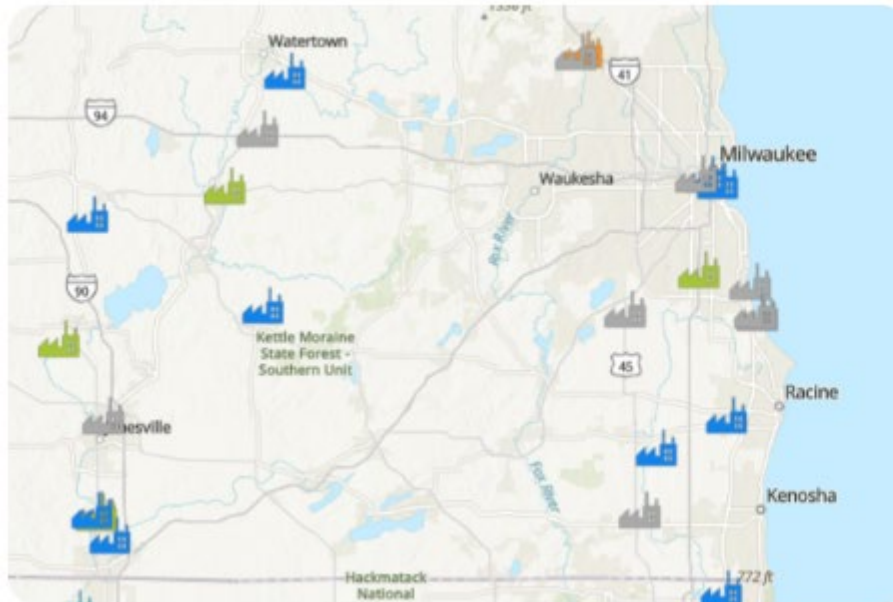
- Newport SMF
- Coal Creek SMF
- Wenatchee RHQ
- Pines Rd SMF
- Tumwater HQ Materials Lab
- Goldendale Area 4 MF
- Northup Area 5 MF
- Grouse Creek SMF
- Walker Mt SMF
- Camp Mason SMF
- Marysville Water Tank Site

Site_FCR	Name	Status	SPWF	Address	City	Zip_Code	Latitude	Longitude
6126DA00	NEWPORT SMF	O	3.300000	806 US HIGHWAY 2	NEWPORT	99156-	48.1759742899999999	-117.0503493
1229DG00	COAL CREEK SMF	O	3.300000	27434 STATE ROUTE 20	SEDRO-WOOLLEY	98284-8020	48.5304470000000002	-122.152365
2004BB00	WENATCHEE RHQ- EUCLID AVE	O	3.100000	2830 EUCLID AVE	WENATCHEE	98801-1156	47.4688269999999997	-120.327397
6132DD00	PINES RD SMF	O	3.300000	12102 E MONTGOMERY DR	SPOKANE VALLEY	99206	47.6752431800000002	-117.2432261
0034AE00	TUMWATER HQ MATERIALS LABORATORY	O	3.700000	1655 S 2ND AVE SW	TUMWATER	98512-6951	47.0011944099999997	-122.9138085
4420CA00	GOLDENDALE AREA 4 MF	O	3.200000	1261 SCALEHOUSE RD	GOLDENDALE	98620-4607	45.8286129999999997	-120.802863
1517CD00	NORTHUP AREA 5 MF	O	3.200000	10833 NORTHUP WAY	BELLEVUE	98004-1415	47.6409400000000001	-122.195181
6433DG00	GROUSE CREEK SMF	O	3.300000	3314 ROITZ RD	VALLEY	99181-	48.1436770400000000	-117.6645454
3216DC00	WALKER MT SMF	O	3.300000	301533 US HIGHWAY 101	BRINNON	98320-	47.7566369999999998	-122.893997
5117DN00	CAMP MASON SMF	O	3.300000	56500 TINKHAM RD	NORTH BEND	98045-	47.4147225999999997	-121.5878582
1331RD00	MARYSVILLE WATER TANK RADIO SITE	L	5.500000	8812 HICKOK RD	MARYSVILLE	98270-	48.0533410000000003	-122.112454

Total potential area: **33.41 acres.**

Utility Franchise Permit (UFP) Layer

- UFP DB maintains utility authorizations on WSDOT ROW.
- Filtered for: **Installation Type: Power Cable**
- **Status: Active**
- Includes State Route + Milepost → enables LRS geospatial joining.
- Created **WA_UFP_PowerCable** layer via Make Event Layer tool.



Power Plants in the U.S.



Federal User Community
Esri U.S. Federal Datasets

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Power Plant Proximity Analysis

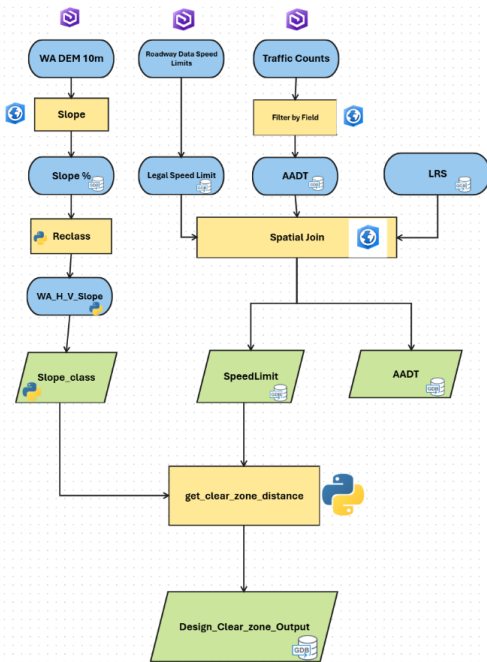
- Used EIA power plant dataset:
- Includes plants ≥ 1 MW
- Categorized by fuel type
- Identified nearest power plants to each top site
- Supports planning for interconnection and distribution feasibility



City location of power plant	County location of power plant	State	Zip code of power plant	Primary Energy Source	Energy sources and c...	Type(s) of technology...
Centralia	Lewis	Washington	98531	coal	Coal = 670 MW	Conventional Steam C...
Ford	Lincoln	Washington	99013	hydroelectric	Hydroelectric = 89.5 M...	Conventional Hydroel...
Wenatchee	Chelan	Washington	98801	hydroelectric	Hydroelectric = 1253.9...	Conventional Hydroel...
Spokane	Spokane	Washington	99212	hydroelectric	Hydroelectric = 4.5 MW	Conventional Hydroel...
Spokane	Spokane	Washington	99027	natural gas	Natural Gas = 24.6 MW	Natural Gas Internal C...
Brinnon	Jefferson	Washington	98320	hydroelectric	Hydroelectric = 0.1 MW	Conventional Hydroel...
North Bend	King	Washington	98045	hydroelectric	Hydroelectric = 4.2 MW	Conventional Hydroel...
Seattle	King	Washington	98195	petroleum	Natural Gas = 3 MW, P...	Natural Gas Steam Tur...
Goldendale	Klickitat	Washington	98620	natural gas	Natural Gas = 263.7 MW	Natural Gas Fired Com...
Mt Vernon	Skagit	Washington	98273	biomass	Biomass = 24.6 MW	Wood/Wood Waste Bi...
Dayton	Columbia	Washington	99328	wind	Wind = 234 MW	Onshore Wind Turbine

Clear Zone Analysis

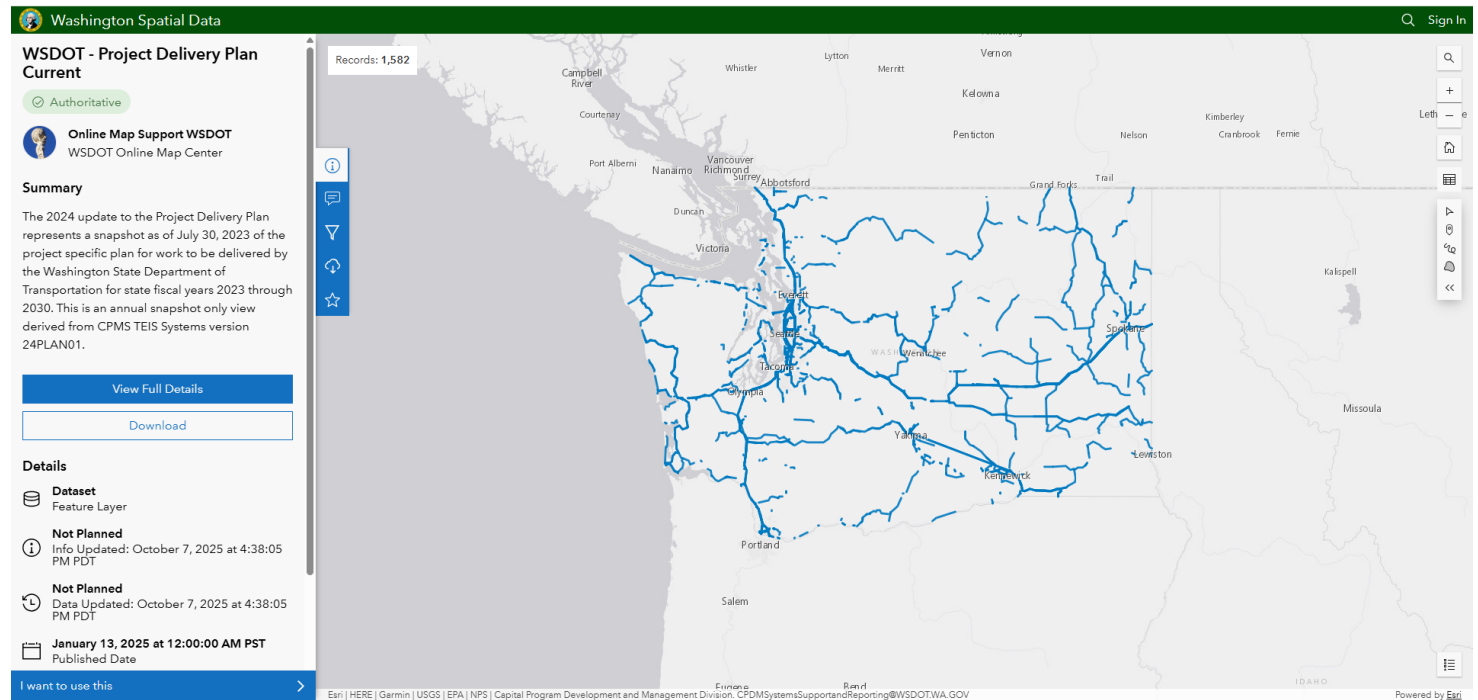
- Derived from WSDOT Design Manual (M 22-01)
- Based on slope categories, AADT, and speed limits
- Continuous route-based clear zone layer ensures solar placements do **not** violate safety buffers



Posted Speed (mph) [2]	Average Daily Traffic	Cut Section (Backslope) (H:V) [4]					Fill Section (H:V) [4]							
		3:1 and steeper	4:1	5:1	6:1	8:1	10:1 and flatter	Steeper than 3:1	3:1	4:1	5:1	6:1	8:1	10:1 and flatter
35 or Less	All	10	10	10	10	10	10	[3]	[1]	10	10	10	10	10
	0 - 250	10	10	10	10	10	10			13	12	11	11	10
	251 - 800	11	11	11	11	11	11			14	14	13	12	11
	801 - 2,000	12	12	12	12	12	12			16	15	14	13	12
	2,001 - 6,000	14	14	14	14	14	14			17	17	16	15	14
40	Over 6,000	15	15	15	15	15	15	19	18	17	16	15		
45	0 - 250	11	11	11	11	11	11	16	14	13	12	11		
	251 - 800	12	12	13	13	13	13	18	16	14	14	13		
	801 - 2,000	13	13	14	14	14	14	20	17	16	15	14		
	2,001 - 6,000	15	15	16	16	16	16	22	19	17	17	16		
	Over 6,000	16	16	17	17	17	17	24	21	19	18	17		
50	0 - 250	11	12	13	13	13	13	19	16	15	13	13		
	251 - 800	13	14	14	15	15	15	22	18	17	15	15		
	801 - 2,000	14	15	16	17	17	17	24	20	18	17	17		
	2,001 - 6,000	16	17	17	18	18	18	27	22	20	18	18		
	Over 6,000	17	18	19	20	20	20	29	24	22	20	20		
55	0 - 250	12	14	15	16	16	17	25	21	19	17	17		
	251 - 800	14	16	17	18	18	19	28	23	21	20	19		
	801 - 2,000	15	17	19	20	20	21	31	26	23	22	21		
	2,001 - 6,000	17	19	21	22	22	23	34	29	26	24	23		
	Over 6,000	18	21	23	24	24	25	37	31	28	26	25		
60	0 - 250	13	16	17	18	19	19	30	25	23	21	20		
	251 - 800	15	18	20	20	21	22	34	28	26	23	23		
	801 - 2,000	17	20	22	22	23	24	37	31	28	26	25		
	2,001 - 6,000	18	22	24	25	26	27	41	34	31	29	28		
	Over 6,000	20	24	26	27	28	29	45	37	34	31	30		
65	0 - 250	15	18	19	20	21	21	33	27	25	23	22		
	251 - 800	17	20	22	22	24	24	38	31	29	26	25		
	801 - 2,000	19	22	24	25	26	27	41	34	31	29	28		
	2,001 - 6,000	20	25	27	27	29	30	46	37	35	32	31		
	Over 6,000	22	27	29	30	31	32	50	41	38	34	33		
70	0 - 250	16	19	21	21	23	23	36	29	27	25	24		
	251 - 800	18	22	23	24	26	26	41	33	31	28	27		
	801 - 2,000	20	24	26	27	28	29	45	37	34	31	30		
	2,001 - 6,000	22	27	29	29	31	32	50	40	38	34	33		
	Over 6,000	24	29	31	32	34	35	54	44	41	37	36		

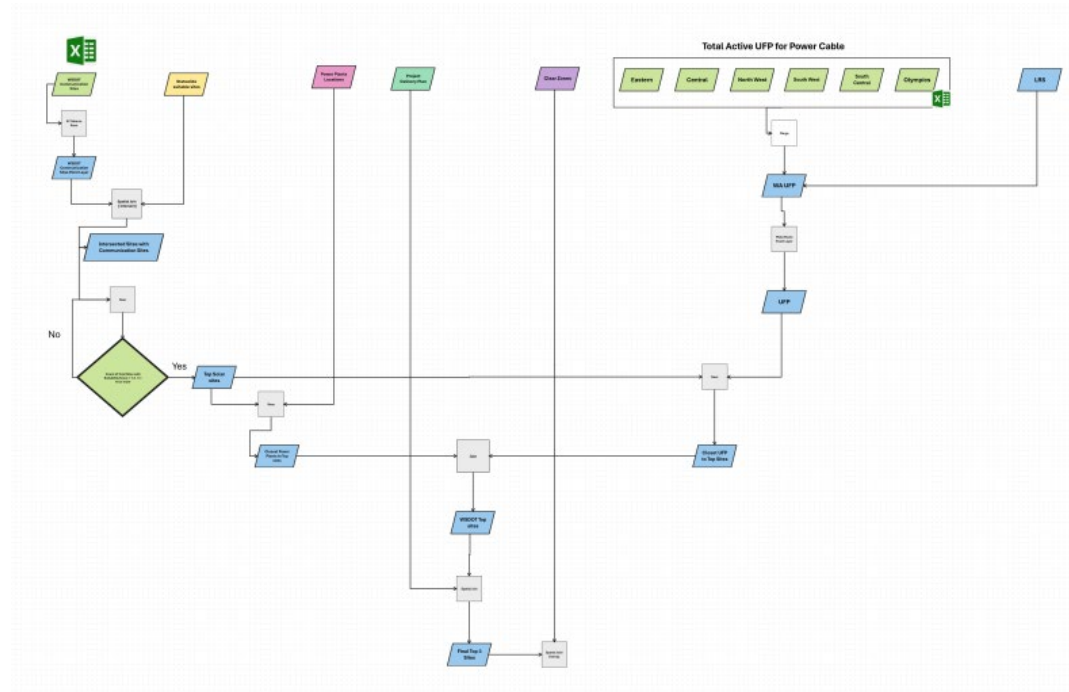
Integration with Project Delivery Plan

- Checked for conflicts with six-year WSDOT construction plan
- Ensures solar deployment does not interfere with upcoming projects
- Identified sites with **no conflicts**



Overview of Data Layers Used

- Solar Suitability (DSM/DEM)
- Communication Sites
- Power Plants (EIA)
- Utility Franchise Permits
- PLSS and Tax Parcels
- Clear Zone Layer
- WSDOT LRS + Event Layer
- Project Delivery Plan
- ECM Plan Sets (for selected top 3 sites)



Top Three Sites

For each of the 3 prioritized sites:

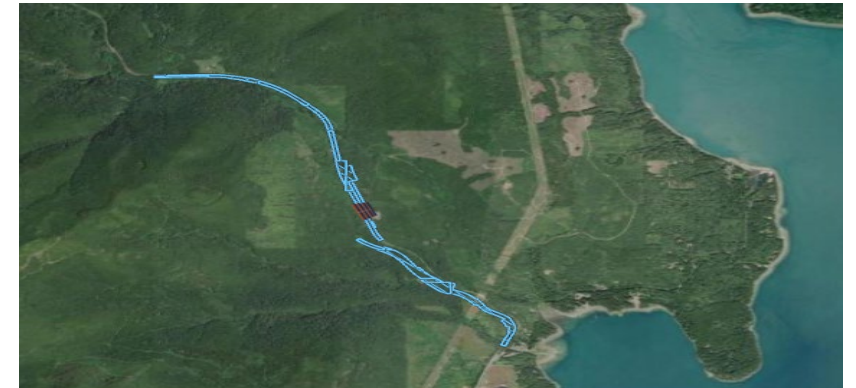
- Parcel ownership details
- ECM plan sets located
- Parcel inventory
- Hand-off to The Ray for 3D modeling



Site 1



Site 2



Site 3

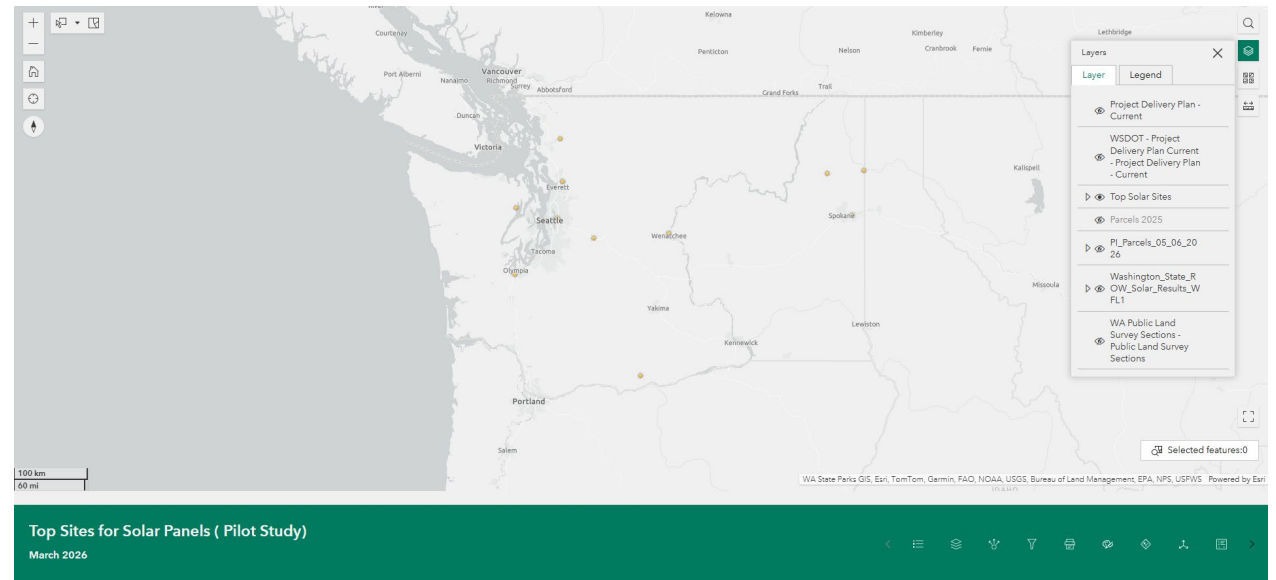
Conclusion

WSDOT ROW has **significant solar potential**: 11,000+ acres suitable

- 3,944 GWh/year potential
- ~\$419M annual electricity value

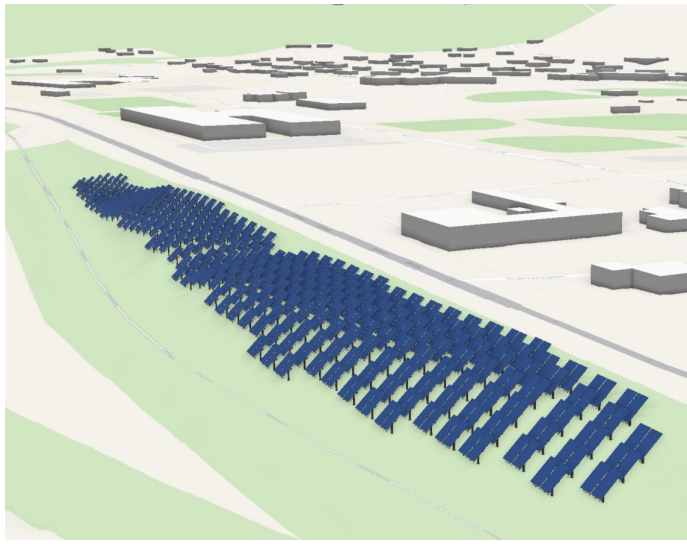
Pilot successfully identified **11 promising communication sites**. Integrated multi-layer GIS approach provides: High spatial accuracy

- Safety conformity
- Utility + power infrastructure alignment
- Planning confidence for long-term deployment

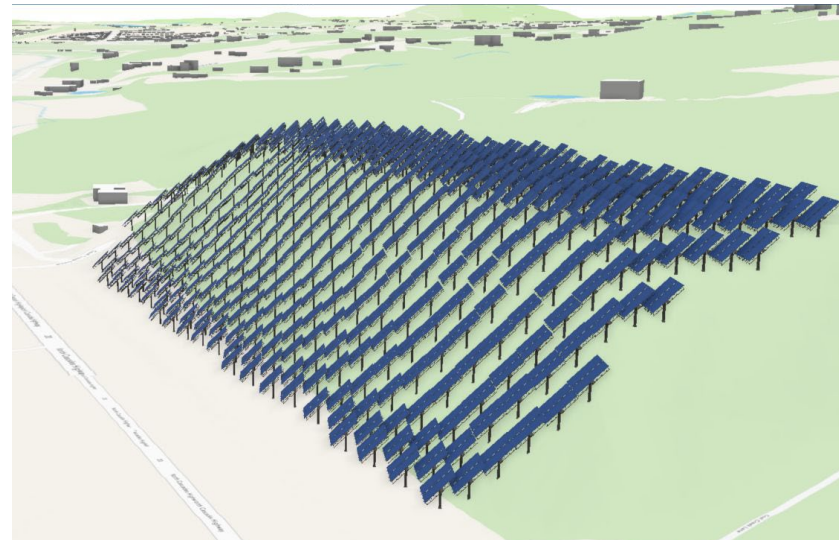


Next Steps

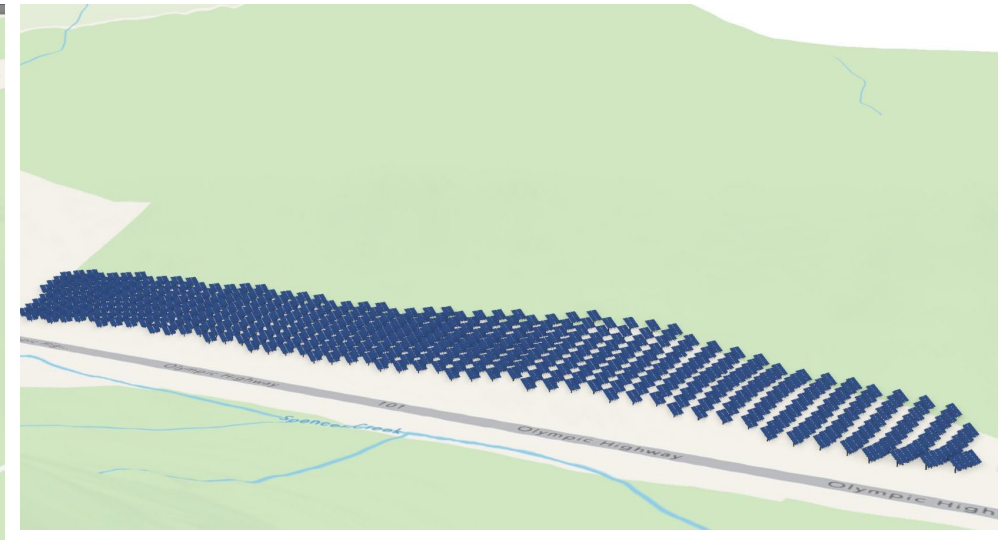
- Complete 3D modeling (The Ray)
- Begin cost and engineering assessments
- Engage utility partners for interconnection



Site 1



Site 2



Site 3

DEMO

WSDOT RES Team
M2D2 Leadership
THE RAY Team

