TUUSSO ENERGY, LLC
COLUMBIA SOLAR PROJECTS
WASHINGTON ENERGY FACILITY SITE EVALUATION COUNCIL
APPLICATION FOR SITE CERTIFICATION

EFSEC Docket Number: EF-170823

January 26, 2018

SWCA ENVIRONMENTAL CONSULTANTS
SEATTLE, WASHINGTON

TABLE OF CONTENTS

APPENDICES AND ATTACHMENTS

LIST OF TABLES

LIST OF FIGURES

1 GENERAL PROJECT INFORMATION

1.1 General — Organization — Index 463-60-012

Except as may be otherwise approved by the council and except as otherwise provided below with respect to applications covering nuclear power plants, the contents of the application shall be organized in the same order as these guidelines.

(1) To aid in the council's review under SEPA and chapter 463-47 WAC, WAC 463-60-302 through 463-60-372 are similar to the elements required in an environmental impact statement.

(2) In the case of an application covering a nuclear power plant, the environmental report prepared for the nuclear regulatory commission may be substituted for the comparable sections of the site certification application, provided that the environmental report is supplemented as necessary to comply with this chapter and that an index is included listing these guidelines in order and identifying where each applicable guideline is addressed.

This Washington Energy Facility Site Evaluation Council (EFSEC) Application for Site Certification (ASC) for TUUSSO Energy, LLC's (TUUSSO's), Columbia Photovoltaic Solar Projects has been organized according to the regulations, providing the requirement verbatim first, followed by the responses to the requirement. A table of contents is provided above, to identify the requirements and the page locations where they are addressed. This application has been organized into four major parts/chapters:

Chapter 1: General Project Information

Chapter 2: Solar Project Proposal Descriptions

Chapter 3: Natural Environment Affected Environment and Impacts

Chapter 4: Built Environment Affected Environment and Impacts

A number of appendices follow these major chapters including, for each of the five Columbia Solar Project sites, copies of the wildlife and habitat assessment reports, critical areas (wetlands and water) reports, cultural resources reports, visual resources report, solar glare report, draft permit applications, site plans, and other materials.

1.2 General — Description of Applicant 463-60-015

The applicant shall provide an appropriate description of the applicant's organization and affiliations for this proposal.

TUUSSO is a privately-owned, Seattle-based utility-scale solar developer. The owners of TUUSSO comprise Pivotal Investments (a Portland-based venture capital firm), the principals and co-founders (Owen Hurd, Jason Evans, Vivek Nayak, and Byron Crawford), and a number of family and friends investors.

TUUSSO is composed of the following board and advisors:

John Cooper, Director
Owen Hurd, Director
John Miner, Director
Mark Liffmann, Advisor

TUUSSO's Management Team includes:

Owen Hurd, President, Chief Financial Officer
Jason Evans, General Counsel and Vice President of Business Development
Vivek Nayak, Vice President of Operations
Bryan Crawford, Vice President of Project Origination

TUUSSO was formed in late 2008 and has developed over 100 MWac of solar photovoltaic (PV) projects across the United States, from California to Maryland, ranging in size from 15 to 45 MWac. These projects are owned by large independent power producers and utilities, including Dominion Power and NRG.

1.3 Council Recognizes Pressing Need for Energy Facilities 463-60-021

RCW 80.50.010 requires the council to "recognize the pressing need for increased energy facilities." For that reason, applications for site certification need not demonstrate a need for the energy facility.

As indicated, no action is required by TUUSSO to meet this regulatory requirement. However, please note that the State of Washington has enacted aggressive legal and policy standards in pursuit of more renewable energy, including a Renewable Portfolio Standard of 15% by 2020. TUUSSO's five proposed Columbia Solar Projects would help the State to meet those objectives.

1.4 General — Designation of Agent 463-60-025

The applicant shall designate an agent to receive communications on behalf of the applicant.

Please direct all communications as follows:

Jason Evans
500 Yale Avenue North
Seattle, WA 98109
Email: Jason.evans@tuusso.com
Phone: 206-303-0198

With a CC to:

Stoel Rives LLP
Attn: Tim McMahan
760 SW Ninth Avenue, Suite 3000
Portland, OR 97205
Email: tim.mcmahan@stoel.com
Phone: 503-294-9517

1.5 General — Application Review Costs and Funding 463-60-035

The statutory initial charges shall accompany an application and shall be a condition precedent to any action by the council. The initial costs and any additional funds needed for the review of an application, including the method of payment, shall be in accordance with chapter 463-58 WAC.

In accordance with WAC 463-58-020, a deposit shall accompany the application as required by Revised Code of Washington (RCW) 80.50.071. RCW 80.50.071 was updated in 2016 establishing the application deposit in an amount up to fifty thousand dollars ($50,000), or such greater amount as specified by EFSEC after consultation with the Applicant. TUUSSO is providing the initial $50,000 deposit with this Application for Site Certification for the five proposed Columbia Solar Projects.

1.6 General — Where Filed 463-60-045

Applications for site certification shall be filed with the council at the council office.

This application is filed with the Council at the following address:

Washington Energy Facility Site Evaluation Council
Utilities & Transportation Commission
1300 S Evergreen Park Drive SW
Olympia, WA 98504-3172

1.7 General — Form and Number of Copies 463-60-055

(1) Applications shall be on 8-1/2 by 11" sheets, in loose-leaf form with a hard cover binder. The applicants shall supply a sufficient number of copies of the application to the council, the number to be determined by the council in consultation with its staff, consultants and the applicant. The applicants shall also supply two copies to each county, two copies to each city, and one copy to each port district in which the proposed project would be located. In addition, one copy shall be supplied to each intervenor on admission to the proceedings. Information later submitted shall be by page-for-page substitutions suitable for insertion in the application binder, bearing the date of the submission.

In accordance with this requirement, TUUSSO is submitting 15 copies of the ASC to EFSEC and one copy to Kittitas County, where all five Columbia Solar Projects would be located.

(2) An applicant shall also provide the council copies of its application in a digital format for use in personal computers. Digital format shall be determined by the council in consultation with its staff, consultants and the applicant.

In accordance with this requirement, TUUSSO is submitting 50 electronic copies of the ASC to EFSEC for its use and review.

(3) At the time of submittal of the application, the applicant shall submit one copy of the applicable land use plans and zoning ordinances for the project site.

Per this requirement, one hard copy of the Kittitas County Comprehensive Plan and Zoning Ordinances have been provided along with the ASC to EFSEC.

1.8 General — Full Disclosure by Applicant 463-60-065

It is recognized that these guidelines can only be comprehensive in a relative sense. Therefore, and in addition to the other guidelines contained herein, the council adopts the basic guideline that an applicant for site certification must identify in the application all information known to the applicant which has a bearing on site certification.

TUUSSO has provided in this application and accompanying documentation all information known to TUUSSO that might have a bearing on site certification for the Columbia Solar Projects.

1.9 General — Assurances 463-60-075

The application shall set forth insurance, bonding or other arrangements proposed in order to mitigate for damage or loss to the physical or human environment caused by project construction, operation, abandonment, termination, or when operations cease at the completion of a project's life. The application shall describe the applicant's commitment to the requirements of chapter 463-72 WAC, Site restoration and preservation.

TUUSSO will comply with the requirements of Washington Administrative Code (WAC) 463-72, Site Restoration and Preservation. A preliminary Decommissioning Plan is being submitted with this application for the Council's review, and an Initial Site Restoration Plan would be submitted to the Council at least 90 days prior to the beginning of site preparation, in accordance with WAC 463-72-040.

TUUSSO is committed to mitigating for the potential of any damage or loss to the physical or human environment at all phases of the five proposed Columbia Solar Projects. Prior to construction, in accordance with WAC 463-72-020(2), TUUSSO would provide evidence of pollution liability insurance coverage, as well as financial assurance in a form and an amount sufficient to ensure the restoration and decommissioning of the five solar project sites, in accordance with the EFSEC-approved Initial Site Restoration and Decommissioning Plan. Such financial assurance would be provided to ensure the availability of said funds to EFSEC in the event that TUUSSO fails to timely or adequately perform its decommissioning duties, as described in the Initial Site Restoration and Decommissioning Plan. The utilization of said funds shall be restricted to decommissioning operation and requirements as detailed by the Plan. Residual funds (not used specifically for reclamation or remediation) shall be returned to TUUSSO once the decommissioning operations have been completed to the satisfaction of EFSEC. The financial assurance shall be in the form of a site closure bond, sinking fund, or other financial instrument or security deemed satisfactory to, and enforceable by, EFSEC. Such funds shall remain in place until decommissioning is completed to the satisfaction of EFSEC.

TUUSSO would provide a report to EFSEC staff every 5 years after approval of the ASC, confirming that the performance and financial assurance guarantees are sufficient to ensure performance and implementation of the Initial Site Restoration and Decommissioning Plan. The report shall provide a decommissioning pro-forma budgetary analysis summarizing the residual value of the salvageable property. The pro-forma shall include, at a minimum, the expected revenue from all salvageable property, the then-current cost of decommissioning the sites, and the then-current value of any performance and financial guarantees.

During construction, TUUSSO and/or its engineering, procurement, and construction (EPC) firm, as appropriate, would hold a full suite of insurance products to mitigate risks, including general liability and property insurance, pollution liability insurance, contractor/builder's risk insurance, and worker's compensation. Once the sites are operational, TUUSSO would continue to maintain general liability insurance and pollution liability insurance, as well as an operational property insurance to cover against all risks associated with physical damage caused by a wide range of physical perils.

1.10 General — Mitigation Measures 463-60-085

(1) Mitigation measures summary. The application shall summarize the impacts to each element of the natural or built environment and the means to be utilized to minimize or mitigate possible adverse impacts during construction, operation, and decommissioning of the proposal, all associated facilities, and any alternatives being brought forward.

Table 1.10-1 summarizes the mitigation measures that TUUSSO plans to implement during construction and operation of the five Columbia Solar Projects. Potential construction and operational impacts of the Columbia Solar Projects are summarized in greater detail below in Section 1.16, Table 1.16-1.

Table 1.10-1. Summary of Mitigation Measures for the Columbia Solar Projects Potential Construction and Operational Impacts

Technical Resource	Mitigation Measures
Earth	Geology Construction: Complete several test borings to determine whether piles could be placed without damage. The purpose of this testing would be two-fold: 1) it is necessary to determine that the piles can be driven into the bearing soils to the required embedment depth without damaging the pile and 2) it is required to load test the resulting piles to determine that adequate bearing capacity is being developed. Operation: There would be no long-term operational mitigation measures for geology. Soils Construction: • Planned BMPs include those from stormwater management guidelines applicable to eastern Washington. • If excavated site soils are to be used as structural fill, they would be protected from moisture while stockpiled. • Stockpiled topsoil would not be mixed with structural fill, if it is planned for use in non-structural areas. • Temporary excavations like utility excavations and foundation excavations with heights in excess of 4 feet would be sloped no steeper than 1.5H:1V. If seepage is observed in these excavations, they may need to be sloped at 2H:1V to prevent sloughing due to seepage pressure. Dewatering measures may also be needed to control seepage. • Temporary construction ingress and egress would be completed prior to the start of ongoing construction traffic at the solar project sites. A temporary construction entrance would be constructed of 8 to 12 inches of quarry spalls. If the soils in the entrance locations are soft, a layer of geotextile fabric would be laid down as a barrier prior to placement of quarry spalls. The quarry spalls would provide a stable entrance/exit to the sites and would limit tracking of mud onto the existing public and private roads during and after wet weather. • Infiltration and temporary erosion and sedimentation control (TESC) measures would consist of installation of silt fencing as needed around the solar project site entrances, around the perimeter of the low side of the sites, and at discharge points where sediment-laden surface water might enter off-site drainage features. Because the solar project sites are flat and slope very gently to the south, silt fencing would probably not be necessary at the southern perimeters. Operation: Planned BMPs include those from stormwater management guidelines applicable to eastern

Technical Resource	Mitigation Measures
	Washington. Topography, Unique Physical Features, and Seismic Activities Construction and Operation: No mitigation measures are proposed for these technical resources because there would be no significant impacts from the proposed solar projects related to these resources.
Air	Construction: Dust from access roads would be controlled by applying gravel or watering, as necessary. Operation: There would be no long-term operational mitigation measures for air.
Water	Water Resources Construction: • TUUSSO utilized avoidance measures during the solar project designs to avoid, reduce, or eliminate impacts to water resources. • At unavoidable crossings of water resources, TUUSSO would utilize the existing bridge infrastructure to the extent possible and, where bridge improvements are needed, techniques would be utilized that would not require impacting water resources below their ordinary high water marks (OHWMs), such as spanning existing bridges. • Proper BMPs to reduce or eliminate runoff of contaminants would be utilized, including the proper use of silt fencing, to protect water resources from contamination and sedimentation. Operation: • Once construction is completed, seeding would be conducted in accordance with the Restoration and Vegetation Management Plan to reduce erosion of bare ground. • Once the solar project sites have been adequately re-vegetated, the operational use of the solar project sites would be limited to the installed infrastructure and would not involve any activities that could affect water resources. Surface Water Construction and Operation: The mitigation measures for Soils (above) and Runoff/Absorption (below) would also reduce the potential for significant surface water impacts. Runoff/Absorption Construction: • Off-site flows have been calculated for the solar project sites, and would bypass the sites via the existing flow paths, which run throughout the sites in poorly defined flow paths. The solar project sites have been laid out to minimize the area that would encroach into the flow paths. Where limited grading would occur, the solar project sites would be graded such that surface water is directed away from structures and slopes. • Surface water would not be allowed to pond near the tops or toes of slopes. • Stormwater discharge BMPs would be implemented to control runoff from the solar project sites. • Sediment-laden surface water would be treated such that water discharged from the solar project sites meets all water quality standards. • Stormwater would not be discharged over the project site slopes to the north of each site. Operation: The measures implemented during the operation phase would be the same as those discussed above for the construction phase of the projects. Floodplains Construction: • TUUSSO utilized avoidance measures during the solar project designs to avoid, reduce, or eliminate impacts to the FEMA-mapped 100-year floodplain within the Columbia Solar Project sites. • In areas of the FEMA-mapped 100-year floodplain that would be unavoidable, TUUSSO

Technical Resource	Mitigation Measures
	would limit site grading, except in areas where roads and transformers would be located, so as not to substantially alter the floodplain storage area. All transformers would be located outside of the FEMA-mapped 100-year floodplain. • Footings for the solar panel modules would be installed using vibratory driven H-piles, which would not result in any soil spoil piles and would minimize the overall footprint of the solar panel modules. Operation: Once construction is completed, no additional measures would need to be taken to mitigate for the operational use of the solar project sites, which would be limited to the installed infrastructure and would have minimal changes in elevation or grade in FEMA-mapped 100-year floodplain areas. Groundwater Construction: Groundwater control measures would be on-site or readily available, including trash pumps, sumps, and discharge ditches. Operation: Groundwater control measures would be on-site or readily available, including trash pumps, sumps, and discharge ditches.
Habitat, Vegetation, Fish, and Wildlife	Construction: Buffers and Seasonal Timing: • To ensure compliance with MBTA, vegetation clearing would ideally be undertaken from August 1 through the end of February. • If construction or vegetation clearing is required between March 1 and August 1, nest surveys would be required in the proposed area of disturbance. If active migratory bird nests (including raptor nests) are encountered during the surveys, land-disturbing construction activities should be avoided while the birds are allowed to fledge. An appropriate species avoidance buffer, as determined in conjunction with WDFW and local agencies, would apply to all active nests for migratory bird species. Riparian Corridors: • Avoidance buffers have been incorporated into the solar project designs for the Yakima River and streams in the vicinity of the proposed solar projects. • To additionally protect riparian corridors and habitats, peak construction activities would be conducted during the dry season as much as possible, to minimize erosion, sedimentation, and soil compaction. Noise: All noise-generating construction activities would be conducted between the hours of 7 a.m. and 10 p.m., in accordance with WAC 173-60-050 and local bylaws and noise ordinances, including but not limited to KCC 9.45.010, Public Disturbance Noises. These practices would avoid night-time noise disturbances to wildlife species. Design and Construction Techniques: • Avoid, when possible, construction in sensitive areas such as riparian zones and wetlands. • Flag sensitive habitat areas (e.g., raptor nests, wetlands, etc.) near proposed areas of construction activity, and designate such areas as off limits to all construction personnel. • During the nesting season, monitor raptor nests within 0.25 mile of the sites for nesting activity; coordinate construction timing and activities with WDFW to avoid impacts to nesting raptors. • Minimize new road construction by improving and using existing roads and trails, instead of constructing new roads. • Develop and implement a Fire Control Plan, in coordination with local fire districts, to minimize the risk of accidental fires during construction, and respond effectively to any fire that does occur. • Designate an environmental monitor during construction to monitor construction activities and

Technical Resource	Mitigation Measures
	ensure compliance with mitigation measures. • Implement a trenching protocol during the installation of underground electrical facilities, to allow for conservation of surface soils. • Require construction personnel to avoid driving over or otherwise disturbing areas outside of the designated construction areas. • Properly store and manage all wastes generated during construction. • Use certified weed-free straw bales during construction to avoid introduction of noxious or invasive weeds. • There would be one straight row of barbed wire, not circular barbed wire, at the top of the perimeter fences. This would avoid birds becoming trapped in circular barbed wire. • For poles installed by TUUSSO, when feasible: o equip overhead power lines with raptor perch guards to minimize risks to raptors and o space overhead power line conductors to minimize potential for raptor electrocution. Erosion and Sediment Control: • Use BMPs to minimize construction-related surface water runoff and soil erosion. • Implement temporary erosion and sediment control measures, as appropriate, both during and after construction. • Flag sensitive habitat areas (e.g., riparian zones, wetlands, etc.) near proposed areas of construction activity, and designate such areas as off limits to all construction personnel. • Limit disturbances to the minimum necessary when working in or near waterbodies, and install stakes or flagging to restrict vehicles and equipment to designated routes and areas. • Delineate construction limits within 200 feet of waterbodies, as specified in the Stormwater Pollution Prevention Plan (SWPPP), with a sediment fence, straw wattles, or similarly approved methods to eliminate sediment discharge into waterways and wetlands, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible. Restoration and Noxious Weed Control: • Quickly revegetate habitats temporarily disturbed during construction with native species. • Reseed all temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed, to accelerate the revegetation of these areas and to prevent the spread of noxious weeds. • Consult with WDFW regarding the appropriate native seed mixes to include in the Vegetation Management Plan for revegetation of the solar project sites. • As further detailed in the Vegetation Management Plan, implement noxious weed control measures. • Develop a Noxious Weed Control Plan prior to construction, and implement the plan over the life of the solar projects as mitigation. Herbicide application could be a noxious weed control method used. Operation: Fire Control Plan: Implement the Fire Control Plan in coordination with local fire districts, to minimize the risk of accidental fires during operation, and respond effectively to any fire that does occur. Erosion and Sediment Control: Use BMPs to minimize operation-related surface water runoff and soil erosion. Noxious Weed Control: Implement the Noxious Weed Control Plan (as further detailed in the Vegetation Management Plan) over the life of the solar projects as mitigation.
Wetlands	Construction: • TUUSSO utilized avoidance measures during the solar project designs to avoid, reduce, or eliminate impacts to wetlands. • At the unavoidable crossing of wetland TW03 on the Typha Solar Project site, TUUSSO would utilize the existing land-bridge to the extent possible to improve the crossing of this wetland. Minor wetland fill would occur, but minimization of impacts would be achieved and

Technical Resource	**Mitigation Measures**
	would keep the wetland fill below 1,000 square feet, which is below the threshold for which wetland mitigation is required. • All other wetlands would be avoided through the solar project designs. • Proper BMPs to reduce or eliminate runoff of contaminants would be utilized, including the proper use of silt fencing, to protect wetlands from contamination and sedimentation. Operation: • Once construction is completed, seeding would be conducted in accordance with the Restoration and Vegetation Management Plan to reduce erosion of bare ground. Once the site has been adequately re-vegetated, the operational use of the solar project sites would be limited to the installed infrastructure and would not involve any activities that could affect wetlands. • In accordance with the Restoration and Vegetation Management Plan, some seeding and planting within wetlands would occur within the first two years of operations at the Typha and Urtica Solar Project sites. These actions would have a net benefit to the quality of wetlands at these two project sites. • Additional operational vegetation management actions would involve some minor herbicide treatments to control noxious weeds, potentially near wetland areas.
Energy and Natural Resources	Construction and Operation: Because there would be minimal or no construction or operational impacts to Energy and Natural Resources, no mitigation measures are proposed.
Environmental Health	Noise Construction: • All noise-generating construction activities would take place within the hours of 7:00 a.m. to 10:00 p.m. so that it is exempt from local noise standards. • Construction equipment would use noise reduction devices that are no less effective than those originally installed by the manufacturer. • Stationary equipment used during construction would be located as far as practical from sensitive noise receptors. • “Quiet” equipment (i.e., equipment that incorporates noise control elements into the design—compressors have “quiet” models) would be used during construction when reasonably available. Operation: Operation of the Fumaria, Penstemon, Typha, and Urtica Solar Projects would not exceed the Washington State Noise Maximum and no mitigation is required. Preliminary estimates of the noise levels at the Camas Solar Project property boundary exceed the Washington State Noise Maximum. Post-construction noise monitoring would be conducted and any further mitigation, such as installing a noise-mitigating barrier, would be completed to comply with the noise standard. Risk of Fire or Explosion Construction and Operation: Because there would be minimal risks and potential impacts of fire during construction or operation of the solar project sites, and no risks of explosion, no mitigation measures are proposed. Spill Prevention and Control Construction and Operation: Because there would be no construction or operational impacts to Spill Prevention and Control from the solar project sites, no mitigation measures are proposed. Solid Wastes Construction and Operation: Because there would be no construction or operational impacts to Solid Wastes from the solar project sites, no mitigation measures are proposed.
Land and Shoreline Use	Land Use and Zoning Construction and Operation:

Technical Resource	Mitigation Measures
	Because there would be no construction or operational impacts to Land Use and Zoning from the solar project sites, no mitigation measures are proposed. Light and Glare Construction and Operation: Because there would be no construction or operational impacts to light and glare from the solar project sites, no mitigation measures are proposed. Aesthetics General: • Vegetation or fencing would be used to interrupt the line of sight from nearby KOPs at or near the same elevation of the projects. o Camas Solar Project site – along the northeast border of the site (see ASC Figure 2.3-1) o Fumaria Solar Project site – along the southeast border of the site (see ASC Figure 2.3-2) o Penstemon Solar Project site – along the northern and western borders of the site (see ASC Figure 2.3-3) o Typha Solar Project site – along the east-central border of the site (see ASC Figure 2.3-4) o Urtica Solar Project site – along the northwestern and southeastern borders of the site (see Figure 2.3-5) • Vegetation and ground disturbance would be minimized near roads, and the use of existing clearings would be maximized. • The use of non-necessary and/or non-safety-related signs and project construction signs should be minimized; necessary signs would be made of non-glare materials and use unobtrusive colors; reverse sides of signs and mounts would be painted or coated using the most suitable color to reduce color contrasts with the existing landscape; however, placement and design of any signs required by safety regulations must conform to regulatory requirements. • “Good housekeeping” procedures would be developed to ensure that the sites are kept clean of debris, garbage, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards. Design features regarding waste management would be applied. • A lighting plan would be prepared that documents how lighting would be designed and installed to minimize night-sky impacts during facility construction and operations phases. Lighting for facilities would not exceed the minimum number of lights and brightness required for safety and security, and would not cause excessive reflected glare. Full cut-off luminaires would be used to minimize upward shining lighting. Lights would be directed downward or toward the area to be illuminated. Light fixtures would not spill light beyond the project boundary. Lights in high illumination areas not occupied on a continuous basis would have switches, timer switches, or motion detectors so that the lights operate only when the area is occupied. Where feasible, vehicle-mounted lights would be used for night maintenance activities. Wherever feasible, consistent with safety and security, lighting would be kept off when not in use. The lighting plan would include a process for promptly addressing and mitigating complaints about potential lighting impacts. • Each of the five solar sites would be adequately screened by either existing or new vegetation or through the application of perimeter fencing to reduce contrast from glint and glare for KOPs with level views. Construction: • Project developers would integrate visual and aesthetics mitigation elements early in the construction, which may include treatments such as thinning and feathering vegetation along project edges, salvaging landscape materials from within construction areas, etc. • Visual impacts would be reduced during construction by clearly delineating construction boundaries. Within areas not intended for long-term use, impacts would be reduced by minimizing areas of surface disturbance within those boundaries; preserving vegetation to the greatest extent possible; using undulating surface disturbance edges; controlling erosion; using fugitive dust suppression techniques; and restoring exposed soils to their original

Technical Resource	Mitigation Measures
	contour and vegetation. • An interim reclamation plan would be in place prior to construction. Interim reclamation of the construction site would begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of impacted areas as quickly as possible. • Existing rocks, vegetation, and drainage patterns would be preserved to the maximum extent practicable, particularly within temporary use areas. • Brush-beating or mowing, or using protective surface matting rather than vegetation removal would be done where feasible. • For interim reclamation areas, slash from vegetation removal would be mulched and spread to cover fresh soil disturbances as part of the revegetation plan. Slash piles would not be left in sensitive viewing areas. • No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate surveyor construction activity limits, except in areas defined and designated for disturbance. • All stakes and flagging would be removed from the construction area and disposed of in an approved facility. Operation: • The project developer would maintain revegetated surfaces until a self-sustaining stand of vegetation is re-established and visually adapted to the undisturbed surrounding vegetation. For new areas of disturbance (beyond the scope of this project), no new disturbance would be created during operation. • Interim restoration would be undertaken during the operating life of the projects as soon as possible after disturbances. • Maintenance activities would include noxious weed control. • Road maintenance activities would avoid blading existing vegetation in ditches and adjacent to roads. • Painted facilities would be kept in good repair and repainted when color fades or flakes increase visual contrast. Recreation Construction and Operation: Because there would be no construction or operational impacts to Recreation from the solar project sites, no mitigation measures are proposed. Cultural and Historical Preservation Construction: • Two historic properties were recommended potentially eligible for listing in the NRHP. The Cascade Canal is 42 miles long and a portion passes through the Fumaria Solar Project generation tie line corridor. The Ellensburg Power Canal passes through the Typha Solar Project generation tie line corridor. However, both resources are located outside of proposed fenced solar facilities and would not be subject to construction impacts. • SWCA recommends that an Inadvertent Discovery Plan be prepared for the solar project sites prior to project construction, to inform construction personnel what to do in the event that previously unidentified cultural resources are discovered during excavation. In addition, it is understood that DAHP may recommend additional mitigation measures after reviewing the reports on the cultural resource surveys conducted for the proposed solar projects. Operation: Because there would be no operational impacts to Cultural and Historic Preservation, no mitigation measures are proposed. Agriculture Construction and Operation: Because there would be no construction or operational impacts to Agriculture from the solar project sites, no mitigation measures are proposed. Shorelines of the State

Technical Resource	Mitigation Measures
	Construction and Operation: • The Typha Solar Project fencing and solar arrays overlap 0.19 acre of the shoreline area that is within 200 feet of a Shoreline of the State, the Yakima River. All project impacts would be at least 144 feet from the Yakima River ordinary high water mark for fence installation and at least 154 feet from the Yakima River ordinary high water mark for solar array installation. Impacts to all wetlands associated with the shoreline of the Yakima River would be avoided through project design, except for 0.01 acre of fill in wetland TW03 to improve an existing access road, for site access, which has been compromised by a collapsed or blocked culvert. Wetland fill impacts of approximately 630 square feet would not require mitigation with the USACE, and further coordination would occur with Ecology to determine necessary mitigation measures. No significant adverse effects are proposed to the shoreline environment. In addition, the 0.19 acre of shoreline jurisdictional area within 200 feet of the Yakima River ordinary high water mark would be planted with low-growing native plant species, which would be an improvement to the current vegetation community dominated by actively grazed non-native and invasive species.
Transportation	Vehicles Construction: • Because there would be less than a 5% increase in average daily traffic volumes and, thus, no impacts to vehicle traffic for the Camas, Penstemon, Typha, and Urtica Solar Project sites, no mitigation measures are proposed. • Because the Fumaria Solar Project site would have ADT increases on Clarke Road (37.88%), Faust Road (12.44%), and Hungry Junction Road (9.23%) for the 3-month construction period (spread over 6 to 9 months of intermittent construction), representing minor to moderate temporary impacts to traffic volumes but which would not exceed road designs, no mitigation measures are proposed. Operation: Because there would be minimal operational staff levels and vehicle trips, and no negative impacts from the solar project sites, no mitigation measures are proposed. Waterborne, Rail, and Air Traffic Construction and Operation: Because there would be no construction or operational impacts to Waterborne, Rail, or Air Traffic from the solar project sites, no mitigation measures are proposed. Parking Construction and Operation: Because there would be no construction or operational impacts to Parking from the solar project sites, no mitigation measures are proposed.
Socioeconomics	Employment, Housing: Tax Revenues, Fire Protection, Police, Schools, Parks and Recreation, Utilities, Maintenance, Communications, Water and Stormwater, Sewer and Solid Waste, Other Governmental Services, and Local Government Revenues Construction and Operation: Because there would be minimal or no construction or operational impacts to these socioeconomic characteristics, public services, or public infrastructure from the solar project sires, no mitigation measures are proposed.

(2) Fair treatment. The application shall describe how the proposal's design and mitigation measures ensure that no group of people, including any racial, ethnic, or socioeconomic group, bear a disproportionate share of the environmental or socioeconomic impacts resulting from the construction and operation of the proposed facility.

No residential or commercial facilities exist on any of the leased parcels for the five Columbia Solar Projects, and thus no non-white or low-income populations, or anyone else, would be displaced as a result of constructing or operating/maintaining the proposed solar facilities.

As described in Section 4.4.2.2, construction of the five Columbia Solar Projects would employ up to 100 workers per day during the peak construction period. It is estimated that approximately 80 of the workers would be hired locally, and could include individual hires as well as employees of existing construction-related firms and businesses that might be retained for various phases of construction. It is assumed these local workers would be hired from within Kittitas County, or a maximum commuting distance of 75 miles from Ellensburg such as from as Yakima (36 miles away), Wenatchee (70 miles), or Moses Lake (71 miles).

The remaining 20 non-local hires might elect to commute to the Ellensburg area on a daily basis, or to stay in either a personal recreational vehicle (RV) at a camp site, or to rent a motel room. Thus, it is not anticipated that construction of the solar projects would result in the permanent relocation or in-migration of any of the construction workforce. Thus, although the construction of the solar facilities might provide some temporary employment opportunities to low-income or minority residents, the levels would be minimal and there would be minimal beneficial impacts to employment.

As described in Section 4.4.2.3, it is anticipated that the operational workforce performing ongoing operations would be relatively small and would typically be off-site, and that an additional four to five maintenance personnel would make about two to three visits per year to each of the five Columbia Solar Project sites to conduct the on-site maintenance functions. This latter workforce would be comprised of general laborers for cleaning the PV panels; skilled electricians for visual inspections and performance testing of the inverters, transformers, and switchyard equipment; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. It is not anticipated that operation of the solar projects would result in the permanent relocation or in-migration of any operational workforce. Thus, although operation of the solar facilities might provide some long-term employment opportunities to low-income or minority residents, the levels would be minimal and, thus, there would be no beneficial impacts to employment.

1.11 General — Sources of Information 463-60-095

The applicant shall disclose sources of all information and data and shall identify all pre-application studies bearing on the site and other sources of information.

Reference lists of the documents, websites, and other information cited in responses to EFSEC requirements for the ASC are provided at the end of each major part/chapter, including the following sections:

1.17 References – Chapter 1

2.24 References – Chapter 2

3.7 References – Chapter 3

4.5 References – Chapter 4

In addition, each of the attached reports in the appendices have their own reference sections for documents, websites, and other information that were used in the preparation of those reports.

Pre-application wildlife and habitat assessment, wetland delineation and waters, archaeological, and built environment field studies were conducted from April 3 to 17, 2017. Detailed descriptions of those studies are provided in Section 2.20 and in the appended study reports.

1.12 General — Consultation 463-60-101

(1) Pre-application consultation. The application shall summarize all consultation that the applicant has conducted with local, state and federal agencies and governments, Indian tribes, nonprofit organizations and community citizen and interest groups prior to submittal of the application to the council.

Table 1.12-1 summarizes the agency and Tribal communications beginning in January 2017 between TUUSSO's representatives and the representatives of EFSEC, Yakama Nation, Washington State Department of Archaeology and Historic Preservation (DAHP), Washington Department of Fish and Wildlife (WDFW), Kittitas County Board of Commissioners, Kittitas County Fire Marshal, and Kittitas County Department of Public Works.

Table 1.12-1. Agency Consultation and Tribal Communications (as of January 24, 2018)

Date	Contact	TUUSSO Energy Representative	Type of Contact
Washington Energy Facility Site Evaluation Council (EFSEC)			
January 24, 2018	EFSEC staff	TUUSSO representatives	EFSEC staff and TUUSSO representatives conducted field site visits of the five proposed Columbia Solar Projects in Ellensburg, Washington.
January 17, 2018	Sonia Bumpus EFSEC (copying DAHP, WDFW, and USFWS staff)	Jason Evans TUUSSO And other representatives	Ms. Bumpus emailed Mr. Evans and others EFSEC's Data Request 1, with comments and questions about the October 16, 2017, version of the ASC and SEPA Environmental Checklist for the five proposed Columbia Solar Projects.
January 17, 2018	Ms. Bumpus EFSEC (Lance Wollwage of DAHP email)	Michelle Hannum SWCA	Ms. Bumpus was copied on an email from Ms. Hannum to Mr. Wollwage, enclosing the Penstemon 45KT4012 Excavation Permit Application.
January 10, 2018	EFSEC staff and environmental consultant	TUUSSO representatives	TUUSSO representatives attended a meeting with EFSEC to discuss their preliminary questions and comments on the October 16, 2017, version of the ASC and SEPA Environmental Checklist for the five proposed Columbia Solar Projects.
December 21, 2017	Stephen Posner EFSEC Manager	Jason Evans TUUSSO	Mr. Evans emailed Mr. Posner the JARPA application for the minimal access road impacts to wetland TW03 on the Typha Solar Project site.
December 12, 2017	EFSEC Council and staff	TUUSSO representatives	TUUSSO representatives attended and made presentations at EFSEC's public meeting and Land Use Consistency Hearing in Ellensburg, Washington.
December 4, 2017	Stephen Posner EFSEC Manager	Jason Evans TUUSSO	Mr. Evans emailed Mr. Posner a letter summarizing the additional cultural resources fieldwork that was going to be initiated in mid-December, based upon comments received from the Yakama Nation and DAHP.
November 8, 2017	Stephen Posner EFSEC Manager	Mike Cannon SWCA	Mr. Posner had a phone conversation with Mr. Cannon, asking that he coordinate directly with Ms. Gretchen Kaehler, Assistant State Archaeologist – Local Governments at DAHP, to obtain her comments about the five Columbia Solar Projects Cultural Resources Reports previously provided to her by SWCA.

Date	Contact	TUUSSO Energy Representative	Type of Contact
March 7, 2017	Stephen Posner EFSEC Manager	Jason Evans TUUSSO	Mr. Posner responded to TUUSSO's February 13 letter, stating that one ASC could be submitted for all five proposed Columbia Solar Projects, requesting some information, and indicating that it appeared that the projects might be consistent with the Kittitas County land use requirements (but that a final land use consistency determination would be made by EFSEC).
February 13, 2017	Stephen Posner EFSEC Manager	Jason Evans TUUSSO	Mr. Evans sent a letter to Mr. Posner providing an overview of the five proposed Columbia Solar Projects, indicating that TUUSSO wished to obtain permits for each of the five sites through the EFSEC Site Certification process, and asking several questions for clarification about the process.
January 20, 2017	Stephen Posner EFSEC Manager	Jason Evans, Vivek Nayak, and Joy Potter TUUSSO Greg Poremba SWCA	TUUSSO met with Mr. Posner to provide him an overview of the five proposed Columbia Solar Projects, and to discuss the EFSEC standard and expedited permitting processes.
Yakama Nation Communications			
December 11, 2017	Jessica Lally Yakama Nation	Jason Evans TUUSSO	Mr. Evans spoke to and exchanged an email with Ms. Lally, and obtained the Yakama Nation's comments on the scope of work for the additional cultural resources fieldwork to be conducted in mid-December.
December 5, 2017	Jessica Lally Yakama Nation	Jason Evans TUUSSO	Mr. Evans forwarded to Ms. Lally, via email, his December 4 letter to Mr. Posner summarizing the additional cultural resources fieldwork that was going to be initiated in mid-December, based upon comments received from the Yakama Nation and DAHP.
November 27, 2017	Jessica Lally Yakama Nation	Jason Evans TUUSSO	Ms. Lally emailed Mr. Evans and others about the Yakama Nation's comments/suggestions about the research design/scope of work for conducting the additional requested cultural resources fieldwork, and about the Cultural Resources Reports.
November 16, 2017	Jessica Lally and Noah Oliver Yakama Nation	Jason Evans TUUSSO	Mr. Evans had a phone conversation with Ms. Lally and Mr. Oliver about the additional fieldwork and suggested that the tribal members comprise half of the field crews. They declined the offer but stated that they would provide comments/suggestions about the research design and any future reports of the results of that fieldwork.
November 15, 2017	Johnson Meninick, Jessica Lally, and Noah Oliver Yakama Nation	Jason Evans and Joy Potter TUUSSO	Mr. Evans and Ms. Potter met with Mr. Meninick, Ms. Lally, and Mr. Oliver about their concerns and comments about the five Columbia Solar Projects Cultural Resources Reports.

Date	Contact	TUUSSO Energy Representative	Type of Contact
November 13, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter exchanged emails with Ms. Lally to try to schedule a meeting with her and Mr. Johnson Meninick, to discuss the Yakama Nation's comments about the five Columbia Solar Projects Cultural Resources Reports.
November 6 and 7, 2017	Jessica Lally and Corrine Camuso Yakama Nation	Joy Potter TUUSSO	Ms. Potter had a phone conversation with Ms. Lally and Ms. Camuso in which they initially stated their procedural concerns and indicated that they would be consulting with EFSEC about the five Columbia Solar Projects. Subsequently, another phone conversation occurred wherein the Yakama Nation indicated that they would be willing to schedule a meeting with TUUSSO.
November 2, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter emailed Ms. Lally to try to schedule a meeting with her and Mr. Johnson Meninick, to discuss the Yakama Nation's comments about the five Columbia Solar Projects Cultural Resources Reports.
October 23 and 24, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter phoned and emailed Ms. Lally to try to schedule a meeting with her and Mr. Johnson Meninick, to discuss the Yakama Nation's comments about the five Columbia Solar Projects Cultural Resources Reports.
October 2 through 8, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter and Ms. Lally exchanged several emails to try to schedule a meeting with her and Mr. Johnson Meninick, to discuss the Yakama Nation's comments about the five Columbia Solar Projects Cultural Resources Reports.
September 25, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter called Ms. Lally to schedule a meeting with her and Mr. Johnson Meninick, to discuss the Yakama Nation's comments about the five Columbia Solar Projects Cultural Resources Reports.
September 18, 2017	Corrine Camuso Yakama Nation	Joy Potter TUUSSO	Ms. Camuso provided Ms. Potter a copy of the letter that was sent to EFSEC, with Yakama Nation comments about the TUUSSO five Columbia Solar Projects Cultural Resources Reports.
September 14, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter and Ms. Lally exchanged emails about when the Yakama Nation would provide their comments about the five Columbia Solar Projects Cultural Resources Reports previously provided to them.
September 6 through 8, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter and Ms. Lally exchanged several emails about whether the Yakama Nation had any comments about the five Columbia Solar Projects Cultural Resources Reports previously provided to them. Ms. Lally indicated that those comments would be sent to EFSEC and TUUSSO.
July 25 through 27, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter and Ms. Lally exchanged several emails and had a phone conversation about the Yakama Nation providing comments on the five Columbia Solar Projects Cultural Resources Reports.

Date	Contact	TUUSSO Energy Representative	Type of Contact
July 24, 2017	Johnson Meninick Yakama Nation	Joy Potter TUUSSO	Ms. Potter met with Mr. Meninick and provided him electronic copies of the five Columbia Solar Projects Cultural Resources Reports. He indicated that, based upon the earlier introductory letter he received, that he initially did not have any major concerns.
July 14 through 18, 2017	Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter and Ms. Lally exchanged several emails about how best to provide electronic copies of the five Columbia Solar Projects Cultural Resources Reports.
June 15, 2017	Johnson Meninick and Jessica Lally Yakama Nation	Joy Potter TUUSSO	Ms. Potter met with Mr. Meninick and Ms. Lally to discuss the five proposed Columbia Solar Projects and to discover any concerns that the Yakama Nation might have.
March 30, 2017	Johnson Meninick Cultural Resources Program at the Confederated Tribes and Bands of the Yakama Nation	Mike Cannon SWCA	SWCA sent, via certified mail, a letter notifying the Cultural Resources Program about the five proposed Columbia Solar Projects and the cultural resource surveys that would be conducted, providing Mr. Meninick the opportunity to provide input.
March 23, 2017	Tribal Council of the Confederated Tribes and Bands of the Yakama Nation	Mike Cannon SWCA	SWCA sent, via certified mail, a letter notifying the Tribal Council about the five proposed Columbia Solar Projects and the cultural resource surveys that would be conducted, providing them the opportunity to provide input.
The Confederated Tribes of the Colville Reservation Communications			
November 21, 2017	Dr. Karen Capuder The Confederated Tribes of the Colville Reservation	Joy Potter TUUSSO	Dr. Capuder emailed Ms. Potter and others a letter with Guy Moura's comments on the Cultural Resources Assessment for the Fumaria Solar Project site. The letter was originally sent to Mr. Stephen Posner, EFSEC, on November 14. Ms. Potter also had a phone conversation with Dr. Capuder about potentially setting up a meeting with Mr. Moura, to discuss their concerns and to obtain additional information from the tribe.
November 9, 2017	Dr. Karen Capuder The Confederated Tribes of the Colville Reservation	Joy Potter TUUSSO	Ms. Potter had email exchanges with Dr. Capuder to try to schedule a meeting with her and Guy Moura, Tribal Historic Preservation Officer, about the five Columbia Solar Projects.
November 6, 2017	Dr. Karen Capuder The Confederated Tribes of the Colville Reservation	Joy Potter TUUSSO	Ms. Potter had a phone conversation with Dr. Capuder to try to schedule a meeting with her and Guy Moura, Tribal Historic Preservation Officer, about the five Columbia Solar Projects.
Washington State Department of Archaeology and Historic Preservation (DAHP)			
January 17, 2018	Lance Wollwage DAHP Ms. Bumpus of EFSEC was cc'd on the email)	Michelle Hannum SWCA	Ms. Hannum emailed Mr. Wollwage, and copied Ms. Bumpus (EFSEC), the Penstemon 45KT4012 Excavation Permit Application.

Date	Contact	TUUSSO Energy Representative	Type of Contact
December 13, 2017	Gretchen Kaehler DAHP	Mike Cannon SWCA	Ms. Kaehler forwarded an email and attached letter to Mr. Cannon, which she originally sent to EFSEC and the tribes on December 12, with her comments about the December 4 letter submitted by Mr. Evans (TUUSSO) to Mr. Posner (EFSEC) outlining the scope-of-work to conduct additional cultural resources fieldwork in mid-December for the five proposed Columbia Solar Projects.
November 22, 2017	Gretchen Kaehler DAHP	Mike Cannon SWCA	Ms. Kaehler emailed Mr. Cannon and others her comments about and requests for the five proposed Columbia Solar Project Cultural Resources Reports.
November 14, 2017	Gretchen Kaehler DAHP	Mike Cannon SWCA	Mr. Cannon and Ms. Kaehler had a phone conversation about her review of the five proposed Columbia Solar Project Cultural Resources Reports. She indicated that she would provide her comments in the following week.
June 12, 2017	Gretchen Kaehler DAHP	Mike Cannon SWCA	Ms. Kaehler called Mr. Cannon to inform him that the DAHP would await EFSEC notifying them that the ASC was received, before beginning their review of the five proposed Columbia Solar Project Cultural Resources Reports.
June 9, 2017	DAHP website	Rhiannon Held SWCA	SWCA submitted five TUUSSO Kittitas County solar project Cultural Resources Reports for DAHP review.
February 10, 2017	Lance Wollwage DAHP	Joy Potter TUUSSO	Ms. Potter called to Mr. Wollwage to discuss the DAHP requirements for conducting cultural resources field surveys and the approach for determining what potential resources might exist on the five proposed Columbia Solar Project sites.
Washington Department of Fish and Wildlife (WDFW)			
September 27, 2017	Justin Allegro, WDFW	Forwarded by Stephen Posner, EFSEC to Jason Evans TUUSSO	Mr. Allegro submitted a letter to Mr. Posner, which was subsequently forwarded to Mr. Evans, providing their comments about the Columbia Solar Application for Site Certification (ASC) to EFSEC.
September 27, 2017	Justin Allegro, Scott Downes, and Brent Renfrow WDFW	Jamie Young SWCA	Mr. Allegro emailed Ms. Young and Mr. Downes to describe the coordination process between WDFW and EFSEC for the TUUSSO Columbia Solar Project ASC.
September 26, 2017	Scott Downes, Brent Renfrow, and Justin Allegro WDFW	Jamie Young SWCA	Mr. Downes emailed Ms. Young providing edits and comments about the TUUSSO Columbia Solar Projects five Critical Areas Reports and the Habitat and Wildlife Report.
September 18, 2017	Scott Downes, Brent Renfrow, and Justin Allegro WDFW	Jamie Young SWCA	Mr. Downes emailed Mr. Allegro, cc'ing Ms. Young, to loop him into the discussion about the TUUSSO Columbia Solar Projects five Critical Areas Reports and the Habitat and Wildlife Report.

Date	Contact	TUUSSO Energy Representative	Type of Contact
September 18, 2017	Scott Downes and Brent Renfrow WDFW (Lori White of Ecology was cc'd on the email, see below)	Jamie Young SWCA	Mr. Downes emailed Ms. Young and indicated that WDFW had not reviewed the five Critical Areas Reports or the Habitat and Wildlife Report, but would be doing so that week.
September 15, 2017	Scott Downes and Brent Renfrow WDFW (Lori White of Ecology was cc'd on the email, see below)	Jamie Young SWCA	Ms. Young sent an email to Mr. Downes and Mr. Renfrow asking if they had any comments or input about the previously provided Critical Areas Reports or the Habitat and Wildlife Report.
August 3, 2017	Scott Downes and Brent Renfrow WDFW (Lori White of Ecology was cc'd on the email, see below)	Jamie Young SWCA	Mr. Downes emailed Ms. Young and indicated that WDFW had not reviewed the five Critical Areas Reports or the Habitat and Wildlife Report, but would be doing so soon.
July 17, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Mr. Downes confirmed his receipt of the six reports submitted on July 11, 2017.
July 11, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Ms. Young made electronic copies available to Mr. Downes and Mr. Renfrow of the Wildlife and Habitat Assessment Report, and each of the five Critical Areas (Wetlands and Waters Delineation) Reports for the proposed Columbia Solar Project sites.
May 3, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Ms. Young sent Mr. Downes and Mr. Renfrow an email requesting Priority Habitats and Species (PHS) mapper geographic information system (GIS) data. Mr. Downes responded and provided WDFW contact information to obtain those data on the same day.
May 1, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Mr. Downes sent Ms. Young an email, in response to her April 28 email.
April 28, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Ms. Young sent an email to Mr. Downes and Mr. Renfrow about field-observed nesting species, asking for WDFW input.
April 20, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	Mr. Downes sent Ms. Young an email providing additional information for use in designing and evaluating the five proposed Columbia Solar Projects, as well as identifying additional WDFW potential issues of concern.

Date	Contact	TUUSSO Energy Representative	Type of Contact
April 12, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young and Evan Dulin SWCA	SWCA conducted the in-field reviews of all five proposed Columbia Solar Project sites with Mr. Downes and Mr. Renfrow, obtaining their input.
April 5, 2017	Scott Downes and Brent Renfrow WDFW	Jamie Young SWCA	SWCA arranged an in-field site visit with Mr. Downes and Mr. Renfrow, and emailed them a geodatabase and PDF overview map for the five proposed Columbia Solar Project sites.
March 14, 2017	Scott Downes and Brent Renfrow WDFW	Evan Dulin SWCA	Mr. Dulin contacted Mr. Renfro regarding the PHS Mapper and other information sources for PHS site-specific information, as well as stream and wetland buffers. Mr. Downes emailed back requesting that WDFW be invited to a site-specific field visit.
U.S. Fish and Wildlife Service (USFWS)			
January 4, 2018	Stephen Lewis USFWS	Evan Dulin SWCA	Mr. Lewis emailed Mr. Dulin and others a letter he had sent to Stephen Posner (EFSEC) with the USFWS' comments about the October 16, 2017, version of the ASC, SEPA Environmental Checklist, and attached reports for the five proposed Columbia Solar Projects.
January 4, 2018	Sierra Franks USFWS	Evan Dulin SWCA	Ms. Franks emailed Mr. Dulin and others to notify him that Stephen Lewis would be the new USFWS point of contact for the five proposed Columbia Solar Projects.
December 27 and 28, 2017	Sierra Franks USFWS	Evan Dulin SWCA	Mr. Dulin exchanged emails with Ms. Franks about a few questions he had regarding potential USFWS requirements for the five proposed Columbia Solar Projects.
December 12, 2017	Sierra Franks USFWS	Evan Dulin SWCA	Ms. Franks emailed Mr. Dulin confirming that she would be the point of contact for coordination with the USFWS for the five proposed Columbia Solar Projects.
December 8, 2017	Sierra Franks USFWS	Evan Dulin SWCA	Mr. Dulin emailed Ms. Franks to obtain a point of contact and to initiate coordination with the USFWS for the five proposed Columbia Solar Projects.
Washington State Department of Ecology (Ecology)			
September 28, 2017	Lori White Ecology (Dusty Pilkington, Kittitas County, was cc'd)	Jamie Young SWCA	Ms. White provided Ms. Young comments and recommendations regarding the Critical Areas Reports for the Fumaria, Penstemon, Typha, and Urtica solar sites, and for the Habitat and Wildlife Report.
September 18, 2017	Lori White Ecology (was cc'd on a Scott Downes and Brent Renfrow, WDFW, email)	Jamie Young SWCA	Ms. White was cc'ed on an email from Mr. Downes to Ms. Young that indicated that WDFW had not reviewed the five Critical Areas Reports or the Habitat and Wildlife Report, but would be doing so that week.

Date	Contact	TUUSSO Energy Representative	Type of Contact
September 15, 2017	Lori White Ecology (was cc'd on a Scott Downes and Brent Renfrow, WDFW, email)	Jamie Young SWCA	Ms. White was cc'ed on an email that Ms. Young sent to Mr. Downes and Mr. Renfrow asking if they had any comments or input about the previously provided Critical Areas Reports or the Habitat and Wildlife Report.
August 3, 2017	Lori White Ecology (was cc'd on a Scott Downes and Brent Renfrow, WDFW, email)	Jamie Young SWCA	Ms. White was cc'ed on an email that Mr. Downes sent to Ms. Young that indicated that WDFW had not reviewed the five Critical Areas Reports or the Habitat and Wildlife Report, but would be doing so soon.
July 26, 2017	Lori White Washington State Department of Ecology	Jamie Young SWCA	Ms. White confirmed her receipt and initiation of her review of the six reports submitted on July 19, 2017.
July 19, 2017	Lori White Washington State Department of Ecology	Jamie Young SWCA	Ms. Young made electronic copies available to Ms. White of the Wildlife and Habitat Assessment Report, and each of the five Critical Areas (Wetlands and Waters Delineation) Reports for the five proposed Columbia Solar Project sites.
July 13, 2017	Gwen Clear Washington State Department of Ecology	Jamie Young SWCA	Ms. Young sent a letter and made electronic copies available to Ms. Clear of the Wildlife and Habitat Assessment Report, and each of the five Critical Areas (Wetlands and Waters Delineation) Reports for the five proposed Columbia Solar Project sites.
U.S. Army Corps of Engineers (USACE)			
August 1, 2017	Jacalen Printz U.S. Army Corps of Engineers	Evan Dulin SWCA	Mr. Dulin sent an email to Ms. Printz regarding the need to submit a Pre-Construction Notification (PCN; filing under NWP 14) for the proposed Ellensburg Power Canal bridge improvement, and also to span a narrow wetland crossing with a bridge that would have footings on either side of the wetland.
U.S. Navy			
August 3 and 15, 2017	Kimberly N. Peacher Community Planning and Liaison Officer, Northwest Training Range Complex	Jason Evans TUUSSO	On August 3, Mr. Evans spoke with and sent project shape files and a short project description to Ms. Peacher, asking for any feedback. On August 15, Ms. Peacher responded that there should be no impacts to military training route overflights from TUUSSO's solar projects.
Kittitas County			
October 16, 2017	Laura Osiadacz Kittitas County Board of Commissioners	Jason Evans and Joy Potter TUUSSO Robert Kahn TUUSSO PR Consultant	Mr. Evans, Mr. Kahn, and Ms. Potter met with Ms. Osiadacz to discuss the Application for Site Certification (ASC) submitted to EFSEC, and the five Columbia Solar Projects more generally.
August 3, 2017	Kittitas County: Dan Carlson, Community Development	Jason Evans and Joy Potter TUUSSO	Mr. Evans and Ms. Potter met with representatives of Kittitas County to provide updates about the five Columbia Solar Projects, and also discussed county administrative

Date	Contact	TUUSSO Energy Representative	Type of Contact
	Director Lucas Huck, County Engineer Paul Jewell, Commissioner Mike Florey, Building Official		permits.
August 1, 2017	Anna Lael District Manager, Kittitas County Conservation District	Joy Potter TUUSSO	Ms. Potter and Ms. Lael discussed ongoing riparian habitat, stream monitoring, and restoration projects.
July 3, 2017	Paul Jewell and Laura Osiadacz Kittitas County Board of Commissioners	Joy Potter TUUSSO Robert Kahn TUUSSO PR Consultant	Ms. Potter and Mr. Kahn met with Mr. Jewell and Ms. Osiadacz, separately, to discuss the results of the TUUSSO voter solar power issues telephone survey (see responses to Item (2), below, for more information about the survey results).
June 28, 2017	Josh Hink Kittitas County Fire Marshal	Jason Evans TUUSSO Marc Kirkpatrick Encompass	Mr. Evans and Mr. Kirkpatrick met with Mr. Hink to discuss fire protection access issues/requirements, potential fire issues, and permitting requirements for all five proposed Columbia Solar Projects.
May 31, 2017	Mark Cook Kittitas County Director of Public Works	Joy Potter TUUSSO	Ms. Potter met with Mr. Cook to discuss potential temporary access road bridge options and issues for some of the proposed solar project sites.
May 15, 2017	Obie O'Brien Kittitas County Board of Commissioners	Jason Evans and Joy Potter TUUSSO	Mr. Evans, Ms. Potter, and Mr. O'Brien discussed the five proposed Columbia Solar Projects when Mr. O'Brien attended the TUUSSO Solar Energy Open House (see responses to Item (2), below, for more information about the open house).
March 10, 2017	Paul Jewell Chair Kittitas County Board of Commissioners	Jason Evans and Joy Potter TUUSSO	Mr. Evans and Ms. Potter met with Mr. Jewell to introduce TUUSSO and the five proposed Columbia Solar Projects to the Board of Commissioners.

(2) Meaningful involvement. The application shall describe all efforts made by the applicant to involve the public, regardless of race, ethnicity, or socioeconomic status, prior to submittal of the application to the council. The application shall also set forth information for contacting local interest and community groups to allow for meaningful involvement of all people, regardless of race, ethnicity or socioeconomic status. For example, such information may include contacts with local minority radio stations and news publications.

On July 7, 2016, TUUSSO Energy sent letters to the 34 surrounding landowners that were unable to attend the previous June 27 and 28, 2016, meetings between TUUSSO and other surrounding landowners (see the next paragraph), to provide those landowners an update about the proposed five Columbia Solar Projects.

On June 16, 2017, TUUSSO Energy sent letters to 45 surrounding landowners within 100 feet of each of the five proposed Columbia Solar Project sites, inviting them to a meeting with TUUSSO representatives on June 27 and 28, 2017, to learn more about the five proposed solar projects and to provide their input. Approximately 20 landowners attended those two sets of meetings held by TUUSSO to discuss the solar projects.

On May 15, 2017, TUUSSO Energy held a solar energy open house for the public and any interested parties from 4:30 to 6:00pm at the Armory Building, 901 E 7th Avenue in Ellensburg. The solar energy open house was widely advertised in the county. Two display ads were placed in the Ellensburg Daily Record on May 6 and 12, 2017, and postcards were mailed to 120 property owners located within 0.25 mile of each of the sites. The Kittitas County Chamber of Commerce also posted notices of the open house on their Facebook page, in their weekly membership newsletter, and on their home webpage. In addition, Central Washington University sent email notifications about the open house to all students involved in the renewable/solar energy program, as well as passing out flyers to students. During the open house, TUUSSO had several staff members available to answer any questions, and maps and other information were available for review. In addition, other solar-related organizations had staffed exhibits, including Puget Sound Energy, the Kittitas County Public Utility District, Ellensburg Solar (a private solar installation company), Central Washington University Institute for Integrated Energy Studies, and the Kittitas County Chamber of Commerce. More than 30 people attended TUUSSO's solar energy open house.

During May 4 to 7, 2017, TUUSSO Energy conducted a renewable and solar power issues survey of Kittitas County voters to determine whether residents supported solar project developed within the county. Telephone interviews were conducted with a representative sample of 250 Kittitas County voters, over landlines and cell phones. That survey found that the most popular renewable energy sources for development were solar (33%), wind (30%), and hydroelectric (26%). When asked whether private property owners should be allowed to develop renewable energy projects, such as wind and solar, on their property even if some neighbors or residents were opposed to such developments, 72% said they should be allowed to do so with 53%in strong agreement with this sentiment. Only 16% of sampled voters said that private landowners should not be allowed to develop such electric facilities. In addition, 33% found solar panels to be very or somewhat attractive, 50% found them to be neither attractive nor unattractive, and 14% found them to be somewhat or very unattractive. When asked how many would be likely to consider installing solar panels on their property, 59% said they would be very or fairly likely to do so and 37% said they would not be likely or would be very unlikely to do so.

1.13 General — Graphic Material 463-60-105

It is the intent that material submitted pursuant to these guidelines shall be descriptive and shall include illustrative graphics in addition to narration. This requirement shall particularly apply to subject matter that deals with systems, processes, and spatial relationships. The material so submitted shall be prepared in a professional manner and in such form and scale as to be understood by those who may review it.

TUUSSO has submitted descriptive material, including illustrative graphics, to facilitate EFSEC's review. This graphic material has been prepared in a professional manner, and in such form and scale as to be understood by those who may review the ASC.

1.14 General — Specific Contents and Applicability 463-60-115

It is recognized that not all sections of these guidelines apply equally to all proposed energy facilities. If the applicant deems a particular section to be totally inapplicable the applicant must justify such conclusion in response to said section. The applicant must address all sections of this chapter and must substantially comply with each section, show it does not apply or secure a waiver from the council. Information submitted by the applicant shall be accompanied by a certification by applicant that all EFSEC application requirements have been reviewed, the data have been prepared by qualified professional personnel, and the application is substantially complete.

TUUSSO hereby certifies that all EFSEC application requirements have been reviewed, the data in this ASC and accompanying appendices have been prepared by qualified professional personnel, and that the ASC is substantially complete.

1.15 General — Amendments to Applications, Additional Studies, Procedure 463-60-116

(1) Applications to the council for site certification shall be complete and shall reflect the best available current information and intentions of the applicant.

This application is complete and reflects the best available information and intentions of TUUSSO, for the five proposed Columbia Solar Projects. It provides and uses the most readily available current federal, state, county, city, agency, and public information, as well as the results of extensive cultural resources, historical resources, biological, and wetlands fieldwork completed in April 2017.

(2) Amendments to a pending application must be presented to the council at least thirty days prior to the commencement of the adjudicative hearing, except as noted in subsection (3) of this section.

TUUSSO does not anticipate that amendments will be required to its application. If, however, EFSEC requests clarification or additional information, we will do so in compliance with this subsection.

(3) Within thirty days after the conclusion of the hearings, the applicant shall submit to the council, application amendments which include all commitments and stipulations made by the applicant during the adjudicative hearings.

In compliance with this subsection, TUUSSO will submit all amendments, commitments, and stipulations made during the adjudicative hearings to EFSEC within the required 30 days of completion of those hearings.

(4) After the start of adjudicative hearings, additional environmental studies or other reports shall be admitted only for good cause shown after petitions to the council or upon request of the council, or submitted as a portion of pre-filed testimony for a witness at least thirty days prior to appearance.

TUUSSO does not anticipate that additional environmental studies or reports will be required to its application. If, however, additional information becomes available and can be provided to EFSEC, we will do so in compliance with this subsection.

1.16 General — Applications for Expedited Processing 463-60-117

(1) Request for expedited processing. Requests for expedited processing shall be accompanied by a completed environmental checklist delineated in WAC 197-11-960. The request for expedited processing shall also address the reasons for which the following are not significant enough to warrant a full review of the application for certification under the provisions of chapter 80.50 RCW:

Pursuant to RCW 80.50.075, RCW 80.50.110, and WAC 463-60-117, TUUSSO requests expedited consideration by EFSEC for its application to develop, own, and operate the five Columbia Solar Projects and two associated generation tie lines. EFSEC can grant expedited processing of certification application upon a finding: 1) that the proposed energy facility's environmental impact is not significant or can be mitigated to a non-significant level under the State Environmental Policy Act (SEPA) and 2) that the project "is found under RCW 80.50.090(2) to be consistent and in compliance with city, county, or regional land use plans *or* zoning ordinances" (RCW 80.50.075(1), emphasis added), "in effect as of the date of the application" (RCW 80.50.090[2]).

1.16.1 The proposed facilities' environmental impact is not significant.

WAC 463-60-117 describes application materials for expedited processing. Through these materials an applicant can demonstrate that the proposed energy facility's environmental impact is not significant or can be mitigated to a non-significant level under SEPA. WAC 463-60-117 requires that an application for expedited consideration include: 1) a completed SEPA Environmental Checklist; 2) a statement demonstrating that the environmental impacts, the areas potentially affected, the cost and magnitude of the proposed energy facilities, and the degree to which the proposed energy facilities represent a change in the use of the proposed sites are not significant enough to warrant a full review; and 3) a discussion of WAC 463-60 and 436-62. Each of these items is discussed below.

1. A completed SEPA Environmental Checklist is attached as Appendix A.

2. Expedited processing is appropriate because the following are not significant enough to warrant a full review of the application for certification under RCW 80.50:

(a) The environmental impact of the proposed energy facility;

The environmental impacts from the proposed five Columbia Solar Projects and two associated generation tie lines would not be significant enough to warrant a full environmental impact statement (EIS) review. Below is a discussion of the minor impacts from the construction and operation of the projects.

The Earth components would not experience significant impacts from construction or operation of the Columbia Solar Projects. The geology, soils, and topography could see minor impacts from installation of the projects' support beams and the minimal grading associated with construction. Because the sites are relatively flat, erosion risk is low. The only unique physical feature, the Yakima River, would not be impacted by the projects. The nearest planned fencing is located 144 feet from the river and the nearest solar arrays are located 154 feet from the river.

Air resources would experience minimal impacts from construction of the Columbia Solar Projects. Anticipated emissions of carbon dioxide equivalent (CO_2e), nitrogen oxides (NO_X), carbon monoxide (CO), and PM_{10} would result in at most 0.12% of Kittitas County's emissions inventory for each pollutant during construction. Once construction is complete, the air impacts would stop, as operating the projects would not cause air emissions.

Impact to water resources would also be limited to isolated impacts. Construction would not cause any impacts to water resources that the Columbia Solar Projects must cross because TUUSSO plans to span water resources rather than constructing in them. Two water resource buffers would experience minor permanent impacts through encroachment of 7 square feet on the Penstemon Solar Project and 0.39 acre on the Urtica Solar Project. All other buffers would be avoided and experience no impacts. Similarly, wetlands and streams would be buffered with at least 20-foot setbacks. At the Typha Solar Project site, due to the project's proximity to the Yakama River, Shoreline Management Act substantial development and conditional use permits would be needed, and considered separately from the zoning code authorization (RCW 80.58.020[22 The designated Shoreline of the State within 200 feet of the Yakima River would be encroached upon by 0.19 acre by fencing and solar array installation by the Typha Solar Project, which would also include an additional 0.01 acre of wetland fill in an associated wetland within Shoreline of the State jurisdiction to improve an existing access road required for site access that has been compromised by a collapsed or blocked culvert. The Shoreline Act permits would confirm that the Typha Solar Project would only have minor negative impacts on the Yakama River's habitat and would have no negative impacts to other protected attributes. Since no stormwater discharges are proposed and less than 5% impervious surface would be added, any increased runoff would be negligible compared to the reduction in current flood irrigation methods. In addition, the Columbia Solar Projects can meet their stormwater discharge obligations through coverage under the Construction Stormwater General Permit. The 100-year floodplain would experience minor permanent impacts from fill at only two locations: 0.19 acre at the Camas Solar Project site and 0.38 acre at the Urtica Solar Project site. Finally, groundwater might see impacts through seepage if construction occurs in rainy winter months, but control measures would be readily available and groundwater otherwise would not be impacted.

The impacts to habitat, vegetation, fish, and wildlife would not be significant. Within the Columbia Solar Projects' 223 fenced-in acres (not the entire 232 leased acres), the most prevalent wildlife "habitat" that would be affected are areas under agricultural production (138 acres). The projects would result in modification or removal of less than 1% of the total available habitat in the landscape analysis area. No sensitive or special-status plants occur on the project sites. Fish and wildlife might experience low levels of impacts during construction through temporary displacement to adjacent habitat or temporary habitat alteration, with some species (e.g., small rodents, snakes, and insects) also suffering minor levels of mortality from direct contact with construction equipment that would not adversely impact those populations. In addition, 11.86 acres (approximately 5% of the projects) would be converted to impervious surfaces, 6 acres of which would have been under agricultural production. This impervious surface accounts for 1% of the spotted skunk's habitat on the projects and less than 1% for other species. Finally, no long-term operational impacts to special-status animal species are anticipated beyond the fencing of 2 acres and removal of 0.07 acre of bald eagle habitat, and the fencing of 3 acres and removal of 0.11 acre of Columbia spotted frog habitat. The impacts to habitat, vegetation, fish, and wildlife are not significant.

One wetland on the Columbia Solar Projects would experience a minor permanent impact, and wetland protection buffers would experience minor permanent and temporary impacts. To provide access to the Typha Solar Project, approximately 0.01 acre of wetland fill would be placed in wetland TW03 to improve an existing access road compromised by a collapsed or blocked culvert. This minor fill would require a Joint Aquatic Resource Permit Application. All other wetlands would be avoided and experience no impacts. Approximately 0.04 acre of wetland protection buffers at the Typha Solar Project would experience minor permanent impacts from road construction, while wetland protection buffers at the Camas, Typha, and Urtica Solar Projects would experience minor temporary impacts. These minor impacts to wetlands and wetland protection buffers are not significant.

The Columbia Solar Projects would cause no impacts to energy sources, as the projects are not anticipated to place a demand on energy supplies. Similarly, the projects would cause no impacts to soil, sand, gravel, or wood products or other natural resources in the Ellensburg area, as the resources needed for the projects are readily available. Water demand would also not impact water sources because the limited project water demand would be met by on-site sources or water trucked from readily available municipal sources.

Environmental health, including noise, fire risk, spills, and solid waste, would experience only minimal impacts. One project, the Camas Solar Project, might cause minimal, daytime-only, impacts from noise at the property boundary with a commercial facility. While this noise level would occur during the time allowance provided by regulation, TUUSSO is committed to ongoing monitoring and mitigation, as needed to ensure the impacts are not significant.

Fire and explosion impacts would be minimal. Potential fire risks and impacts from the Columbia Solar Projects would be minimal because the projects' equipment has fire protection and prevention measures and project water can be diverted for firefighting. Moreover, the risk of explosion is low because fossil fuels would be transported, stored, or used on the projects in small quantities.

Like fossil fuels, toxic, hazardous, or solid waste materials are unlikely to pose impacts because they would be generated in such small quantities. To the maximum extent possible, these materials would be recycled and the remainder would be landfilled.

Construction and operation of the Columbia Solar Projects would cause minor visual changes but would not substantially degrade the existing visual character or quality of the vicinity of the projects. While the projects would be visible from key observation points (KOPs), none of the KOPs would experience a major or significant change to the characteristic view. The projects would create a minor visual contrast in the viewshed, but they would be less likely to be visible as the viewer moves further away. The projects' mitigation measures are intended to decrease the aesthetic impacts of construction of the Columbia Solar Projects.

While some land uses and resources, like recreation facilities and parking, would see no impacts from the Columbia Solar Projects, some land uses and resources could experience some non-significant impacts. Isolated cultural resources that are not eligible for the National Register of Historic Places would be minimally to moderately impacted by the projects, but such impacts are not expected to be significant. The majority of the roads in the area would see no impacts from the projects, but the three county roads that access the Fumaria Solar Project would experience temporary minor to moderate impacts from increased traffic. Similarly, during construction, traffic from slow-moving construction vehicles could cause minor, temporary impacts. None of these impacts are expected to be significant.

The Columbia Solar Projects would have minimal beneficial to no impacts on socioeconomics and employment, with the likely minimal benefit to employment coming from temporary construction hiring. Similarly, no impacts are expected on housing and potentially beneficial impacts are expected on tax revenues, with an estimated $4,880,000 in property tax revenues for Kittitas County over the 30-year project life. Because of the projects' on-site fire prevention and protection measures, the risk and impacts of potential fires are minimal. Impacts on police and law enforcement would be limited to minimal impacts from responding to traffic issues, emergency medical calls, and coordination in the unlikely event of a fire. Finally, no impacts would occur for other city services, like schools, communications, utilities, maintenance, and sewer and solid waste, since no permanent relocations or in-migration is anticipated and no toilet, septic, or sewer system connections would be made at the project sites.

The Columbia Solar Projects' impacts to the natural and human environment are, in many cases, minor and/or temporary. In fact, a number of resources would not be impacted at all by the projects. Based on the discussion above, the environmental impacts should be viewed as not significant enough to warrant a full review of this application.

(b) The area potentially affected;

The Columbia Solar Projects would be located in unincorporated Kittitas County, east of the Cascade Mountains, within the Kittitas Valley, outside of the city of Ellensburg. Approximately 232 acres of leased land would potentially be affected. The land is currently agricultural and is being used principally for hay production, grazing, or is fallow, with common weed infestation. The described 232 acres represent only 0.13% of the total 183,124 acres of farmlands in Kittitas County and 0.34% of the 68,314 acres of total croplands. By choosing agricultural lands, the TUUSSO has intentionally avoided areas of significant habitat, such as shrub steppe and other areas that are important wildlife habitat. The projects are not anticipated to affect areas beyond the solar sites' footprints and generation tie lines, encompassed within the described 232 acres.

(c) The cost and magnitude of the proposed energy facility; and

Each of the five proposed Columbia Solar Projects is estimated to cost $8 to $10 million, for a total estimated cost of $40 to $50 million for all five projects. As to magnitude, the projects would generate approximately 5MWac each, approximately 25 MWac in total. Please refer to the responses in Sections 2.1 and 2.2 for more detailed information about the magnitude of the five proposed Columbia Solar Projects.

(d) The degree to which the proposed energy facility represents a change in use of the proposed site.

Each of the five Columbia Solar Project sites is active or fallow agricultural land:

- Camas Solar Project site – 51.21 acres of active agricultural land, growing alfalfa
- Fumaria Solar Project site – 35.24 acres of fallow agricultural land
- Penstemon Solar Project site – 39.38 acres of active agricultural land, growing Sudangrass
- Typha Solar Project site – 54.29 acres, primarily consisting of irrigated agricultural land being used for grazing pasture
- Urtica Solar Project site – 51.94 acres, primarily consisting of active agricultural land, growing common timothy hay

The proposed Columbia Solar Projects represent changes from the sites' current agricultural uses, but the projects' impacts would be minimal and isolated, and the projects are an allowable use under the current zoning and land use. Solar project development is a permitted conditional use in these areas under their designated zoning of Commercial Agriculture or Rural Working – Agriculture 20. Moreover, as noted above, the combined 232 acres represents only 0.13% of the total 183,124 acres of farmlands in Kittitas County and 0.34% of the 68,314 acres of total croplands.

(2) Contents. Applications for expediting processing submitted to the council in accordance with the requirements of chapter 463-43 WAC must address all sections of chapters 463-60 and 463-62 WAC.

3. A discussion of WAC 463-60 and 436-62.

WAC 463-60 and 463-62 criteria are discussed below in Chapters 3 and 4.

None of the environmental impacts, the areas affected, the cost and magnitude of the Columbia Solar Projects, and the degree of land use change are sufficiently significant to warrant full review of this application.

1.16.2 As to the second criteria, the Columbia Solar Projects are consistent with and in compliance with city, county, or regional land use plans or *zoning ordinances.*

Pursuant to RCW 80.50.075, to be eligible for expedited processing, an applicant must show “that the project is consistent with and in compliance with city, county, or regional land use plans or zoning ordinances.” The five Columbia Solar Projects and two associated generation tie lines are located in an unincorporated portion of Kittitas County and are consistent and compliant with the Kittitas County Code and the December 2016 Kittitas County Comprehensive Plan.

Since Kittitas County is a full-planning Growth Management Act county, the Kittitas County Code, including its zoning code, must be consistent with the county’s comprehensive plan. As a result, compliance with the Kittitas County Code also serves as compliance with the comprehensive plan.

Under the Kittitas County Code, each of the Columbia Solar Projects is a “major alternative energy facility” because each is a solar farm that is not a “minor alternative energy facility” (see KCC 17.61.010[9, 11]). As major alternative energy facilities, the projects can be authorized as conditional uses in Rural Working – Agriculture 20 (A-20) and Commercial Agriculture zones (see KCC 17.61.020). In designating solar PV generation facilities as permitted conditional uses, Kittitas County has made the legislative decision (based on its comprehensive plan policies) that these projects are allowable within the A-20 and Commercial Agricultural zones, subject to site-specific review and conditions to address potential, *localized, substantiated impacts* to the uses of agricultural land in the vicinity. Specifically, none of the projects would interfere with any adjacent or surrounding agricultural land uses and would in no way cause or force conversions to any non-agricultural land uses. The Camas, Penstemon, and Typha Solar Projects would be located on land zoned as Commercial Agriculture. The Fumaria and Urtica Solar Projects would be located on land zoned as A-20. As a result, the Columbia Solar Projects are consistent and compliant with siting and zoning pursuant to the Kittitas County Code and Comprehensive Plan.[1]

The Columbia Solar Projects can be authorized as conditional uses in A-20 and Commercial Agriculture zones because the projects meet the Kittitas County Code review criteria for conditional uses. In accordance with RCW 80.50.110 and WAC 463-28-020, EFSEC will make all decisions related to permitting and authorization of the projects. In considering the county’s land use plan and zoning code,

[1] On July 18, 2017, the Kittitas County Board of Commissioners extended until January 9, 2018, a moratorium on accepting applications for major alternative energy facilities in the form of solar farms (Ordinance 2017-004 [July 18, 2017]). The moratorium temporarily precludes accepting applications but does not preclude approving facilities. In addition, it does not alter the Kittitas County Comprehensive Plan or Kittitas County Code which allow (via a Conditional Use Permit) solar facilities on Commercial Agriculture and Rural Working – Agriculture 20 zoned lands. Therefore, the moratorium does not alter findings that the Columbia Solar Projects are consistent and compliant with the Comprehensive Plan and Kittitas County Zoning Code.

EFSEC can apply the county's criteria. In doing so, a conditional use may be authorized when the following requirements are met:

1. The proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or to the character of the surrounding neighborhood. KCC 17.60A.015(1).

The Columbia Solar Projects are essential or desirable to the public convenience because the projects would help the state meet Washington's Renewable Portfolio Standard mandates for 9% of Washington's electricity to be generated from renewable sources by 2016, increasing to 15% by 2020. The projects would also provide clean, locally produced power that would be delivered directly to the Puget Sound Energy electricity grid.

Washington has a policy to increase the use of renewable energy facilities through focusing on local sources such as solar (RCW 82.16.110 and 82.16.110). The legislature also found it in the public interest to encourage private investment in renewable energy resources, to stimulate the state's economic growth and to enhance the continued diversification of energy resources used in the state (RCW 80.60.005). The Columbia Solar Projects meet this policy because they would be funded by private money, with an estimated total cost of $40 to $50 million, which should stimulate economic growth and would diversify energy resources further through additional solar facilities.

Finally, the Columbia Solar Projects would not be detrimental or injurious to the public health, peace, safety, or character of the surrounding neighborhoods. As discussed above, the projects would have minimal impacts to the environment and available agricultural lands, and would cause no negative impacts to surrounding agricultural operations.

2. The proposed use at the proposed location will not be unreasonably detrimental to the economic welfare of the county and that it will not create excessive public cost for facilities and services by finding that:

   (a) The proposed use will be adequately serviced by existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers, and schools; or

   (b) The applicant shall provide such facilities; or

   (c) The proposed use will be of sufficient economic benefit to offset additional public costs or economic detriment (KCC 17.60A.015[2]).

The Columbia Solar Projects would not be unreasonably detrimental to the economic welfare of Kittitas County or create excessive public costs. The projects would not have a detrimental impact on the county's economic welfare but rather a positive impact. During peak construction, the projects would employ up to 100 workers per day, hired locally when possible, and should increase local spending. The projects would also provide an estimated $4,880,000 in property tax revenues for Kittitas County over the 30-year project life, as well as consistent revenue to the landowners through lease payments, aiding agricultural landowners in weathering variable market and weather events, bolstering the operations with a predictable and steady stream of income from a use that is compatible with surrounding agricultural operations. In addition, as described in Sections 4.3 and 4.4, existing services would adequately serve the projects with no anticipated significant impacts to police, fire, school, irrigation, refuse, water or septic systems, or health care services. TUUSSO would have facilities available at the projects to address fire prevention and protection. Finally, the projects should generate a positive tax-related impact for the area that could help expand services.

3. The proposed use complies with relevant development standards and criteria for approval set forth in this title or other applicable provisions of Kittitas County Code (KCC 17.60A.015[3]).

TUUSSO and the Columbia Solar Projects would comply with all relevant development standards and criteria in the Kittitas County Code, including applicable stormwater guidelines and operation and best management practices, as well as:

KCC Title 8 Health, Welfare, and Sanitation
KCC Title 9 Public Peace, Safety, and Morals
KCC Title 10 Vehicles and Traffic
KCC Title 12 Roads and Bridges
KCC Title 13 Water and Sewers
KCC Title 14 Buildings and Construction
KCC Title 15 Environmental Policy
KCC Title 17 Zoning
KCC Title 17A Critical Areas
KCC Title 20 Fire and Life Safety

4. The proposed use will mitigate material impacts of the development, whether environmental or otherwise (KCC 17.60A.015[4]).

As discussed in the SEPA Environmental Checklist and this application's Section 1.10 and Chapter 3, the Columbia Solar Projects would mitigate potential impacts through the mitigation plan and measures. TUUSSO is committed to developing well-sited, well-constructed projects.

5. The proposed use will ensure compatibility with existing neighboring land uses (KCC 17.60A.015[5]).

The Columbia Solar Projects would be compatible with the existing neighboring uses by creating very limited visual and auditory impacts and generating almost no traffic during operations. The projects are an allowed use, considered to be compatible with the County's Comprehensive Plan and an accepted rural land use. Solar PV facilities are therefore compatible with the rural nature of Kittitas County. The projects satisfy this criteria in that the solar PV facilities will not cause any impacts to the ongoing adjacent and surrounding farming operations, and would in no way cause or force the conversion to non-farming land uses. To the contrary, solar farms in Kittitas County discourage the costly conversion of agricultural lands to sprawling, low-density residential development, provide farmers with a cushion in variable markets with a new source of income, and provide a new and steady stream of new tax revenues for Kittitas County.

6. The proposed use is consistent with the intent and character of the zoning district in which it is located (KCC 17.60A.015[6]).

The Kittitas County Code allows major alternative energy facilities as conditional uses in A-20 and Commercial Agriculture zones. A major alternative energy facility can be a solar farm that is not a minor alternative energy facility (KCC 17.61.010[9]). As a result, the Columbia Solar Projects would be major alternative energy facilities that can be allowed as conditional uses in A-20 and Commercial Agriculture zones. The projects are consistent with the intent and character of the zoning districts, as they are expressly allowed, and satisfy the Growth Management Act's intent that the county allow a range of land uses in rural areas, discouraging residential sprawl, to meet local economic needs. The projects would not cause any significant conversion of lands to non-agricultural uses. Instead, the solar facilities are considered under the county's zoning code to be a permitted, compatible use. As a conditional use, the projects must be authorized unless the facilities would cause an impact that discourages and impedes the ongoing use of the surrounding lands for farming.

7. For conditional uses outside of Urban Growth Areas the use:

   (a) Is consistent with the intent, goals, policies, and objectives of the Kittitas County Comprehensive Plan, including the policies of Chapter 8, Rural and Resource Lands;

Kittitas County has established goals, policies, and objectives (GPOs) to provide its intent toward land use planning and the implementation of county wide planning policies. The county created these GPOs in response to identified needs within the county and to guide legislative actions in adopting zoning. Tables 1.16-1 and 1.16-2 summarize the GPOs related to the lands where the Columbia Solar Projects would be located and the projects themselves, and are intended to direct the county in its legislative process in the adoption of specific zoning ordinances.

Table 1.16-1. Kittitas County Comprehensive Plan GPO General Policy Statements

GPO Number	General Policy Statements
2.15	The development of resource based industries and processing should be encouraged in all areas of Kittitas County. When such uses are located in rural and resource lands, criteria shall be developed to ensure the protection of these lands to ensure compatibility with rural character. Consider adding a definition for "resource based industry" to the definitions in Title 17, Zoning.
6.18	Decisions made regarding utility facilities should be consistent with and complementary to regional demand and resources and should reinforce an interconnected regional distribution network.
6.36	Develop a study area encompassing the entire county to establish criteria and design standards for the siting of solar farms.
8.1	Rural lands are characterized by a lower level of services; mixed residential, agricultural and open space uses; broad visual landscapes and parcels of varying sizes, a variety of housing types and small unincorporated communities.
8.3	The County shall promote the retention of its overall character by establishing zoning classifications that preserve rural character identified to Kittitas County.
8.4	Development in rural areas is subject to agricultural and forestry activities that may take place as a right on adjacent properties.
8.8	A certain level of mixed uses in rural areas and rural service centers is acceptable and may include limited commercial, service, and rural industrial uses
8.11	Policies will reflect a "right to farm" in agricultural lands.
8.13	Encourage development activities and establish development standards which enhance or result in the preservation of rural lands.
8.14C	Development shall be located distances from streams, rivers, lakes, wetlands, critical areas determined necessary and as outlined within existing Shorelines Management Program, the Critical Areas Ordinance and other adopted resource ordinances in order to protect ground and surface waters.
8.15	Uses common in rural areas of Kittitas County enhancing rural character, such as agriculture uses in Lower Kittitas and rural residential uses and recreation uses in Upper Kittitas shall be protected from activities which encumber them.
8.17	Land use development within the Rural area that is not compatible with Kittitas County rural character or agricultural activities as defined in RCW 90.58.065(2)(a) will not be allowed
8.44	Growth and development in Rural lands will be planned to minimize impacts upon adjacent natural resource lands.
8.129	Encourage development projects whose outcome will be the significant conservation of farmlands.
8.16	Give preference to land uses in Rural designated areas that are related to agriculture, rural residential development, tourism, outdoor recreation, and other open space activities.

GPO Number	General Policy Statements
8.21	Kittitas County will provide criteria within its zoning code to determine what uses will be permitted within rural zone classifications in order to preserve rural character.

Table 1.16-2. Kittitas County Comprehensive Plan GPO Zoning Implementation Statements

GPO Number	Zoning Implementation Statements
6.7	Decisions made by Kittitas County regarding utility facilities will be made in a manner consistent with and complementary to regional demands and resources.
6.9	Process permits and approvals for all utility facilities in a fair and timely manner, and in accordance with development regulations that ensure predictability and project concurrency.
6.10	Community input should be solicited prior to county approval of utility facilities, which may significantly impact the surrounding community.
6.23	Kittitas County reserves the right to review all applications for utilities placed within or through the County for consistency with local policies, laws, custom and culture.
8.5	In order to protect and preserve Resource Lands, non-resource development and activities on adjacent Rural lands shall require preservation of adjacent vegetation, existing landforms (e.g. ravines) or use of other methods that provide functional separation from the resource land use.
8.9	Protecting and preserving resource lands shall be given priority. Proposed development allowed and adjacent to resource lands shall be conditioned to protect resource lands from negative impacts from that development.
8.21B	Functional separation and setbacks found necessary for the protection of water resources, rural character and/or visual compatibility with surrounding rural areas shall be required where development is proposed. The first sentence of this policy shall not apply to agricultural activities as defined in RCW 90.58.065(2(a). When required by the county shoreline master program or critical area regulations, buffers shall be provided.

The above GPOs are directed at the legislative effort to adopt zoning codes that implement the intent and policy direction of Kittitas County, and these GPOs therefore have little to no direct application to the Columbia Solar Projects. Given this, while the zoning code references the comprehensive plan, the plan itself is not a regulatory mandate, does not include regulatory criteria capable of reliable and predictable implementation, and is not directly applicable or enforceable as such.

However, the Columbia Solar Projects are consistent with the above listed GPOs from the Kittitas County Comprehensive Plan, including policies in Chapters 2 (Land Use), 6 (Utilities), and 8 (Rural and Resource Lands). The projects implement the intent under the Growth Management Act for land uses that are compatible with agricultural uses, provide economic opportunity to the residents and landowners, minimize and mitigate impacts to rural and resource lands, and recognize the emphasis the GPOs place on the character and use of these lands. The projects are consistent particularly with GPO 6.36, which focuses on developing and studying the county for siting solar farms, showing an intent to address solar facilities for the county.

(b) Preserves “rural character” as defined in the Growth Management Act (RCW 36.70A.030[15]);

The Columbia Solar Projects preserve rural character as defined in the Growth Management Act by being compatible with the county’s rural patterns of land use and development. The projects maintain natural landscapes, open space, and the visual landscape. The panels used in the projects are quiet, unobtrusive structures with very few moving parts and minimal maintenance requirements that would not significantly impact viewsheds or alter the county's rural character during operations. The panels would have native vegetation planted under them and would be surrounded by native habitat, including native plants, where possible. The projects would also be compatible with current rural uses of the land. The projects would not impact traditional rural lifestyles, rural-based economies, or opportunities to live and work in rural areas. Local farming practices can (and TUUSSO anticipates would) continue on the properties adjacent to the projects, particularly where the projects would operate on portions of larger parcels. The projects would not in any way interfere with existing, surrounding agricultural practices and would not force or compel any conversions to non-agricultural land uses.

The Columbia Solar Projects would also not cause inappropriate conversion of undeveloped lands to incompatible uses. Given this, the projects help advance the Growth Management Act mandate that expands economic use of rural areas and strongly discourages incompatible uses that require imprudent and costly extensions of roads and other public services. In short, the projects would be temporary and provide an opportunity for diversified farming income that disincentivizes sprawling, low-density development. Finally, as discussed in (c) immediately below, the projects would not require the extension of urban governmental services.

The Columbia Solar Projects would also maintain the rural character of the wildlife habitat and protection of natural surface water and groundwater flows, recharge, and discharge. The projects would also be compatible with local wildlife habitat. TUUSSO would continue to work with the Washington Department of Fish and Wildlife to manage existing wildlife habitat. In addition, the projects would maintain current patterns of surface water and groundwater flow and recharge and discharge areas, as well as surface water and groundwater uses. The projects are anticipated to have no stormwater discharges and would use water under existing water allocations or water that is trucked in from municipal water sources.

(c) Requires only rural government services; and

The Columbia Solar Projects would require only rural government services, such as police and fire services. The projects would have on-site fire prevention and protection measures. In addition, with minor improvements, the roads and infrastructure would be sufficient to serve the project's construction and operation. As mitigated, the projects would not increase the need for police, fire, school, irrigation, refuse, water or septic systems, or health care services. As mitigated, there should be no costs or detriments to offset.

(d) Does not compromise the long term viability of designated resource lands (KCC 17.60A.015[7]).

The Columbia Solar Projects would not compromise the long-term viability of the surrounding agricultural lands. The projects would temporarily remove approximately 232 acres of land from its current agricultural use or fallow status, introducing native vegetation, and providing sound weed management practices beneficial to the surrounding farmlands. Throughout the projects' life, the projects would not compromise agricultural and rural use on the surrounding land. Moreover, after the removal of all solar equipment after the lease terms, the land would be returned to its original state and can be returned to agricultural production.

For the foregoing reasons, this application should be granted expedited processing. The application meets the requirements of RCW 80.50.075 and WAC 463-60-117 through demonstrating that the proposed facilities' environmental impacts are not significant or can be mitigated to a non-significant level under SEPA and that the projects are consistent with and in compliance with city, county, or regional land use plans or zoning ordinances.

(3) Funds. The applicant shall submit those funds and costs for independent consultant review and application processing pursuant to RCW 80.50.071 (1)(a) and (b) and chapter 463-58 WAC with the understanding that any unexpended portions shall be returned to the applicant at the completion of application processing.

In accordance with WAC 463-58-020, a deposit shall accompany the application as required by RCW 80.50.071. RCW 80.50.071 was updated in 2016, establishing the application deposit in an amount up to fifty thousand dollars ($50,000), or such greater amount as specified by EFSEC after consultation with the Applicant. TUUSSO is providing the initial $50,000 deposit with this ASC for the five proposed Columbia Solar Projects.

1.17 References – Chapter 1

Materials from other documents were not used in the preparation of this chapter.

2 SOLAR PROJECT PROPOSAL DESCRIPTIONS

2.1 Site Description 463-60-125

The application shall contain a description of the proposed site indicating its location, prominent geographic features, typical geological and climatological characteristics, and other information necessary to provide a general understanding of all sites involved, including county or regional land use plans and zoning ordinances.

2.1.1 Kittitas County Overview

TUUSSO Energy, LLC's (TUUSSO's), Columbia Solar Projects would be located in unincorporated Kittitas County, east of the Cascade Mountains, within the Kittitas Valley, outside of the city of Ellensburg, but relatively close to the northwest, southwest, and southeast of the city (see Figure 2.1-1, and below for additional details).

The topography of each of the five sites is relatively consistent and fairly flat, with surface elevations ranging from 1,455 to 1,750 feet above mean sea level (amsl), depending on the site. The sites are not within any mapped geologically hazardous areas. No erosion/landslide geologic hazard areas, snow avalanche hazards, or mine hazard areas are mapped on any of the parcels (Kittitas County 2016). As a result, the projects would not require specialized engineering to ascertain that the properties are suitable for development.

Historical (1971–2000) average annual rainfall is 8.96 inches, as obtained from the closest wetlands climate analysis (WETS) climate station, the Ellensburg National Weather Service (NWS) station (ELBW1) at the Ellensburg Wastewater Treatment Plant, located south of Ellensburg, Washington.

Land use in Kittitas County is guided by the Kittitas County Comprehensive Plan (Kittitas County 2016). The plan is currently being revised, is the subject of public review, and is scheduled to be adopted in April 2018. The 20-year plan will be the guiding document for land use for the county through 2037. All five of the proposed TUUSSO Columbia Solar Project sites would be located on land zoned either as "Commercial Agriculture" or as "Rural Working – Agriculture 20."

The "Commercial Agriculture" land use zone "is an area wherein farming and ranching are the priority." The purpose of this zoning classification, "is to preserve fertile farmland from encroachment by nonagricultural land uses and protect the rights of those engaged in agriculture." The Commercial Agriculture zone only allows for agricultural land use with no more than two residential dwellings per 20 acres. According to Kittitas County Code (KCC) 17.15.050.01, utilities, including "solar farms" as defined by County Code 17.61, are a permitted use of a Commercial Agriculture zone.

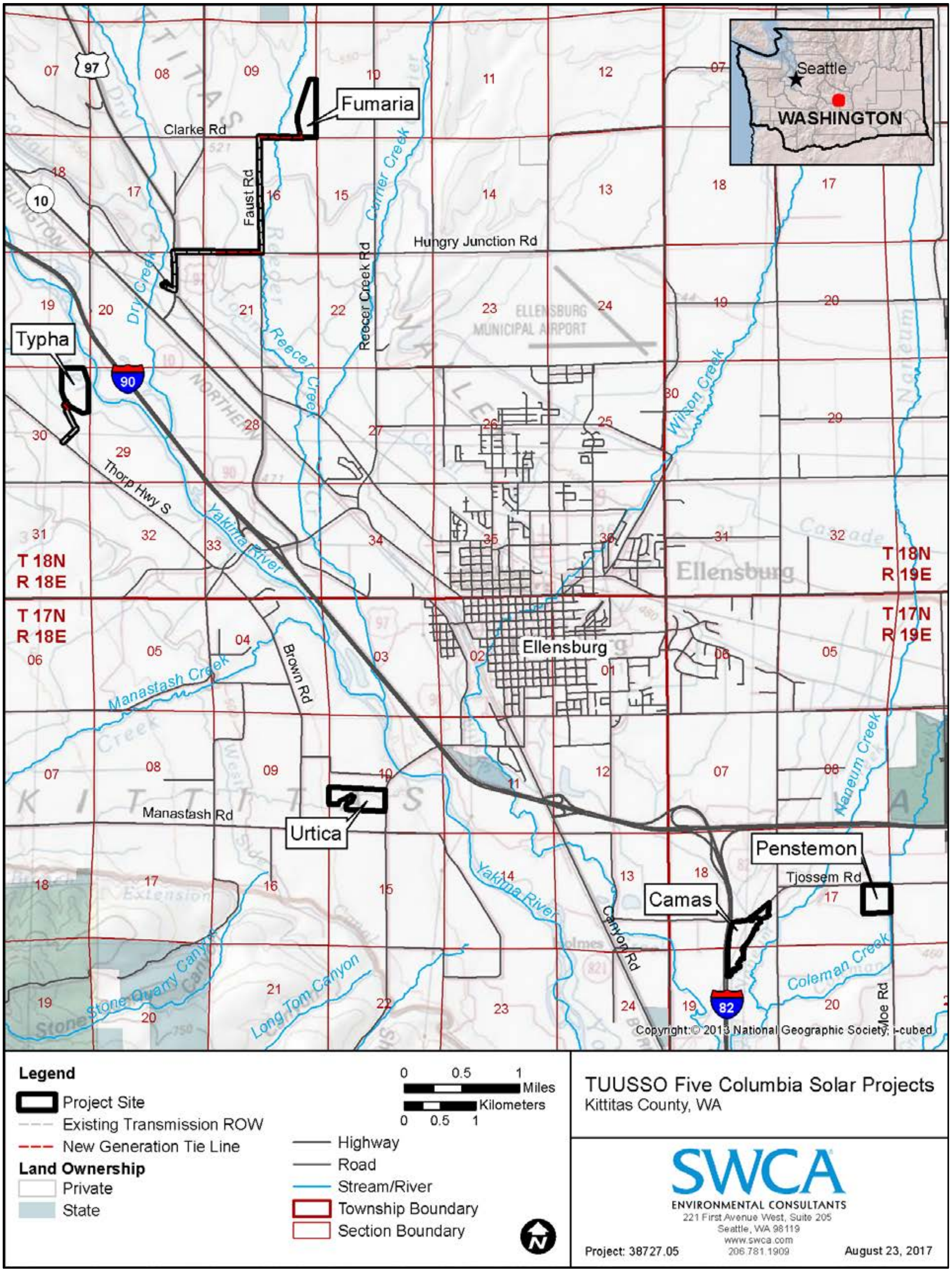


Figure 2.1-1. Columbia Solar Project site locations.

The “Rural Working” general land use designation “generally encourages farming, ranching and storage of agriculture products, and some commercial and industrial uses compatible with a rural environment and supporting agriculture and/or forest activities.” The purposes of the Rural Working designation are to:

- Provide preservation of agriculture activities where producers can live and work on their own lands separate from resource lands.
- Support the continuation, whenever possible, of agriculture, timber, and mineral uses on lands not designated for long-term commercial significance.
- Provide some buffer between rural residential lands and resource lands.
- Provide areas of low intensity land use activities within the agriculture and forest activities.

Within the “Rural Working” general land use designation are areas zoned as “Agriculture 20” (A-20). According to KCC 17.29.10, the A-20 zone “is an area wherein farming, ranching and rural life styles are dominant characteristics. The intent of this zoning classification is to preserve fertile farmland from encroachment by nonagricultural land uses; and protect the rights and traditions of those engaged in agriculture.” According to KCC 17.15.060.1, utilities, including “solar farms” as defined by County Code 17.61, are a permitted use within an A-20 zone.

2.1.2 Solar Project Sites

2.1.2.1 Camas Solar Project Site

TUUSSO is proposing to construct a new photovoltaic (PV) solar facility on approximately 51.21 acres of private agricultural land, which would connect into the existing Puget Sound Energy (PSE) distribution transmission line along Tjossem Road, located southeast of Ellensburg, in unincorporated Kittitas County, Washington. The Camas Solar Project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

The Camas Solar Project site is active agricultural land, growing alfalfa, located immediately southeast of the intersection of Tjossem Road and Interstate 82 (I-82). The project would be located approximately 2.25 miles southeast of the Ellensburg city center, in Sections 18 and 19 of Township (T) 17 North (N), Range (R) 19 East (E), Willamette Meridian (Figure 2.1-2). Topography of the site is fairly flat and slopes to the south toward Little Naneum Creek, with surface elevations ranging from 1,465 to 1,455 feet amsl.

The Camas Solar Project site would be located on land zoned as Commercial Agriculture, and would be a permitted conditional use under KCC 17.15.050.01.

2.1.2.2 Fumaria Solar Project Site

TUUSSO is proposing to construct a new PV solar facility on approximately 35.24 acres of fallow pasture land, including the construction of a switchyard with a short (2.56-mile-long, 25.4-acre) generation tie line into an existing PSE substation, located northwest of Ellensburg, in incorporated Kittitas County, Washington. The Fumaria Solar Project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

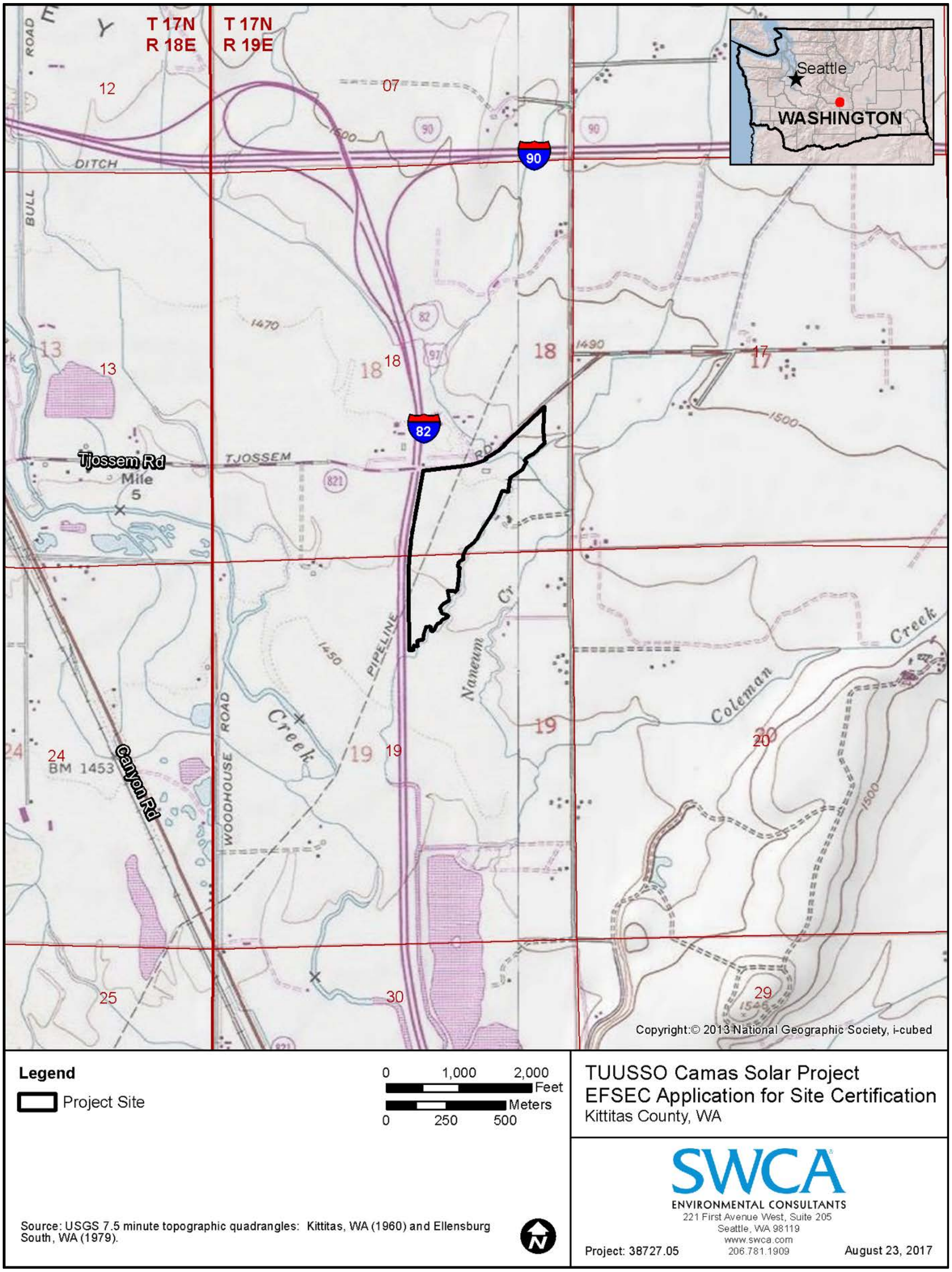


Figure 2.1-2. Camas Solar Project site location.

The Fumaria Solar Project site primarily consists of fallow pasture land. The project would be located approximately 1.5 miles northwest of the intersection of Hungry Junction Road and Reece Creek Road, in Sections 9, 16, 17, and 20, T18N, R18E, Willamette Meridian (Figure 2.1-3). The generation tie line would originate from the southwestern site boundary corner and follow Clarke Road, along one of two proposed alignments, to Faust Road, where it would parallel Faust Road south along an existing transmission corridor (sharing poles with an existing distribution line) on the east side of the road right-of-way (ROW) to Hungry Junction Road, where it would turn west and travel along the north side of the road ROW for roughly 2,000 feet, and then continue to travel along the north side of the road ROW within an existing transmission corridor (sharing poles with an existing distribution line) to U.S. Highway 97, where it would travel south along the west side of the road ROW down to just south of McManamy Road, where it would turn northwest to connect into an existing PSE substation (a total of 2.6 miles). The two proposed alignments along Clarke Road comprise one that follows the north side of the road (ROW A), and one that follows the south side of the road (ROW B).

The Fumaria Solar Project study area totals approximately 67.0 acres (35.24 acres for the solar site and 25.4 acres for the generation tie line). Topography of the site generally slopes to the south toward the Cascade Irrigation District Canal. Surface elevation within the study area ranges from 1,750 to 1,600 feet amsl, the lowest elevation being along the southern study area boundary near the existing PSE substation and the highest elevation being at the northern end of the solar site.

The Fumaria Solar Project site would be located on land zoned as Rural Working – Agriculture 20, and would be a permitted conditional use under KCC 17.15.060.1.

2.1.2.3 Penstemon Solar Project Site

TUUSSO is proposing to construct a new PV solar facility on approximately 39.38 acres of private agricultural land, which would connect into the existing Puget Sound Energy (PSE) distribution transmission line along Tjossem Road, located southeast of Ellensburg, in unincorporated Kittitas County, Washington. The Penstemon Solar Project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

The Penstemon Solar Project site is active agricultural land, for growing export hay products (such as timothy and alfalfa), located immediately southwest of the intersection of Tjossem Road and Moe Road. The project would be located approximately 4 miles southeast of the Ellensburg city center, in Section 17, T17N, R19E, Willamette Meridian (Figure 2.1-4). Topography of the site slopes to the south, with surface elevations ranging from 1,498 to 1,509 feet amsl.

The Penstemon Solar Project site would be located on land zoned as Commercial Agriculture, and would be a permitted conditional use under KCC 17.15.050.01.

2.1.2.4 Typha Solar Project Site

TUUSSO is proposing to construct a new PV solar facility on approximately 54.29 acres of private agricultural land, including the construction of a switchyard with a short (0.45-mile-long, 4.4-acre) generation tie line into an existing PSE distribution transmission line, located northwest of Ellensburg, in unincorporated Kittitas County, Washington. The Typha Solar Project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

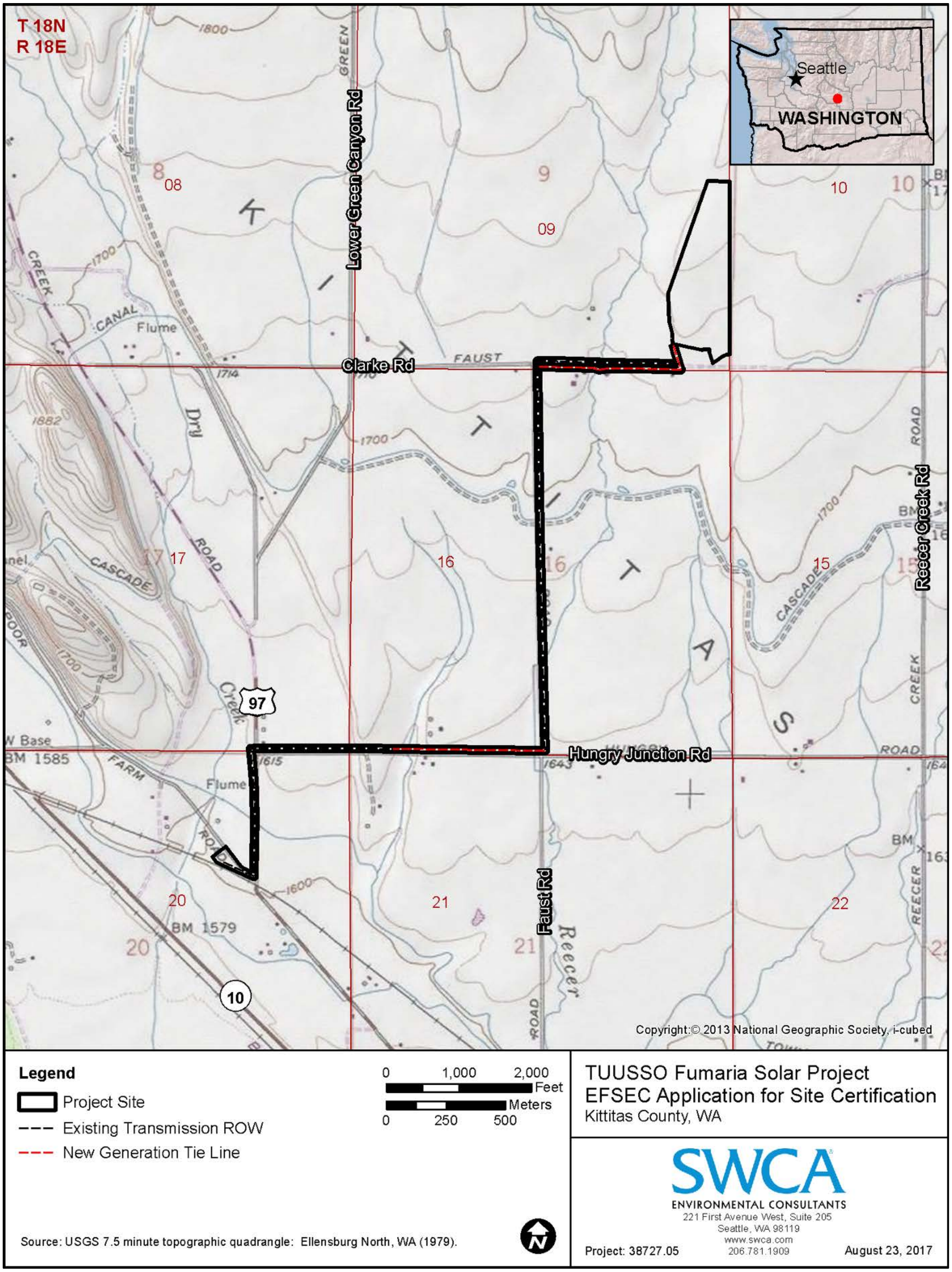


Figure 2.1-3. Fumaria Solar Project site location.

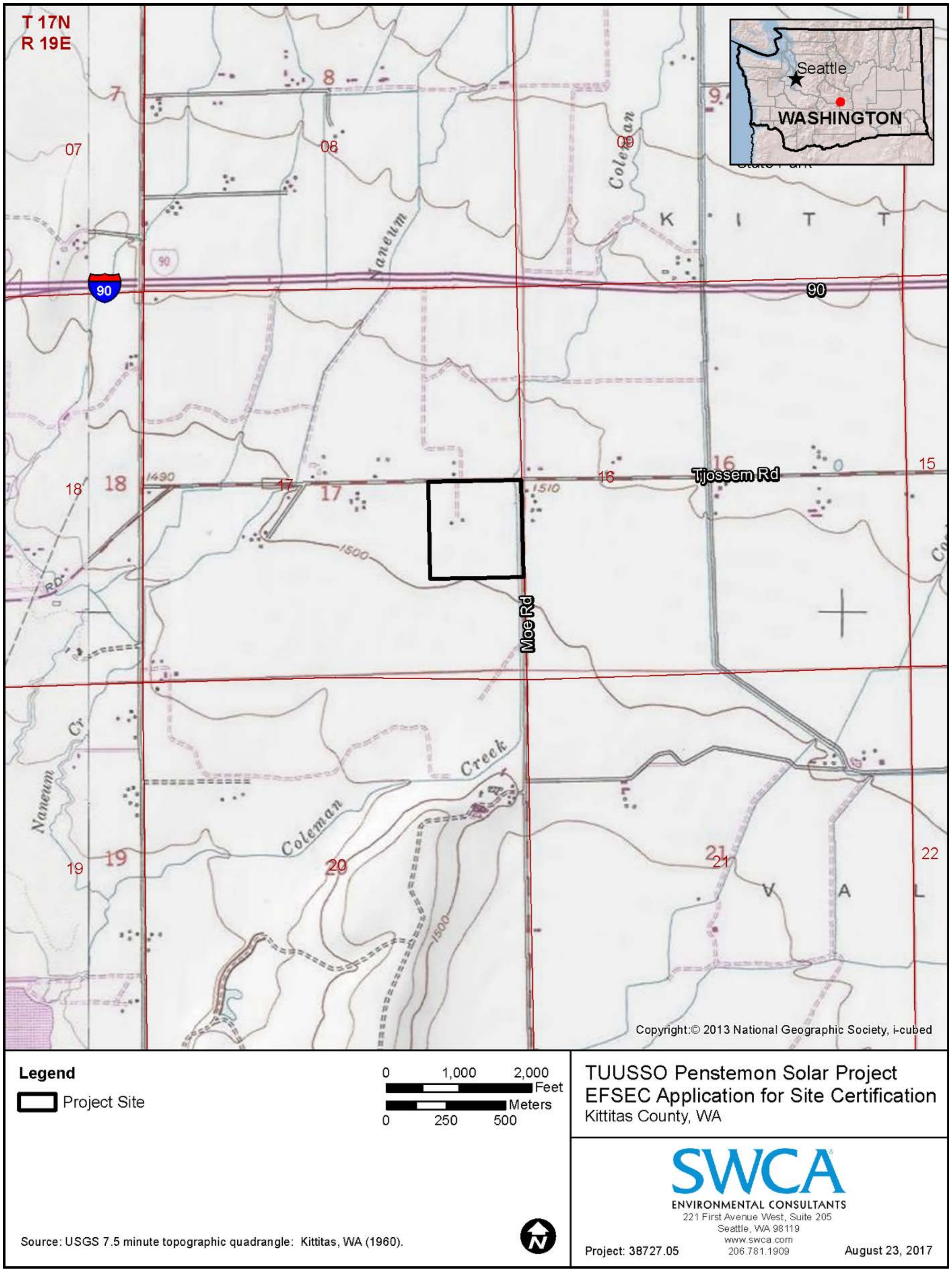


Figure 2.1-4. Penstemon Solar Project site location.

The Typha Solar Project site primarily consists of agricultural land (irrigated and grazed pasture) located just west of the Yakima River and north of Thorp Highway South. The project would be located approximately 1.1 miles east of the intersection of Thorp Highway South and Cove Road, in Section 30, T18N, R18E, Willamette Meridian (Figure 2.1-5). The generation tie line would originate from the southwestern site boundary and follow existing transmission lines to cross south along an existing access road, crossing the Ellensburg Power (EP) Canal three times, and passing through the Ellensburg Golf and Country Club to connect to the existing PSE distribution transmission line along Thorp Highway South. Topography of the site generally slopes to the east toward the Yakima River. Surface elevation within the study area ranges from 1,570 to 1,614 feet amsl, the lowest elevation being along the eastern site boundary closest to the Yakima River and the highest elevation being at the southern end of the generation tie line near Thorp Highway South.

The Typha Solar Project site would be located on land zoned as Commercial Agriculture, and would be a permitted conditional use under KCC 17.15.050.01.

2.1.2.5 Urtica Solar Project Site

TUUSSO is proposing to construct a new PV solar facility on approximately 51.94 acres of private agricultural land, which would connect into the existing PSE distribution transmission line along Umptanum Road, located southwest of Ellensburg, in unincorporated Kittitas County, Washington. The Urtica Solar Project is intended to provide up to 5 MW of solar energy to PSE for use within their service area.

The Urtica Solar Project site primarily consists of active agricultural land, growing common timothy, located on the west side of Umptanum Road and approximately 0.2 mile southwest of the Yakima River, with McCarl Creek flowing through the site from west to east. The project would be located approximately 0.2 mile north of the intersection of Umptanum Road and Manastash Road, in Section 10, T17N, R18E, Willamette Meridian (Figure 2.1-6). Topography of the site generally slopes to the east toward Umptanum Road and toward McCarl Creek, which flows through the site. Surface elevation within the project area ranges from 1,539 to 1,575 feet amsl, the lowest elevation being within the eastern portion of the McCarl Creek channel along Umptanum Road and the highest elevation being along the western site boundary.

The Urtica Solar Project site would be located on land zoned as Rural Working – Agriculture 20, and would be a permitted conditional use under KCC 17.15.060.1.

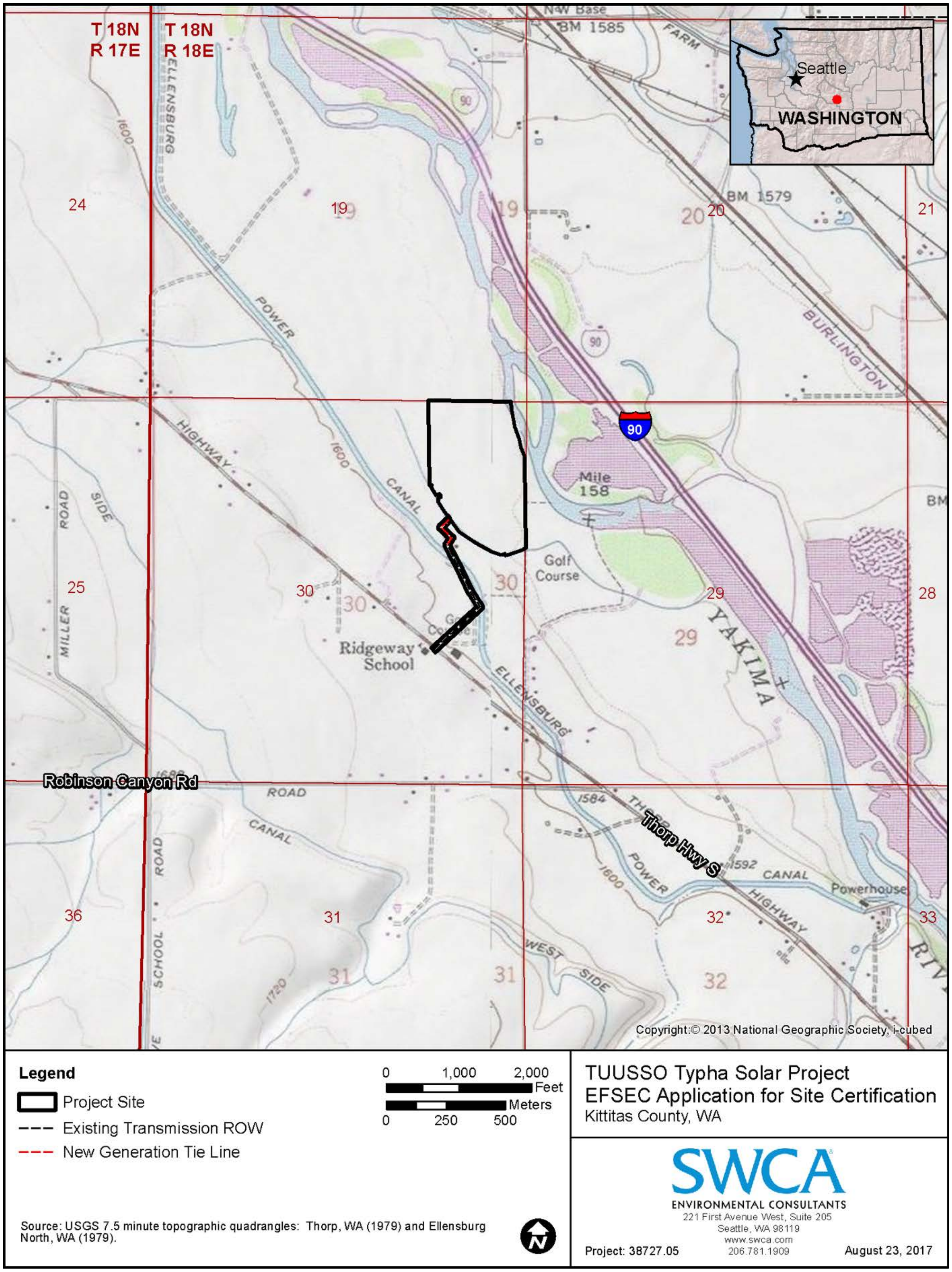


Figure 2.1-5. Typha Solar Project site location.

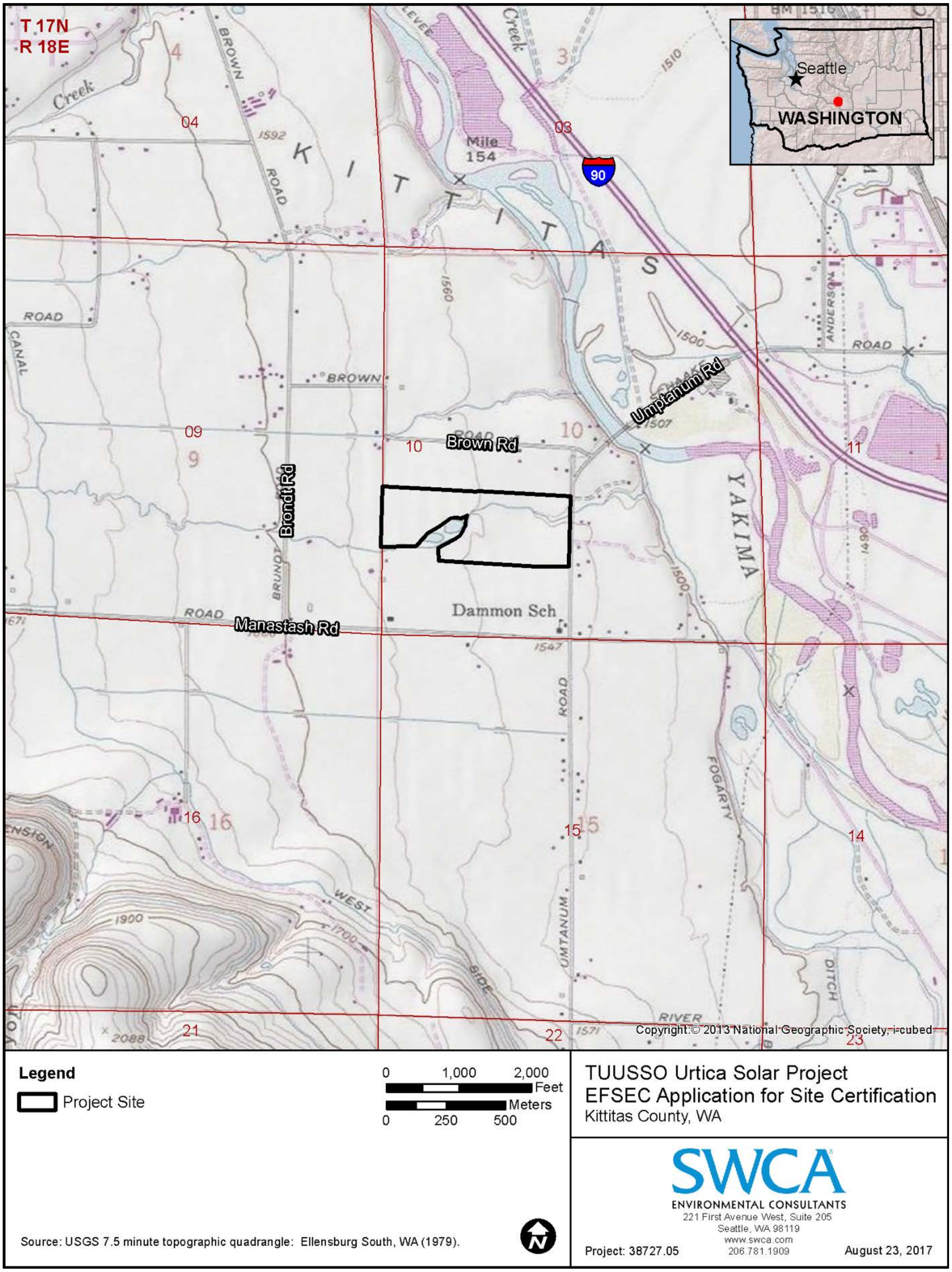


Figure 2.1-6. Urtica Solar Project site location.

2.2 Legal Descriptions and Ownership Interests 463-60-135

(1) Principal facility. The application shall contain a legal description of the site to be certified and shall identify the applicants and all nonprivate ownership interests in such land.

TUUSSO has established site control of all five of the proposed Columbia Solar Project sites via lease agreements executed with the landowners of record. All project sites are located in Kittitas County, Washington.

2.2.1 Camas Solar Project Site

2.2.1.1 Legal Description

TRACT A:

THAT PORTION OF PARCEL 1D OF THAT CERTAIN SURVEY AS RECORDED JUNE 15, 1994 IN BOOK 20 OF SURVEYS AT PAGE 60, UNDER AUDITOR'S FILE NO. 571789, RECORDS OF KITTITAS COUNTY, WASHINGTON, WHICH LIES SOUTHWESTERLY OF THE BULL DITCH RIGHT OF WAY; BEING A PORTION OF PARCEL 1B OF THAT CERTAIN SURVEY AS RECORDED APRIL 29, 1993 IN BOOK 19 OF SURVEYS AT PAGE 74, UNDER AUDITOR'S FILE NO. 559059, RECORDS OF KITTITAS COUNTY, WASHINGTON; LOCATED IN THE SOUTHEAST QUARTER OF SECTION 18, TOWNSHIP 17 NORTH, RANGE 19 EAST, W.M., KITTITAS COUNTY, WASHINGTON.

AND

THAT PORTION OF PARCEL 1C OF THAT CERTAIN SURVEY AS RECORDED JUNE 15, 1994 IN BOOK 20 OF SURVEYS AT PAGE 60, UNDER AUDITOR'S FILE NO. 571789, RECORDS OF KITTITAS COUNTY, WASHINGTON, WHICH LIES SOUTHWESTERLY OF THE BULL DITCH RIGHT OF WAY; BEING A PORTION OF PARCEL 1B OF THAT CERTAIN SURVEY AS RECORDED APRIL 29, 1993 IN BOOK 19 OF SURVEYS AT PAGE 74, UNDER AUDITOR'S FILE NO. 559059, RECORDS OF KITTITAS COUNTY, WASHINGTON; LOCATED IN THE SOUTHEAST QUARTER OF SECTION 18, TOWNSHIP 17 NORTH, RANGE 19 EAST, W.M., KITTITAS COUNTY, WASHINGTON.

TRACT B:

THAT PORTION OF THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 19, TOWNSHIP 17 NORTH, RANGE 19 EAST, W.M., IN THE COUNTY OF KITTITAS, STATE OF WASHINGTON, WHICH IS BOUNDED BY A LINE DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHWEST CORNER OF PARCEL A OF THAT CERTAIN SURVEY RECORDED APRIL 22, 1993, IN BOOK 19 OF SURVEYS, PAGE 73, UNDER AUDITOR'S FILE NO. 558819. WHICH IS THE TRUE POINT OF BEGINNING FOR SAID DESCRIBED LINE;

THENCE SOUTHERLY, ALONG THE WEST BOUNDARY OF SAID PARCEL A, WHICH IS ALSO THE EAST RIGHT OF WAY BOUNDARY OF 1-82, TO THE SOUTH BOUNDARY OF SAID NORTH HALF OF THE NORTHEAST QUARTER; THENCE NORTH 87°58'34" EAST, ALONG SAID SOUTH BOUNDARY OF SAID NORTH HALF OF THE NORTHEAST QUARTER, 60.81 FEET TO THE CENTERLINE OF NANEUM CREEK; THENCE NORTHEASTERLY, ALONG SAID NANEUM CREEK CENTERLINE, TO THE NORTH BOUNDARY OF SAID NORTH HALF OF THE NORTHEAST QUARTER; THENCE SOUTH 87°42'10" WEST, ALONG SAID NORTH BOUNDARY, 763.52 FEET TO THE TRUE POINT OF BEGINNING FOR SAID DESCRIBED LINE.

(SAID TRACT BEING A PORTION OF PARCEL A OF THAT CERTAIN SURVEY RECORDED APRIL 22, 1993, IN BOOK 19 OF SURVEYS, PAGE 73, UNDER AUDITOR'S FILE NO. 558819 AND OF LOT 1, OF REDD SHORT PLAT, KITTITAS COUNTY

SHORT PLAT NO. SP-93-14, AS RECORDED JANUARY 19, 1994 IN BOOK D OF SHORT PLATS, PAGE 89 AND 90, UNDER AUDITOR'S FILE NO. 567251, RECORDS OF KITTITAS COUNTY, STATE OF WASHINGTON.)

TRACT C:

THAT PORTION OF PARCELS 1C AND 1D OF THAT CERTAIN SURVEY AS RECORDED JUNE 15, 1994 IN BOOK 20 OF SURVEYS AT PAGE 60, UNDER AUDITOR'S FILE NO. 571789, RECORDS OF KITTITAS COUNTY, WASHINGTON, WHICH LIES NORTHERLY OF THE BULL DITCH RIGHT OF WAY AND NORTHWESTERLY OF THE CENTERLINE OF THE BRANCH OF NANEUM CREEK WHICH FLOWS THROUGH SAID PARCEL 1C; BEING A PORTION OF PARCEL 1B OF THAT CERTAIN SURVEY AS RECORDED APRIL 29, 1993 IN BOOK 19 OF SURVEYS AT PAGE 74, UNDER AUDITOR'S FILE NO. 559059, RECORDS OF KITTITAS COUNTY, WASHINGTON; LOCATED IN THE SOUTHEAST QUARTER OF SECTION 18, TOWNSHIP 17 NORTH, RANGE 19 EAST, W.M., KITTITAS COUNTY, WASHINGTON.

CONTAINS 51.21 ACRES.

2.2.1.2 Applicants and All Non-private Ownership Interests

The Applicant is TUUSSO Energy, LLC, which has a leasehold interest in the Camas Solar Project site from:

Ownership: Valley Land Company, LLC
1585 Tjossem Road
Ellensburg, WA 98926

TUUSSO is not aware of any non-private ownership interest in the project site.

2.2.2 Fumaria Solar Project

2.2.2.1 Fumaria Solar Project Site

Legal Description

A TRACT OF LAND SITUATED IN THE SOUTHEAST QUARTER OF SECTION 9, TOWNSHIP 18 NORTH, RANGE 18 EAST, W.M., KITTITAS COUNTY, STATE OF WASHINGTON, BEING A PORTION OF PARCEL E OF THAT CERTAIN SURVEY AS RECORDED DECEMBER 22, 1998 IN BOOK 23 OF SURVEYS, AT PAGES 249 THROUGH 251, UNDER AUDITOR'S FILE NO. 199912220015, RECORDS OF SAID COUNTY, WHICH IS BOUNDED BY A LINE DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SOUTHEAST QUARTER OF SAID SECTION 9;

THENCE SOUTH 00°06'44" EAST ALONG THE EAST BOUNDARY LINE OF SAID SOUTHEAST QUARTER OF SAID SECTION 9, 60.76 FEET TO THE TRUE POINT OF BEGINNING OF SAID LINE;

THENCE CONTINUING SOUTH 00°06'44" EAST, ALONG SAID EAST BOUNDARY LINE OF SAID SOUTHEAST QUARTER, 2384.88 FEET;

THENCE SOUTH 89°36'01" WEST, 41.02 FEET;
THENCE SOUTH 71°56'57" WEST, 18.75 FEET;
THENCE SOUTH 68°28'25" WEST, 25.60 FEET;
THENCE SOUTH 59°52'18" WEST, 21.39 FEET;
THENCE SOUTH 55°35'54" WEST, 165.95 FEET;
THENCE NORTH 16°08'33" WEST, 159.35 FEET;
THENCE NORTH 04°55'17" WEST, 37.25 FEET;

THENCE SOUTH 86°43’54” WEST, 105.98 FEET;
THENCE NORTH 77°47’27” WEST, 339.61 FEET;
THENCE NORTH 88°06’56” WEST, 37.07 FEET;
THENCE SOUTH 69°10’09” WEST, 24.70 FEET;
THENCE NORTH 17°18’53” WEST, 22.35 FEET;
THENCE NORTH 02°14’53” WEST, 143.64 FEET;
THENCE NORTH 02°27’39” WEST, 389.33 FEET;
THENCE NORTH 19°22’16” EAST, 1646.02 FEET

THENCE SOUTH 89°13’18” EAST, 298.08 FEET TO THE TRUE POINT OF BEGINNING AND THE TERMINUS OF SAID LINE.

CONTAINS 35.24 ACRES.

Applicants and All Non-private Ownership Interests

The Applicant is TUUSSO Energy, LLC, which has a leasehold interest in the Fumaria Solar Project site from:

Ownership: Reecer Creek Solar LLC
6616 - 223rd Ave. NE
Redmond, WA 98053

TUUSSO is not aware of any non-private ownership interest in the project site.

2.2.2.2 Fumaria Solar Project Generation Tie Line

The following is a list of landowners located with 0.25 mile of the Fumaria Solar Project generation tie line centerline.

BNSF RAILWAY COMPANY
P.O. BOX 961089
FORT WORTH, TX 76161-0089

BUCKLIN, DOUGLAS J. & MICHELE R.
41 HUNGRY JUNCTION ROAD
ELLENSBURG, WA 98926

BURRESS, RANDEL & TERRY
(for HWY 97, ELLENSBURG)
P.O. BOX 1358
ELLENSBURG, WA 98926-1904

CASKEY, GARY L.
4050 HWY 97
ELLENSBURG, WA 98926

CRIDLEBAUGH, RONALD W.
5731 FAUST RD
ELLENSBURG, WA 98926

DEVELOPMENT SERVICES OF AMERICA INC.
(for 2121 CLARKE RD, ELLENSBURG)
C/O MISTY ISLE CATTLE CO.
P.O. BOX 25139
SCOTTSDALE, AZ 85255-0181

DEWITT, RANCE P.
(for 4041 HWY 97, ELLENSBURG)
607 N RUBY ST
ELLENSBURG, WA 98926

ERICKSON, MARK E.
C/O Broach, Peggy E.
1840 CLARKE RD
ELLENSBURG, WA 98926

ERICKSON, THOMAS R.
405 DRIVER LN
ELLENSBURG, WA 98926

GIESY, ERIC J.
1040 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

HABERMAN, ROBERT E.
771 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926
HABERMAN, SCOTT
1460 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

HABERMAN, WILLIAM E.
2730 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

HAMMOND, E. SCOTT
5450 FAUST RD
ELLENSBURG, WA 98926

HAND, JAMES E.
(for HWY 97, ELLENSBURG)
961 WHITNEY RD
WALLA WALLA , WA 99362

HAND, PATRICK J.
580 MCMANAMY RD
ELLENSBURG, WA 98926

HATLESTAD, ANDREW A.
(for FAUST RD, ELLENSBURG)
P.O. BOX 365
MERCER ISLAND, WA 98040

HEAD, ROGER S. & SUSAN E.
(for 4764 W DRY CREEK RD, ELLENSBURG)
P.O. BOX 26
YAKIMA, WA 98907-0026

HUNGRY-JUNCTION LLC
(for CLARKE RD, ELLENSBURG)
C/O GERALD J. PITTENGER
6511 - 117TH PL S.E.
BELLEVUE, WA 98006

KIENE, MARILEE M.
(for 1590 CLARKE RD, ELLENSBURG)
435 SIGRIST DR E.
ENUMCLAW, WA 98022-5104

MILLS, MARK L.
4640 W DRY CREEK RD
ELLENSBURG, WA 98926

MORGAN, J. P.
(for DRIVER LN, ELLENSBURG)
6711 REECER CREEK RD
ELLENSBURG, WA 98926

PICHA, JOHN L.
1560 CLARKE RD
ELLENSBURG, WA 98926

PITTENGER, JAY T. & LORI A.
(for CLARKE RD, ELLENSBURG)
6616 - 223RD AVE NE
REDMOND, WA 98053

POPE, DERIK & SARAH
4093 HWY 10
ELLENSBURG, WA 98926

POPE, DERIK
(for HWY 10, ELLENSBURG)
C/O HOWARD, NANCY E.
565 RADER RD
ELLENSBURG, WA 98926

POTTER, STEVEN R.
600 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

PUGET SOUND ENERGY/ELECTRIC
ATTN: PROPERTY TAX
P.O. BOX 97034
BELLEVUE, WA 98009-9734

RINEHART, DAVID W.
(for HWY 97, ELLENSBURG)
490 LOWER GREEN CANYON RD
ELLENSBURG, WA 98926

RINEHART, DONALD C.
480 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926-8564

RINEHART, JASON C.
750 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

SANDAGE, LANCE C.
890 HUNGRY JUNCTION RD,
ELLENSBURG, WA 98926

SKIBA, JANICE LYNN
4840 DRY CREEK RD
ELLENSBURG, WA 98926-8375

THREE-B FARMS
771 HUNGRY JUNCTION RD
ELLENSBURG, WA 98926

THREE-B FARMS
2550 HUNGRY JCT RD
ELLENSBURG, WA 98926

WALKER, R. BRUCE
(for 1562 CLARKE RD, ELLENSBURG)
904 E CAPITOL
ELLENSBURG, WA 98926

2.2.3 Penstemon Solar Project Site

2.2.3.1 Legal Description

THE NORTHEAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 17, TOWNSHIP 17 NORTH, RANGE 19 EAST, W.M., IN THE COUNTY OF KITTITAS, STATE OF WASHINGTON;

EXCEPT:

RIGHT OF WAY OF TJOSSEM AND MOE COUNTY ROADS.

CONTAINS 39.38 ACRES.

2.2.3.2 Applicants and All Non-private Ownership Interests

The Applicant is TUUSSO Energy, LLC, which has a leasehold interest in the Penstemon Solar Project site from:

Ownership: Valley Land Company LLC
1585 Tjossem Road
Ellensburg, WA 98926

TUUSSO is not aware of any non-private ownership interest in the project site.

2.2.4 Typha Solar Project

2.2.4.1 Typha Solar Project Site

Legal Description

A TRACT OF LAND SITUATED IN THE EAST HALF OF THE NORTHEAST QUARTER OF SECTION 30, TOWNSHIP 18 NORTH, RANGE 18 EAST, W.M., KITTITAS COUNTY, STATE OF WASHINGTON, WHICH IS BOUNDED BY A LINE DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHWEST CORNER OF SAID NORTHEAST QUARTER; THENCE SOUTH 89°16’48” EAST ALONG THE NORTH BOUNDARY LINE OF SAID NORTHEAST QUARTER, 1314.14 FEET TO THE TRUE POINT OF BEGINNING OF SAID LINE;

THENCE CONTINUING SOUTH 89°16’48” EAST ALONG SAID NORTH BOUNDARY LINE, 1134.53 FEET;

THENCE SOUTH 05°04’50” EAST, 98.92 FEET;
THENCE SOUTH 14°06’00” EAST, 80.70 FEET;
THENCE SOUTH 08°58’08” EAST, 174.50 FEET;
THENCE SOUTH 19°32’43” EAST, 160.93 FEET;
THENCE SOUTH 15°40’01” EAST, 143.68 FEET;
THENCE SOUTH 20°06’14” EAST, 124.44 FEET TO A POINT ON THE EAST BOUNDARY LINE OF SAID NORTHEAST QUARTER;
THENCE SOUTH 00°52’11” EAST, ALONG THE EAST BOUNDARY LINE OF SAID NORTHEAST QUARTER, 1262.44 FEET;
THENCE SOUTH 63°35’36” WEST, 47.38 FEET;
THENCE SOUTH 69°41’30” WEST, 117.32 FEET;
THENCE SOUTH 69°54’58” WEST, 101.62 FEET;
THENCE SOUTH 83°42’43” WEST, 36.85 FEET;
THENCE NORTH 15°17’56” WEST, 24.03 FEET;
THENCE SOUTH 74°30’43” WEST, 56.36 FEET;
THENCE NORTH 74°37’20” WEST, 75.56 FEET;
THENCE NORTH 69°50’05” WEST, 53.25 FEET;
THENCE NORTH 60°06’51” WEST, 195.24 FEET;
THENCE NORTH 60°42’51” WEST, 100.56 FEET;
THENCE NORTH 55°37’02” WEST, 226.49 FEET;
THENCE NORTH 40°07’35” WEST, 65.17 FEET;
THENCE NORTH 36°07’05” WEST, 135.85 FEET;
THENCE NORTH 22°37’59” WEST, 58.56 FEET;
THENCE NORTH 51°24’40” WEST, 47.40 FEET;
THENCE NORTH 36°10’00” WEST, 75.75 FEET;
THENCE NORTH 34°20’25” WEST, 72.58 FEET;
THENCE NORTH 26°34’08” WEST, 60.13 FEET;
THENCE NORTH 04°10’07” WEST, 55.08 FEET;
THENCE NORTH 81°36’17” EAST, 30.19 FEET;
THENCE NORTH 04°17’30” EAST, 33.02 FEET;
THENCE NORTH 38°49’40” WEST, 25.43 FEET;
THENCE SOUTH 66°22’39” WEST, 53.58 FEET;
THENCE NORTH 30°46’47” WEST, 93.84 FEET;
THENCE NORTH 21°54’36” WEST, 39.86 FEET;
THENCE NORTH 14°45’26” EAST, 20.96 FEET;

THENCE SOUTH 89°23’14” WEST, 31.77 FEET TO A POINT ON THE WEST BOUNDARY LINE OF SAID EAST HALF OF SAID NORTHEAST QUARTER;

THENCE NORTH 00°36’46” WEST ALONG SAID WEST BOUNDARY LINE OF SAID EAST HALF OF SAID NORTHEAST QUARTER, TO A POINT ON THE NORTH LINE OF SAID NORTHEAST QUARTER, 1166.28 FEET TO THE TRUE POINT OF BEGINNING AND TERMINUS OF SAID LINE.

CONTAINS 54.29 ACRES.

Applicants and All Non-private Ownership Interests

The Applicant is TUUSSO Energy, LLC, which has a leasehold interest in the Typha Solar Project site from:

Ownership: Douglas Dicken
P.O. Box 1201

Ellensburg, WA 98926

TUUSSO is not aware of any non-private ownership interest in the project site.

2.2.4.2 Typha Solar Project Generation Tie Line

The following is a list of landowners located with 0.25 mile of the Typha Solar Project generation tie line centerline.

BOONE, LAYNE D. & RUTH E.
3420 S THORP HWY
ELLENSBURG, WA 98926-8035

CAMARATA, KENNETH & CHRISTY
C/O MCCULLOUGH, GERALD D.
3040 S THORP HWY
ELLENSBURG, WA 98926

CHANDLER, TARA J. & JONATHAN C.
320 PACKWOOD LANE
ELLENSBURG, WA 98926

CLOUTIER, PAUL W.
1111 ROBINSON CANYON RD
ELLENSBURG, WA 98926

CRUSE, CHRISTOPHER C.
821 ROBINSON CANYON RD
ELLENSBURG, WA 98926

DEHAVEN, WILLIAM R. & LAURA L.
390 PACKWOOD LN
ELLENSBURG, WA 98926-8026

DICKEN, DOUGLAS A.
(for PACKWOOD LN, ELLENSBURG)
P.O. BOX 639
ELLENSBURG, WA 98926

GILLIS, CHARLES A. & KASANDRA M.
(for 3310 S THORP HWY, ELLENSBURG)
1204 N CORA ST
ELLENSBURG, WA 98926-9461

GORDON, JULIE & AARON
(for 511 ROBINSON CANYON RD, ELLENSBURG)
20381 PINE DR
CHANDLER, TX 75758-8926

GREEN JACKET INC.
(for S THORP HWY, ELLENSBURG)
3231 THORP HWY S
ELLENSBURG, WA 98926

GREGERICH BROWN, GAIL M.
(for 3761 S THORP HWY, ELLENSBURG)
C/O FRANK A. GREGERICH JR. TESTAMENTARY TRUST
2003 W BEAVER LAKE DR SE
SAMMAMISH, WA 98075-8018

GREGERICH, LILLIAN TESTAMENTARY TRUST
(for 3700 S THORP HWY, ELLENSBURG)
2003 W BEAVER LAKE DR SE
SAMMAMISH, WA 98075-8018

JOHNSON, SHELDON R.
C/O TRUSTEES
581 ROBINSON CANYON RD
ELLENSBURG, WA 98926

MESSNER, MARK J. & KRISTIN L.
370 PACKWOOD LN
ELLENSBURG, WA 98926-8026

MOHN, JOSEPH & NOREEN M.
2960 S THORP HWY
ELLENSBURG, WA 98926-8031

NORTON, SARAH J.
3150 THORP HIGHWAY S
ELLENSBURG, WA 98926

PANATTONI, MICHAEL G.
751 ROBINSON CANYON RD
ELLENSBURG, WA 98926

REYNOLDS, ROGER A.
(for ROBINSON CANYON RD, ELLENSBURG)
P.O. BOX 1501
ELLENSBURG, WA 98926

ROBINSON, DICK A. & WANDA R.
310 PACKWOOD LN
ELLENSBURG, WA 98926-8026

ROMANKO, MONICA
C/O MONSEES, ROBERT
490 PACKWOOD LN
ELLENSBURG, WA 98926-8027

SPENCER, LEE R.
3100 S THORP HWY
ELLENSBURG, WA 98926

THREE BAR G RANCH INC.
(for 4510 S THORP HWY, ELLENSBURG)
C/O GREGERICH, FRANK J.
4491 THORP HWY S
ELLENSBURG, WA 98926

WILBER, DANIEL E.
3360 THORP HWY S
ELLENSBURG, WA 98926

WOODS, NORMAN R.
460 PACKWOOD LN
ELLENSBURG, WA 98926

2.2.5 Urtica Solar Project Site

2.2.5.1 Legal Description

A TRACT OF LAND SITUATED IN THE SOUTHWEST QUARTER OF SECTION 10, TOWNSHIP 17 NORTH, RANGE 18 EAST, W.M., KITTITAS COUNTY, STATE OF WASHINGTON, BEING A PORTION OF LOTS 1, 2, 3 AND 4, AND ALL OF LOTS 7, 8, 9, 10, 11, AND 12 OF THAT CERTAIN SURVEY, AS RECORDED IN BOOK 32 OF SURVEYS, PAGE 71, UNDER AUDITOR'S FILE NO. 200602280020, RECORDS OF SAID COUNTY, WHICH IS BOUNDED BY A LINE DESCRIBED AS FOLLOWS:

COMMENCING AT THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER; THENCE NORTH 01°15'25" EAST ALONG THE EAST BOUNDARY LINE OF SAID SOUTHWEST QUARTER, 1023.64 FEET; THENCE NORTH 88°44'35" WEST, 29.10 FEET TO THE TRUE POINT OF BEGINNING OF SAID LINE;

THENCE NORTH 89°14'26" WEST, 453.87 FEET;
THENCE NORTH 87°05'29" WEST, 1325.35 FEET;
THENCE NORTH 04°10'29" WEST, 211.33 FEET;
THENCE NORTH 61°45'24" EAST, 261.93 FEET;
THENCE NORTH 42°39'06" EAST, 113.46 FEET;
THENCE NORTH 31°25'35" EAST, 123.63 FEET;
THENCE NORTH 40°11'01" WEST, 121.12 FEET;
THENCE NORTH 87°43'34" WEST, 128.38 FEET;
THENCE SOUTH 56°41'46" WEST, 155.23 FEET;
THENCE SOUTH 28°15'58" WEST, 100.76 FEET;
THENCE NORTH 87°36'58" WEST, 96.74 FEET;
THENCE SOUTH 63°15'03" WEST, 170.80 FEET;
THENCE SOUTH 33°19'00" WEST, 161.55 FEET;
THENCE SOUTH 88°58'40" WEST, 447.52 FEET TO A POINT ON THE WEST BOUNDARY LINE OF SAID SOUTHWEST QUARTER;
THENCE NORTH 01°17'45" EAST ALONG SAID WEST BOUNDARY LINE OF SAID SOUTHWEST QUARTER, 801.99 FEET;
THENCE SOUTH 86°51'18" EAST, 1320.00 FEET;

THENCE NORTH 01°17’45” EAST, 7.60 FEET;
THENCE SOUTH 86°50’25” EAST, 1277.79 FEET TO A POINT ON THE EAST BOUNDARY LINE OF SAID SOUTHWEST QUARTER;
THENCE SOUTH 01°18’25” WEST ALONG SAID EAST BOUNDARY LINE OF SAID SOUTHWEST QUARTER, 971.53 FEET TO THE TRUE POINT OF BEGINNING AND TERMINUS OF SAID LINE.

CONTAINS 51.94 ACRES.

2.2.5.2 Applicants and All Non-private Ownership Interests

The Applicant is TUUSSO Energy, LLC, which has a leasehold interest in the Urtica Solar Project site from:

Ownership: Herbert and Shirley Snowden
751 Manastash Road
Ellensburg, WA 98926

TUUSSO is not aware of any non-private ownership interest in the project site.

(2) Associated and transmission facilities. For those facilities described in RCW 80.50.020 (6) and (7) the application shall contain the legal metes and bounds description of the preferred centerline of the corridor necessary to construct and operate the facility contained therein, the width of the corridor, or variations in width between survey stations if appropriate, and shall identify the applicant's and others' ownership interests in lands over which the preferred centerline is described and of those lands lying equidistant for 1/4 mile either side of such center line.

Pursuant to Revised Code of Washington (RCW) 80.50.020 (7), all on-site improvements to the five proposed Columbia Solar Project sites are described in Section 2.3 of this application.

With respect to off-site improvements, of the five proposed TUUSSO Columbia Solar Project sites, only two would have off-site generation tie lines of significant length that tie into PSE’s distribution transmission line network, namely the Fumaria and Typha Solar Project sites. Applicable additional information is provided below.

Camas Solar Project Site: the point of interconnection would be adjacent the Camas Solar Project site (Figure 2.2-1), and TUUSSO would not construct any associated or transmission facilities off-site.

Fumaria Solar Project Site: the generation tie line would originate from the southwestern corner of the Fumaria Solar Project site and would connect to the existing Puget Sound Energy’s distribution transmission lines (or the Puget Sound Energy substation) approximately 2.6 miles away to the southwest. The Fumaria Solar Project site, alternative access routes, and generation tie line path are illustrated in Figures 2.2-2 through 2.2-6. Up to 0.9 miles of the generation tie line would require new wooden poles or undergrounded conductor (as shown in the figures). The remaining length of the new generation tie line would be installed along existing distribution/transmission ROWs, and would either be mounted on the existing wooden poles, or those existing poles would be replaced with new poles to which the new generation tie line would be mounted. The generation tie line corridor ROWs would be 20 to 60 feet wide.

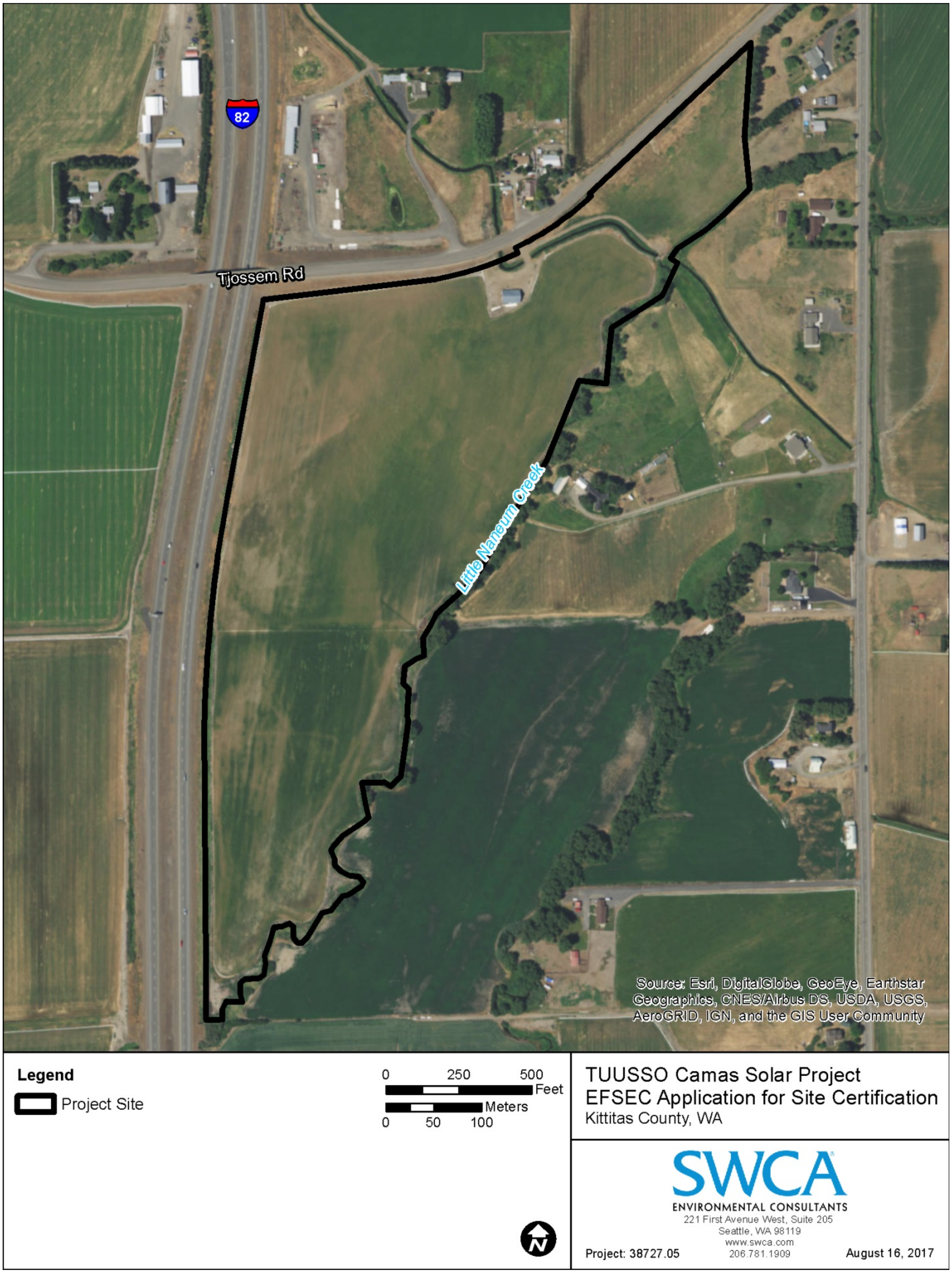


Figure 2.2-1. Camas Solar Project site.

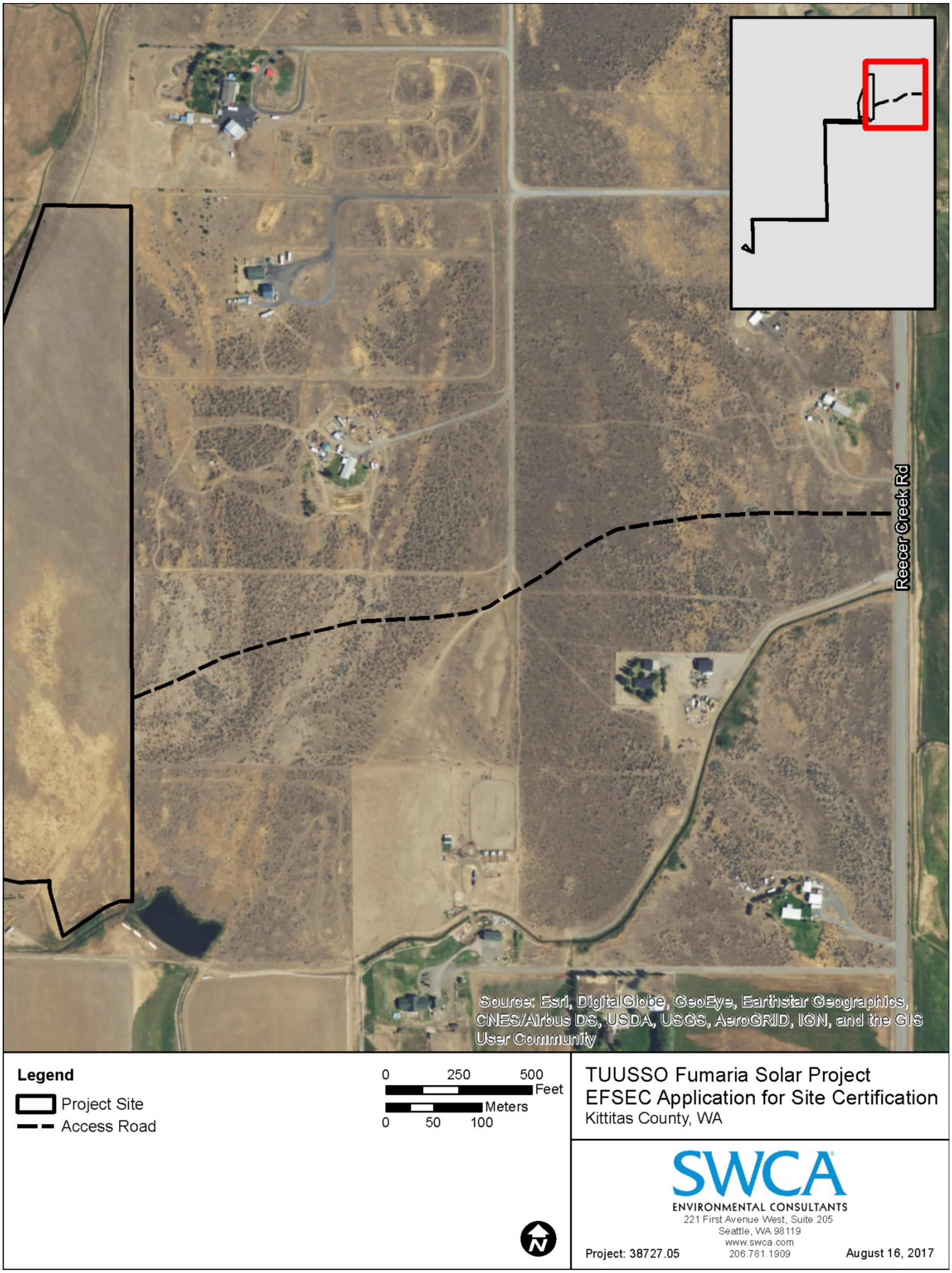


Figure 2.2-2. Fumaria Solar Project site, Map 1 of 5.

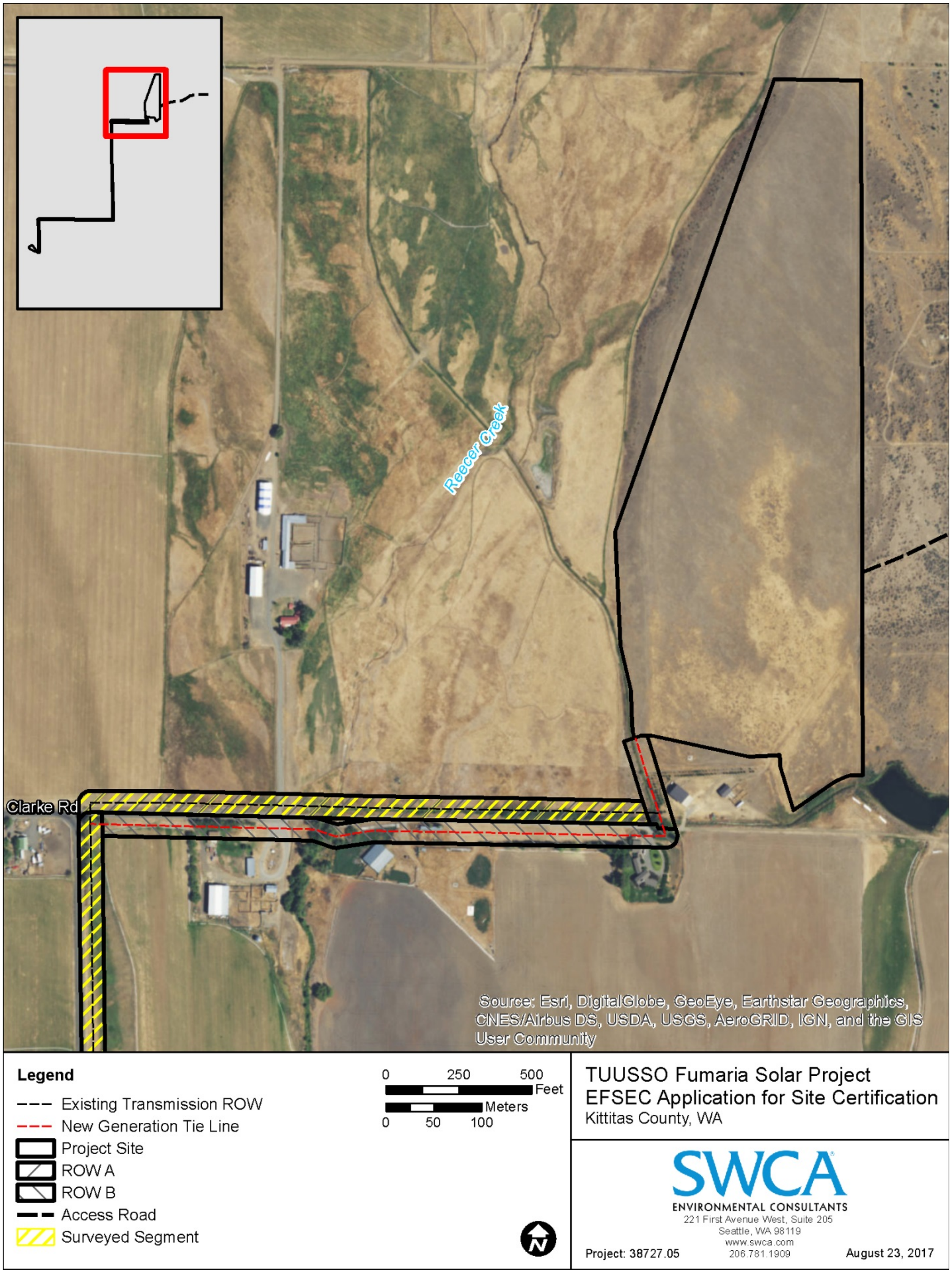


Figure 2.2-3. Fumaria Solar Project site, Map 2 of 5.

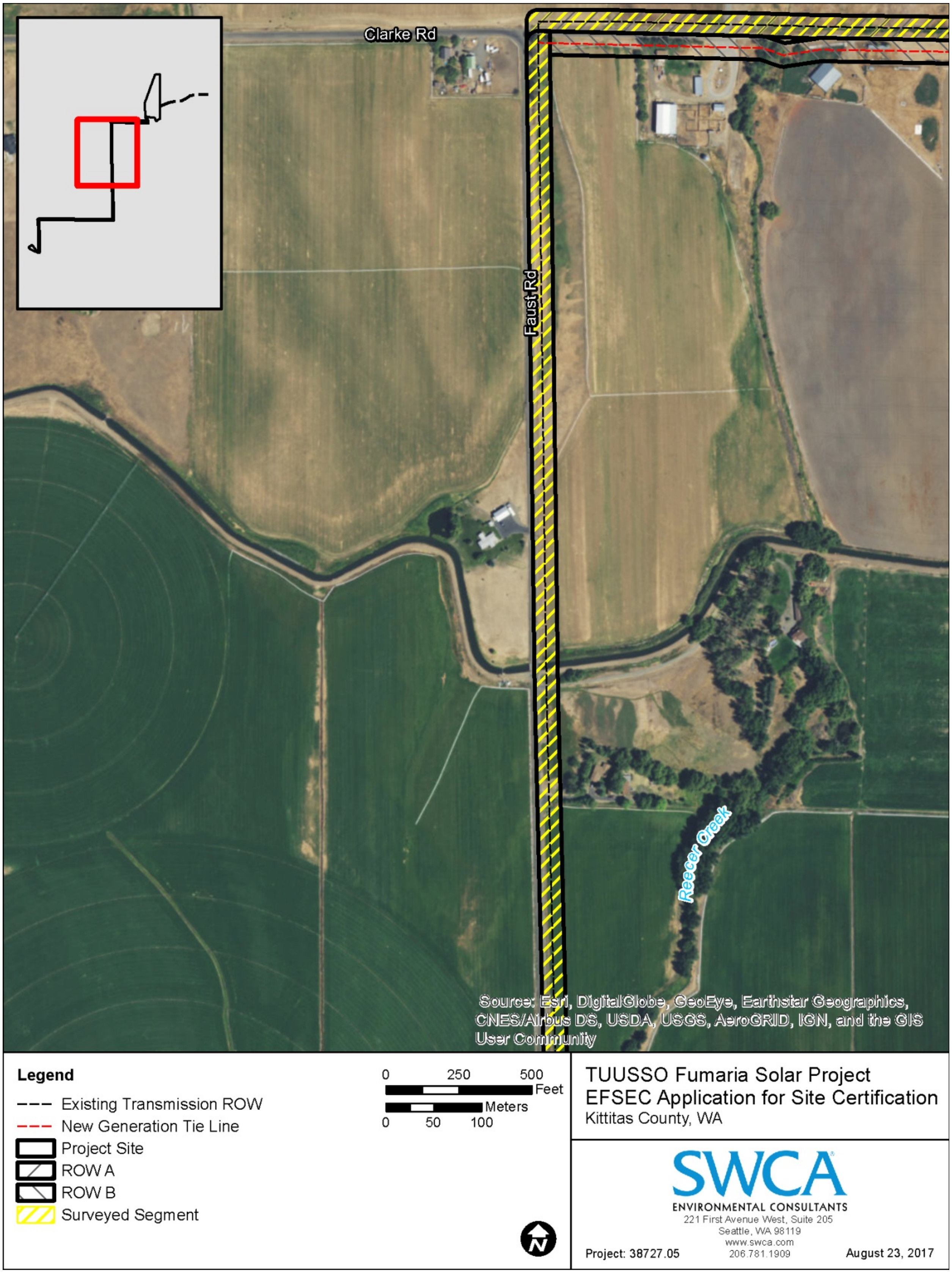


Figure 2.2-4. Fumaria Solar Project site, Map 3 of 5.

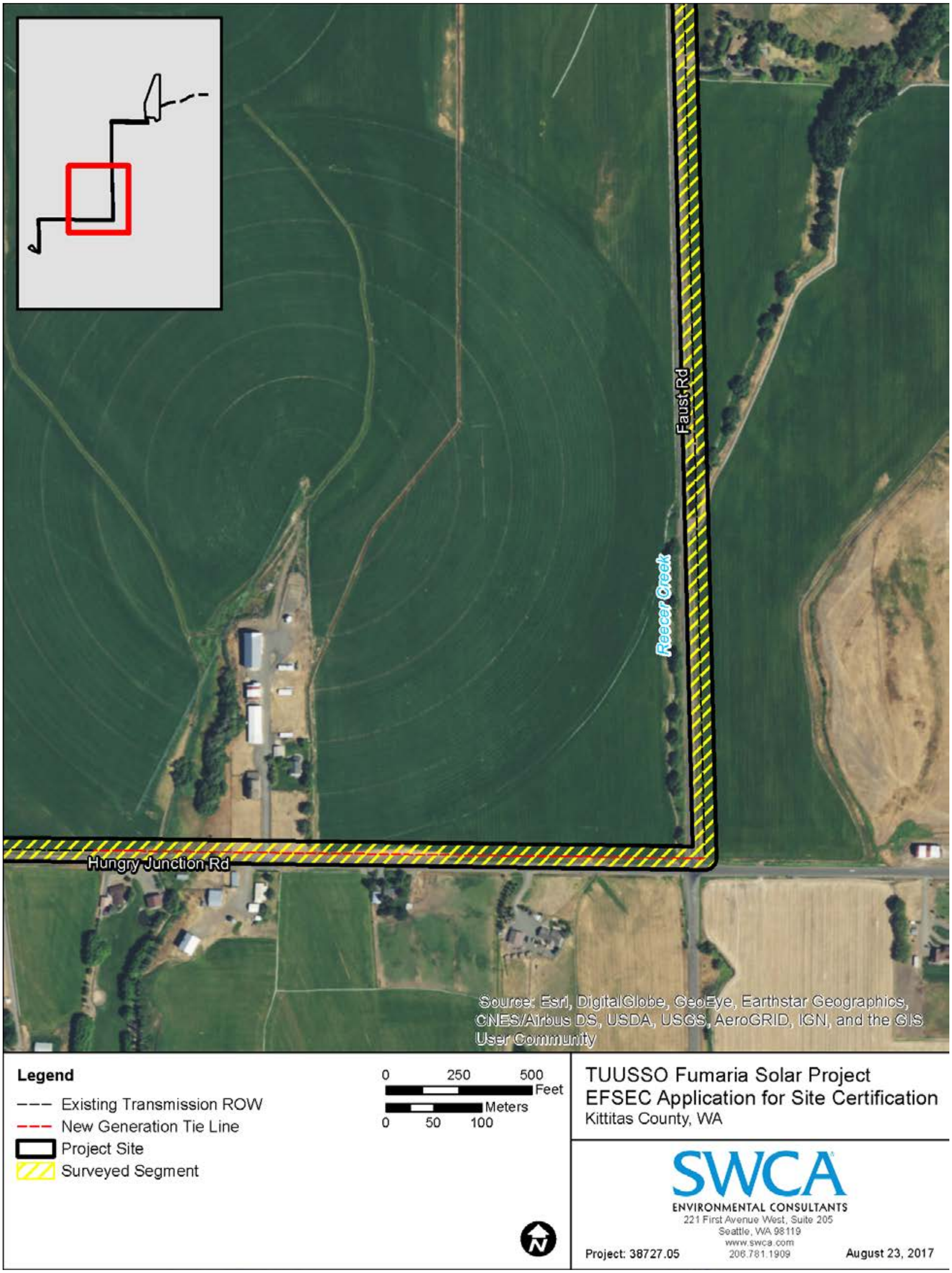


Figure 2.2-5. Fumaria Solar Project site, Map 4 of 5.

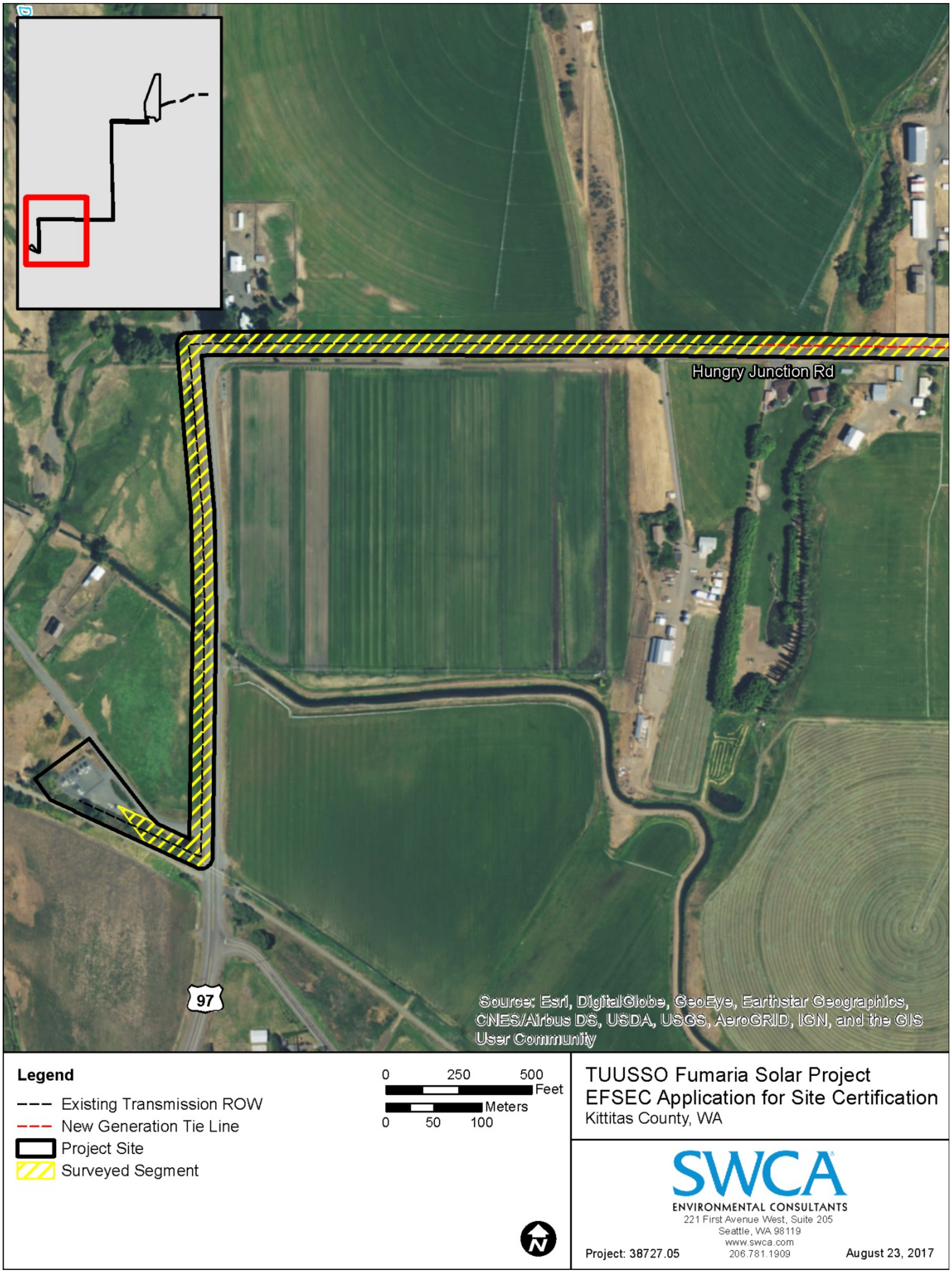


Figure 2.2-6. Fumaria Solar Project site, Map 5 of 5.

Penstemon Solar Project Site: the point of interconnection would be adjacent to the Penstemon Solar Project site (Figure 2.2-7) and TUUSSO would not construct any associated or transmission facilities off-site.

Typha Solar Project Site: the generation tie line would originate from the southwestern corner of the Typha Solar Project site and share wooden poles with existing distribution transmission lines that cross south along an existing access road, crossing the EP Canal three times, passing through the Ellensburg Golf and Country Club, to connect to the existing PSE distribution line along Thorp Highway South. The approximately 0.5-mile path is illustrated in Figure 2.2-8, of which less than 0.1 mile would require new wooden poles and conductor (as shown in Figure 2.2-8). The remaining length of the new generation tie line would be installed along existing electrical ROWs, and would either be mounted to the existing wooden poles, or those existing poles would be replaced with new poles to which the new generation tie line would be mounted. The generation tie line corridor ROWs would be 20 to 60 feet wide.

Urtica Solar Project Site: the point of interconnection would be adjacent to the Urtica Solar Project site (Figure 2.2-9), and TUUSSO would not construct any associated or transmission facilities off-site.

Figure 2.2-7. Penstemon Solar Project site.

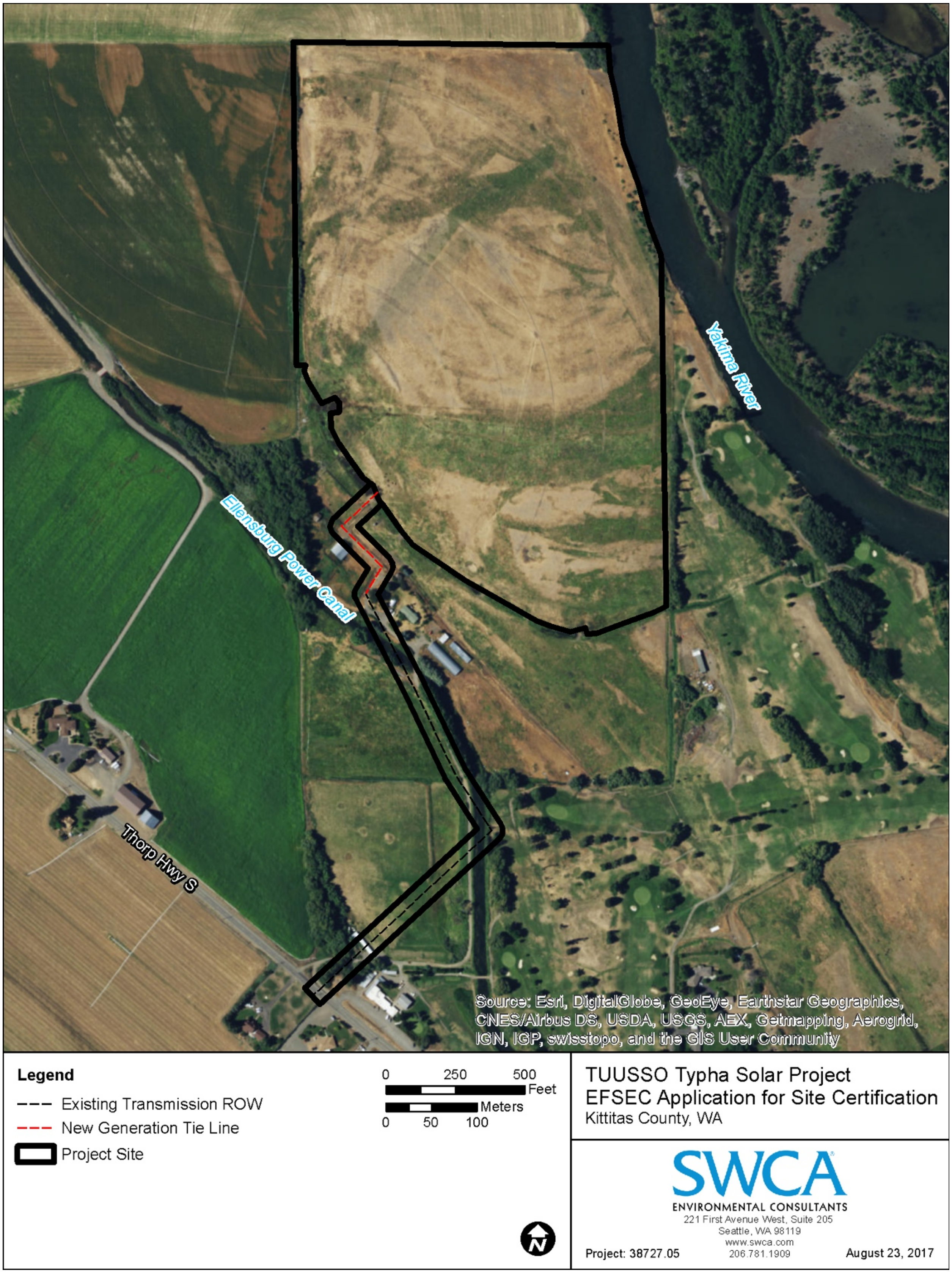


Figure 2.2-8. Typha Solar Project site.

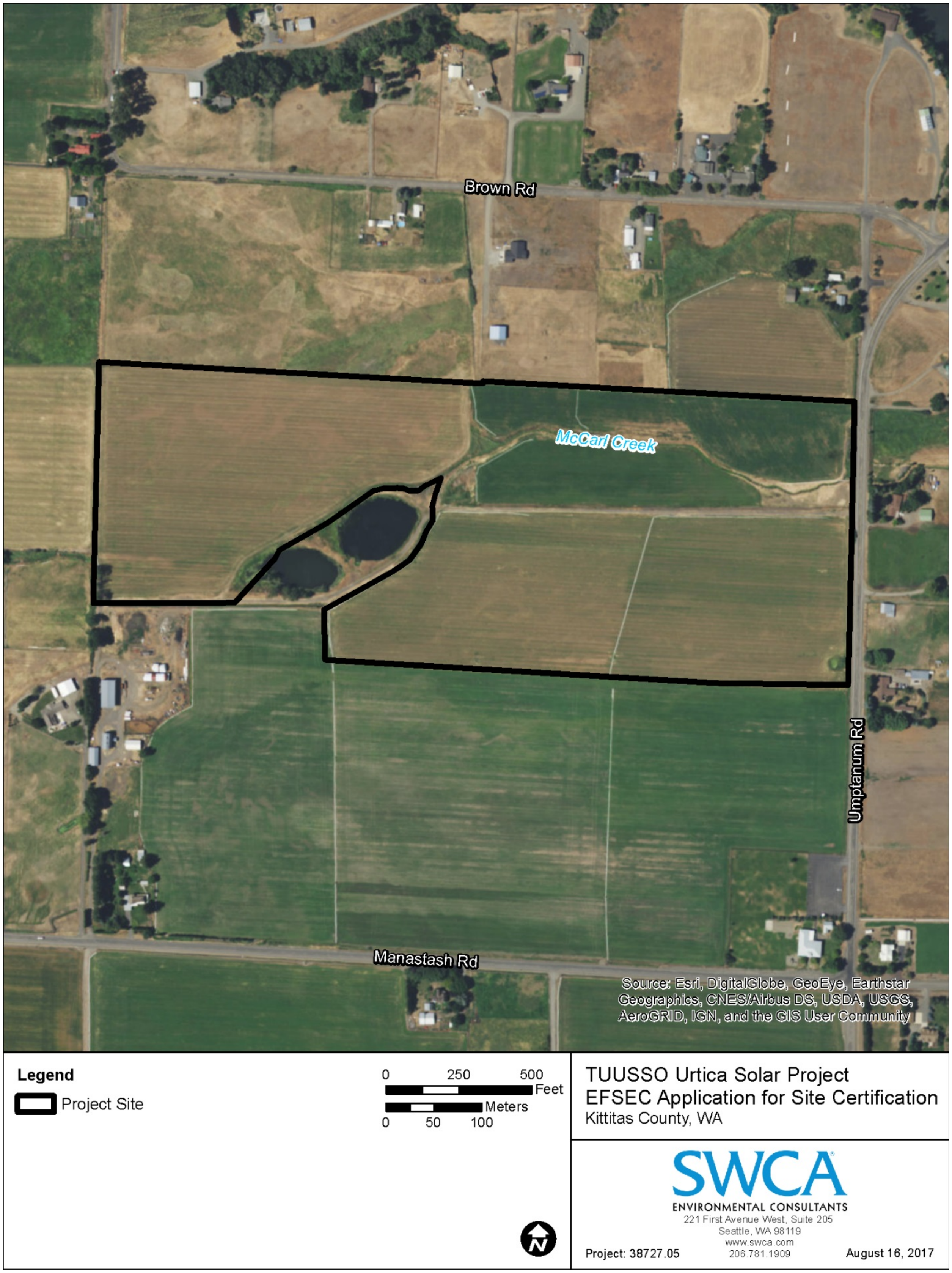


Figure 2.2-9. Urtica Solar Project site.

2.3 Construction on Site 463-60-145

The applicant shall describe the characteristics of the construction to occur at the proposed site including the type, size, and cost of the facility; description of major components and such information as will acquaint the council with the significant features of the proposed project.

2.3.1 Overview of TUUSSO'S Columbia Solar Projects

The Applicant, TUUSSO, a Seattle-based developer of ground-mounted solar power projects with a proven history of successful low-impact development of over 100 MW of solar projects, proposes to develop, own, and operate five PV projects, the Camas, Fumaria, Penstemon, Typha, and Urtica Solar Projects, collectively the Columbia Solar Projects. Each of these projects would be located in Kittitas County, outside of the city of Ellensburg on agricultural land, where major alternative energy facilities are a permitted conditional use under county code. The project sites would be converted to solar power generating facilities with associated grid interconnection equipment. The projects would operate year-round, producing up to 25 MW of renewable electric power in aggregate during daytime hours. The proposed schedule for construction of the facilities is to begin grading and construction of the facilities in April 2018 and complete construction by November 2018. The total cost of each facility is estimated to be $8 to 10 million, for a total of $40 to 50 million for all five solar projects.

TUUSSO has established site control of the Columbia Solar Project sites via lease agreements and has executed 15-year power purchase agreements with PSE to supply electricity generated by the projects to the utility under PSE's Schedule 91 program. Each of the projects is currently in advanced stages of the interconnection process with PSE, who have determined that the interconnection and proposed timelines are feasible, and may be made with limited impact to the local distribution and transmission system.

TUUSSO is proposing to construct each of the five Columbia Solar Projects to meet the following objectives:

- provide PSE and the State of Washington with clean, renewably generated electricity;
- stimulate the local economy through construction and operations job creation;
- support Washington's efforts to reduce greenhouse gas emissions and meet Renewable Portfolio Standard (RPS) mandates; and
- develop economically feasible and commercially financeable projects.

2.3.2 Columbia Solar Projects Facilities and Infrastructure

Each of the five Columbia Solar Project facilities would consist of:

- a solar field of north-south-oriented rows of crystalline silicon PV panels, such as QCells Q.Antum Solar Modules Q.Plus L-G4.2 between 325 and 345Wp, mounted on single-axis tracking systems, such as NEXTracker's NX Horizon™, on galvanized steel support structures;
- an electrical collection and inverter system that aggregates the output from the PV panels and converts the electricity from direct current (DC) to alternating current (AC), including inverters such as Solectria's SGI 750/500 XTM inverters;

- interconnection equipment where the facility output is transformed to a voltage of 12.47 kV, including a padmount-style transformer manufactured by ABB or similar;
- for the Typha and Fumaria Solar Projects, a 12.47-kV generation tie line connecting each solar project site to nearby existing distribution lines;
- Remote Supervisory Control and Data Acquisition (SCADA) monitoring incorporated into the process control system to allow unmanned operations;
- communications and grid-protection equipment;
- a meteorological data collection system configured to collect meteorological information roughly at the height of the PV panels;
- civil infrastructure including access gates, internal access roads, and secure fencing; and
- where appropriate, native trees, shrubs, and/or plants in selected locations to provide visual screening.

The design, including the selection of the primary components of each of the five Columbia Solar Project facilities, is subject to change based on the final engineering and market conditions at the time of construction.

Figures 2.3-1 through 2.3-5 show preliminary plans for each of the five Columbia Solar Project sites. These plans include the scale of the drawing and north point; locations of all existing and proposed uses, structures, fences, and improvements; distances between structures and property lines; and locations of all driveways, internal access roads, and points of ingress and egress. Typical racking details depict the array with portrait racking, with one row of modules positioned vertically on each rack. An elevation sketch is also provided to show a proposed inverter pad, including inverter and transformer structures on a concrete pad, showing dimensions and heights above the ground (Appendix L).

2.3.2.1 Photovoltaic Panels

The solar field would consist of PV panels mounted on steel support structures. The PV panels would consist of polycrystalline panels arranged in rows aligned north to south. The assembled PV panels would have a minimum leading edge height (bottom edge of the modules) of approximately 1 foot from grade, and a maximum top edge height of approximately 8 feet from grade, depending on the angle of the tracking system as it changes over the course of each day.

The supports would be configured with a pivoting, single-axis tracking system, such as NEXTracker's NX Horizon™ system. Throughout the day, the PV panels would pivot up to 120 degrees around a north-south axis, tracking the sun from east to west.

Depending on the final racking vendor selection and design, the number of racks supporting the PV panels could vary. Subject to final design, the typical three string rows would consist of nine pile driven posts, each serving as the foundation. Each post would be an I-beam, 10 to 15 feet in length, and have a cross-section of approximately 6 by 4 inches. They would be driven to a depth of approximately 5 to 7 feet below grade. The solar arrays would be designed to withstand snow loads of 25 pounds per square foot (psf) and winds of 120 miles per hour (mph).

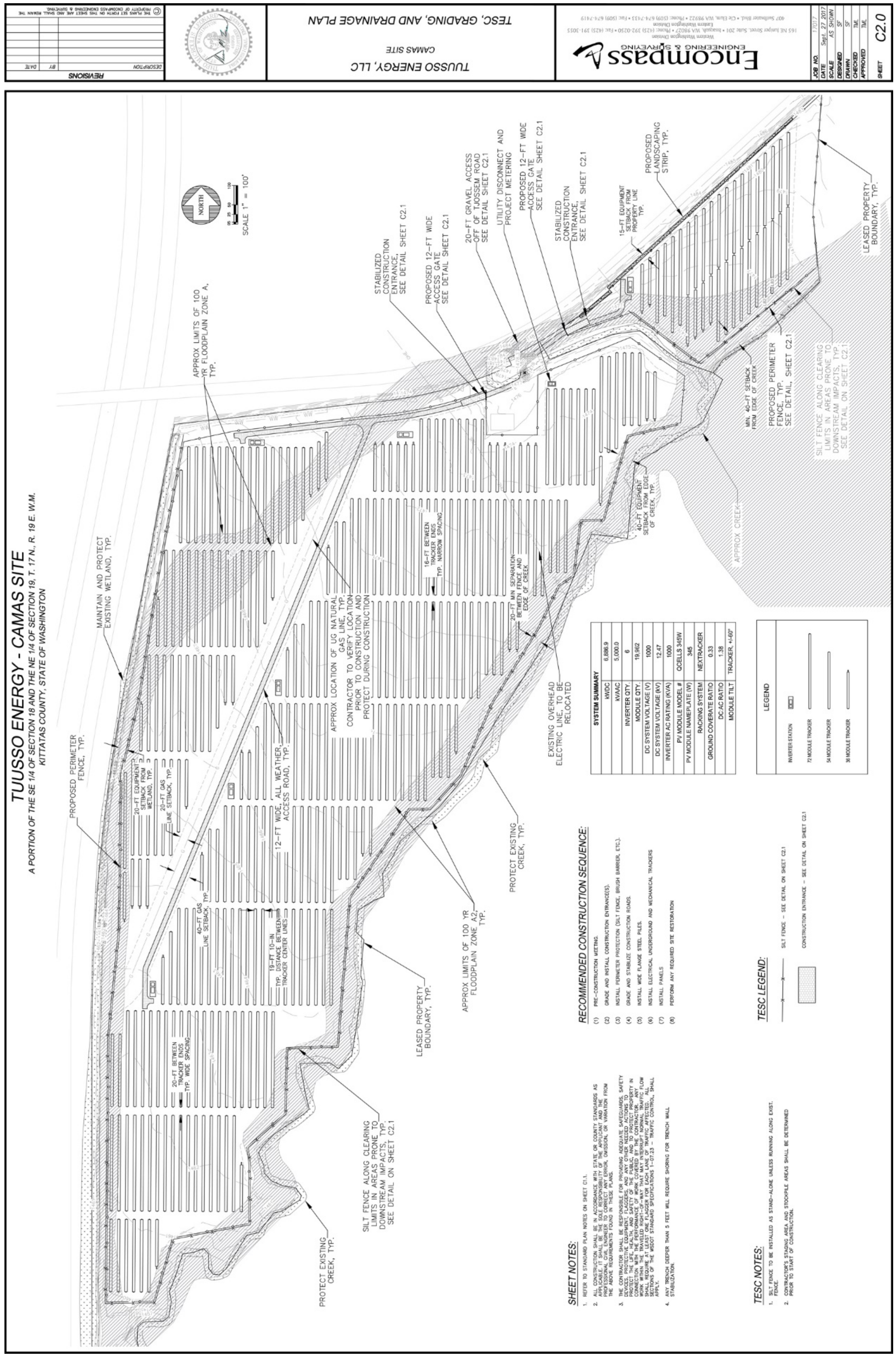


Figure 2.3-1. Camas Solar Project preliminary project plan.

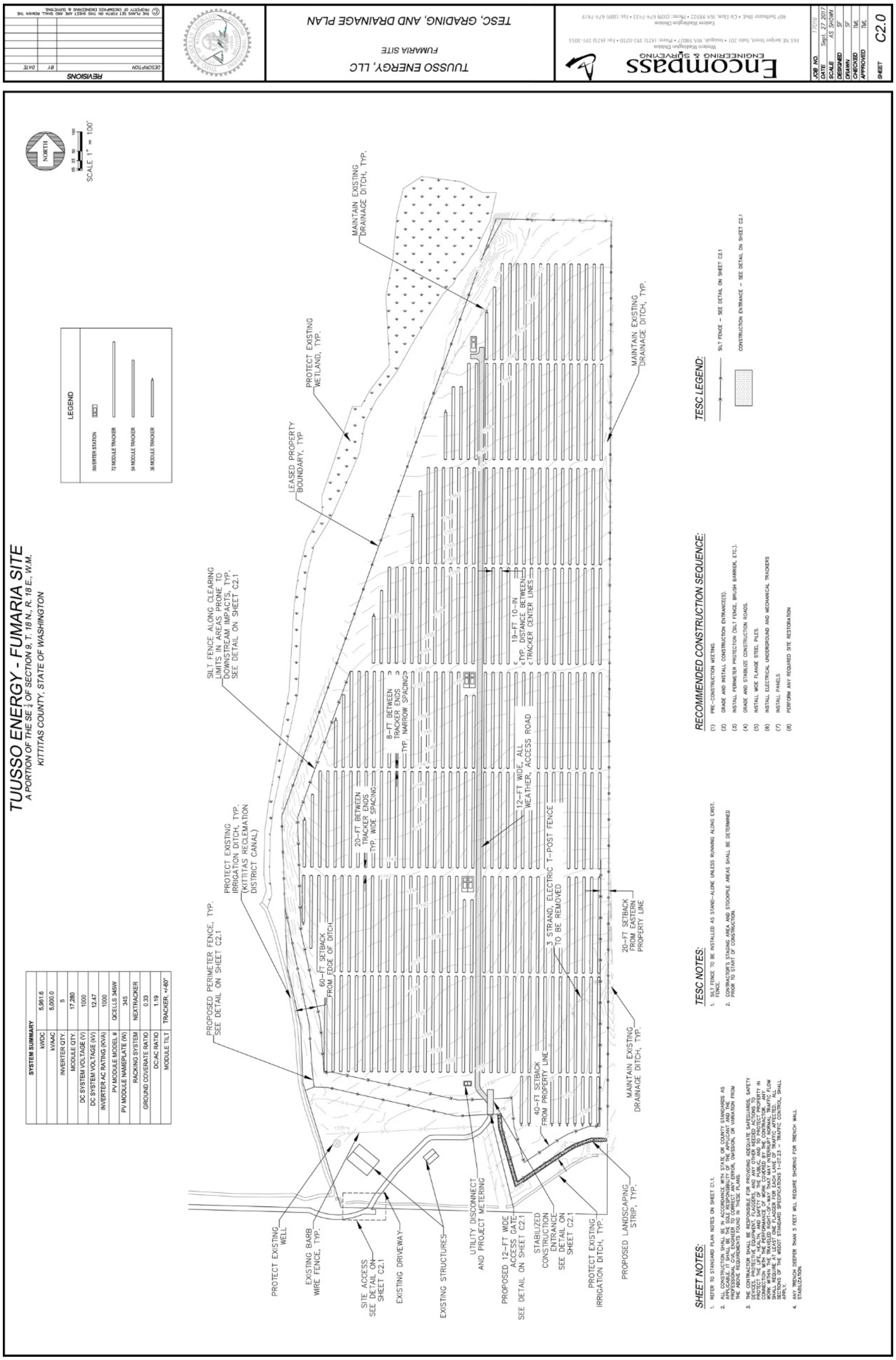


Figure 2.3-2. Fumaria Solar Project preliminary project plan.

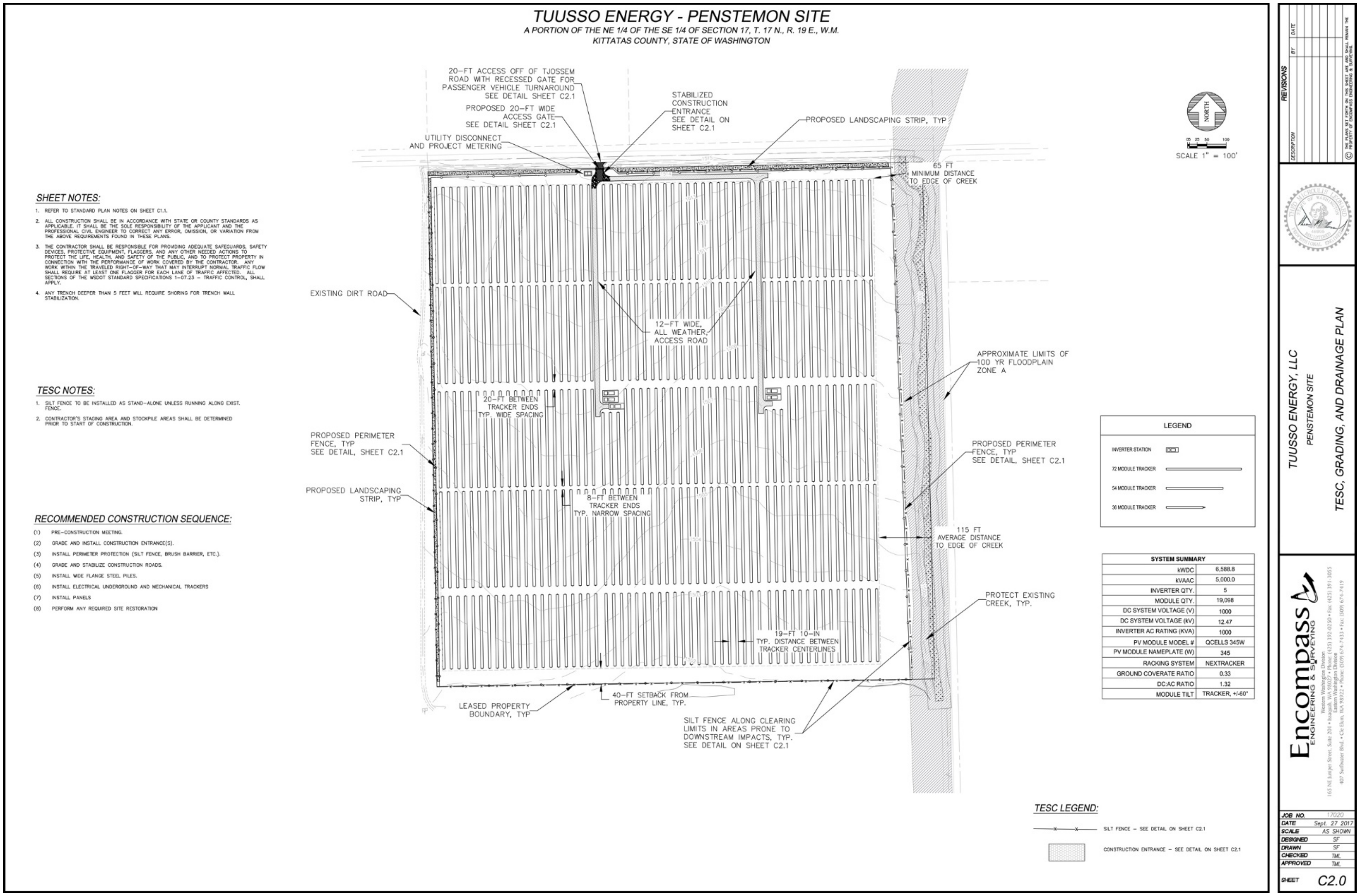


Figure 2.3-3. Penstemon Solar Project preliminary project plan.

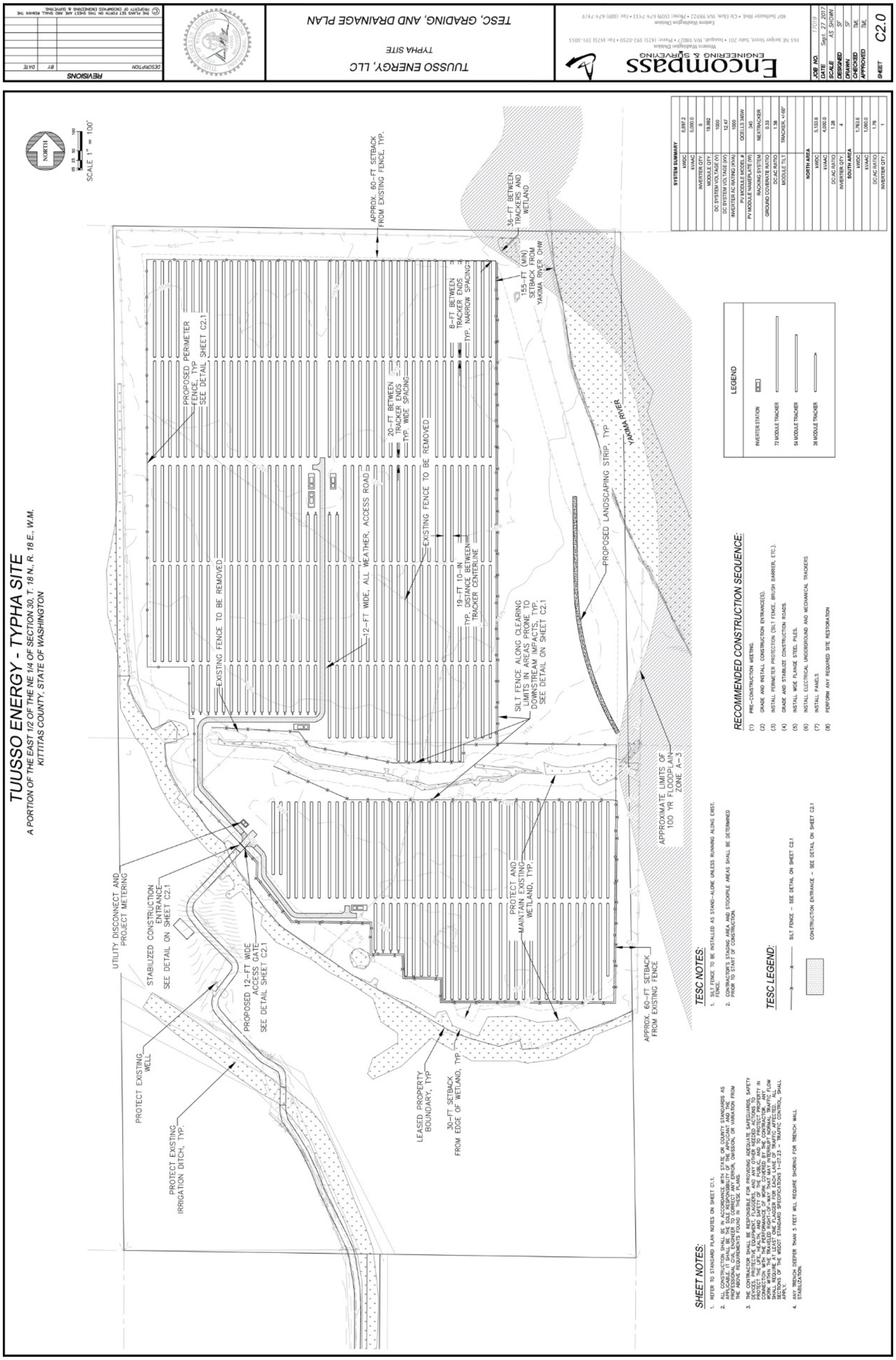
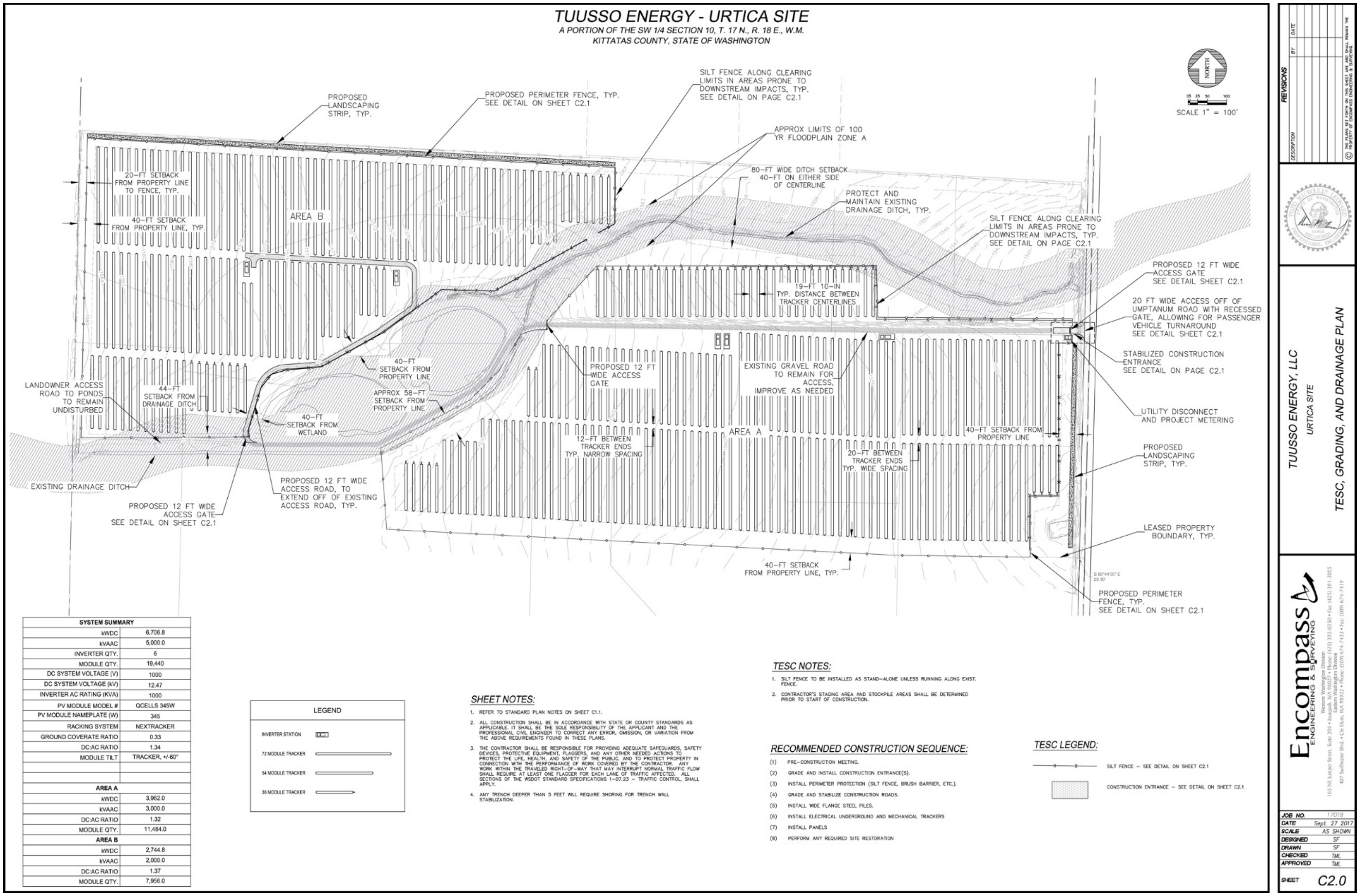


Figure 2.3-4. Typha Solar Project preliminary project plan.



SYSTEM SUMMARY	
kWDC	6,706.8
kVAAC	5,000.0
INVERTER QTY.	6
MODULE QTY.	19,440
DC SYSTEM VOLTAGE (V)	1000
DC SYSTEM VOLTAGE (kV)	12.47
INVERTER AC RATING (KVA)	1000
PV MODULE MODEL #	QCELLS 345W
PV MODULE NAMEPLATE (W)	345
RACKING SYSTEM	NEXTRACKER
GROUND COVERATE RATIO	0.33
DC:AC RATIO	1.34
MODULE TILT	TRACKER, +/-60°
AREA A	
kWDC	3,962.0
kVAAC	3,000.0
DC:AC RATIO	1.32
MODULE QTY.	11,484.0
AREA B	
kWDC	2,744.8
kVAAC	2,000.0
DC:AC RATIO	1.37
MODULE QTY.	7,956.0

Figure 2.3-5. Urtica Solar Project preliminary project plan.

2.3.2.2 Electrical Collection System

The PV panels would be organized into electrical groups referred to as “blocks.” Each block would encompass approximately 7 acres of PV panels (capable of producing about 1.3 MW DC of power each) and would be connected to a central station inverter that would transform the DC power to AC power, which would then be transmitted by the grid and used by the utility’s customers. A typical block would measure approximately 600 by 500 feet. The size of each block would depend primarily on the inverter loading ratio (ILR; the ratio of DC power capacity to the AC output power of the inverter, and typically 1.3:1), and the ground cover ratio (GCR; i.e., the space that the PV panels occupy as a percentage of land area beneath them). The lower the GCR, the less space the PV panels occupy, thereby minimizing shading from row to row in the early morning and late afternoon hours.

Special weather and sunlight resistant conductors, attached under the PV panels, allow the connection of the panels with each other in parallel, to cumulatively form strings of higher voltage and power capacity. Each of these strings would consist of up to 20 panels in parallel and would terminate into above-ground special DC source circuit combiner boxes, with dimensions of approximately 36 × 36 × 10 inches that collect the power produced by multiple strings. From the combiner boxes, the cabling transitions to underground via buried trenches, feeding into the inverters and associated switchgear housed in each inverter skid. The cable sizes would vary based on the detailed electrical design, as would the size and depth of the trenches. However, the trenches would likely be about 36 to 48 inches deep, with cables installed in sand or similar material at the bottom of the trench and then 30 inches of compacted backfill placed over the bottom material. In the event that cables are buried less than 48 inches deep, as described in greater detail in Appendix F, the cables will be removed during decommissioning. The trenches would be 6 to 24 inches wide. Actual cable width would be smaller, depending on whether direct burial or cable-in-conduit is used. In general, at least 3 inches of clearance is required from the bottom and sides of the trench to any cable or conduit.

Each inverter skid is anticipated to be a 15- by 30-foot, and 12- to 24-inch-deep prefabricated concrete pad with equipment mounted to it, including meteorological equipment up to 8 feet in height. The array and skid would be unoccupied except during inspection and maintenance. Each inverter skid would include an associated outdoor utility-grade transformer, roughly 6 × 6 × 6 feet, to step up the electricity voltage from the inverter output level (e.g., 480 V AC) to 12.47 kV AC.

From these transformers, electricity would be conveyed via an underground 12.47-kV AC collector circuit to a common 12.47-kV switchyard. The interconnection specifics for each of the five Columbia Solar Project sites would then vary, as described in greater detail below.

2.3.2.3 Energy Resource

TUUSSO modeled the design and associated energy output for each project using PVSyst v6.21. PVSyst is a PV solar project modeling software widely used in the solar power industry and is considered the state of the art standard for output simulation. The energy output simulated by PVSyst is based on the meteorological data at the project site, models of the system equipment such as the inverters and solar panels, and project design specifications. PVSyst v6.21 was used to simulate the predicted energy output from each of the five Columbia Solar Projects, with an estimate of approximately 11,500 megawatt hours (MWh) in the first full year of project operation.

2.3.2.4 Electrical Interconnection

Conceptual single-line diagrams illustrating the electrical collection system and interconnection for each of the five Columbia Solar Project sites are included in Appendix L. The switchyards would each include protection and communication equipment, including:

- 12.47-kV switchgear and circuit breaking devices;
- 12.47-kV capacitors;
- wood support structures up to 30 feet in height;
- grounding grid;
- prefabricated utility control enclosures;
- perimeter fence; and
- SCADA system, remotely monitored by TUUSSO's operations and maintenance (O&M) provider and PSE.

For the Typha and Fumaria Solar Projects, a generation tie line would be constructed from the on-site switchyard to the nearby distribution line infrastructure owned by PSE. The specifics of each generation tie line are described in greater detail below.

2.3.2.5 Meteorological Data Collection System

Each of the five Columbia Solar Project facilities would also include at least one meteorological data collection system, configured to collect the following meteorological data at the level of the solar panels, or approximately 6 to 8 feet above the ground:

- global horizontal irradiance;
- global irradiance/plane of array;
- ambient temperature;
- wind speed;
- wind direction;
- relative humidity;
- precipitation;
- barometric pressure; and
- visibility.

2.3.2.6 Infrastructure

Driveways and Access Roads

The points of access and associated construction methods vary for each project site and are described below in greater detail. Interior all-weather access roads within each site would be designed to provide access to the inverter pads from the site entrance. These all-weather access roads would be 12 feet wide, and would consist of compacted soils or gravel. These all-weather access roads would be compacted to 90%, and a soil binder would then be sprayed or aggregate would be laid down to protect them from wind and water erosion and allow for continuous access. The soil binder would be reapplied annually to ensure the integrity of the access roads.

The remainder of the access roads throughout each solar site would be unpaved vegetated drive roads, with slopes of less than 4%. All access roads have been placed to minimize grading, closely following the existing elevations.

Grading Design

Grading for each of the five Columbia Solar Projects would be minimal and would be isolated to the all-weather access roads (as needed), inverter pads, and switchyard pads to accommodate interconnection equipment. The all-weather access roads would be relatively flat and would be graded to match existing conditions in order to minimize earthwork. Inverter pads would be placed throughout each solar project site, each of which would be approximately 15 by 30 feet and 1 to 2 feet thick. Each of these pads would be graded, but as with the switchyard pads, the proposed elevation would be set to minimize earthwork. The switchyard and inverter pads would require a minimum of 90% relative compaction.

No export of soil is anticipated for any of the five Columbia Solar Project sites. At the conclusion of construction, all disturbed areas surrounding graded areas would be remediated through reseeding with native, low-cover vegetation.

Landscaping

Per the recommendation of the Washington Department of Fish and Wildlife (WDFW), each of the five Columbia Solar Project sites, except for the Fumaria Solar Project site, would be revegetated with low-cover native plant species. These species would be planted from drought-tolerant seed mixes, adapted well to the Kittitas County climate. Each solar project has been designed to minimize disturbed areas by keeping grading to a minimum. The Fumaria Solar Project site has very limited water availability, and so TUUSSO plans to leave the existing established vegetation on-site.

To effectively establish the new native plant species, TUUSSO would likely undertake mowing, herbicide treatments, tilling, drilling seeds, and irrigation during the initial few years of operation. Subsequent broadleaf treatments during the first couple years after construction would be undertaken to prevent broadleaf weeds from competing against the newly planted native vegetation. Formal landscaping is not proposed for any of the solar projects, as the amount of proposed grading does not warrant a full landscape design. The plantings planned for each solar project site are set forth below in greater detail.

Fencing

The five proposed Columbia Solar Project sites would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped by razor wire surrounding the PV system and switchyard. The entrance gates for each of the solar sites would be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access. All fencing would be placed at or above grade to ensure drainage flows are unobstructed.

“Warning High Voltage” signs would be placed on the fencing at about 100-foot intervals and at each gate.

Lighting

Lighting would be installed on metal poles, up to 20 feet tall, located around the periphery of each of the five Columbia Solar Project sites, as well as at the inverter pads, as required for nighttime security purposes. Lighting would consist of modern, low intensity, downward-shielded fixtures that are motion activated, and would be directed onto the immediate site. For each site, between five and 10 lights would be installed and fed by direct buried underground electrical supply lines.

Sewer and Water Facilities

None of the five Columbia Solar Project facilities would have on-site toilet and septic or sewer system connections. The projects would follow the applicable state and/or county guidelines with respect to relief stations for employees, when employees are on-site. Any on-site water for ongoing use would be provided by the landowners or would be trucked to the site from outside water sources.

Fire Suppression and Safety

Combustible vegetation on and around each of the five Columbia Solar Project boundaries would be maintained by TUUSSO and the landowner, and each solar project site would include fire breaks around the project boundary, in accordance with state and/or county standards, as applicable. TUUSSO would also coordinate with the Kittitas County Fire Department to provide PV training to fire responders and construction, operational, and maintenance staff. The intent of this training would be to familiarize both responders and workers with the codes, regulations, associated hazards, and mitigation processes related to solar electricity. This training would include techniques for fire suppression of PV systems.

2.3.3 Solar Project Sites

The following sections describe any site-specific characteristics of the construction and/or major components that might occur at each proposed Columbia Solar Project site.

2.3.3.1 Camas Solar Project Site

The proposed Camas Solar Project, a preliminary plan for which is provided in Figure 2.3-1, is a 5-MWac solar energy generation facility that would be located at the intersection of Tjossem Road and I-82, within a development envelope of approximately 50.83 acres. The setbacks to the fencing and to the electrical generating equipment are depicted in Figure 2.3-1. As illustrated, the project would consist of two primary sections separated by Bull Ditch that are separately fenced but electrically connected. To clarify references to these different portions of the solar project, that larger portion of the project to the southwest of Bull Ditch is referred to as Camas A, and that smaller portion of the project to the northeast of Bull Ditch is referred to as Camas B.

A total of approximately 20,000 PV panels would be arranged in approximately 270 rows with center-to-center spacing of about 15 feet. The GCR is currently planned at approximately 33%. The final facility equipment numbers and locations would depend upon the results of technical studies (e.g., the Interconnection Facilities Study).

There would be approximately six inverter pads throughout the Camas Solar Project site, each of which would be approximately 15 by 30 feet and 1 to 2 feet thick, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one to two inverter enclosures and one AC transformer. The inverter located within Camas B would be electrically connected to Camas A via an overhead 12.47-kV conduit mounted to four to six wood monopoles passing over Bull Ditch. A typical wood monopole would be 30 to 45 feet tall, set 6 to 8 feet deep in the ground, and be 8 to 16 inches in diameter.

Aside from construction equipment traffic, there is little to no anticipated ground disturbance for the installation of the racking and solar modules. The Camas Solar Project site has an overall grade change of less than 2%, is relatively flat, and the piles can be installed on the existing grades. There would be 5% or less of impervious surfaces added to the site, less than 100,000 square feet. Impervious areas would be associated with all-weather access roads running to the inverter pads, the six inverter pads, piles for the solar panels and fencing, and a pad for the switchyard.

The only grading/earth moving expected on the Camas Solar Project site would be associated with a minor widening of the entrance road to Camas A; grading/leveling as required for the all-weather access roads; the small areas required for the concrete pads to support the inverters, transformers, and switch gear; and trenching for the DC and AC collection system. Other property improvements that would have only moderate impact/disturbance to in situ conditions would involve roadbed stabilization for the all-weather access roads.

In addition, TUUSSO is proposing to re-site an existing overhead distribution line owned by PSE that passes through the northeast quadrant of Camas A. TUUSSO would pursue one of three options for this distribution line: 1) direct burial of the line from the northern boundary of Camas A to the eastern boundary of Camas A, staying within the current ROW, 2) modifying the ROW slightly to cause the path of the distribution line to travel more directly north-south through Camas A, or 3) modifying the ROW and path of the current overhead distribution line to instead closely follow Bull Ditch and Little Naneum Creek such that the line skirts the northeast boundary of Camas A. Option 1 would have minimal impact to the current site conditions, simply providing for the burial of the PSE distribution line where it passes through Camas A. Option 2 would comprise the construction of up to 4 additional monopoles (typically wood) to support the more north-south path through the project site. Option 3 would comprise the construction of up to around 10 monopoles (typically wood) to support the conduit along the northeast boundary of Camas A. A typical wood monopole would be 30 to 45 feet tall, set 6 to 8 feet deep in the ground, and be 8 to 16 inches in diameter.

Electrical Interconnection

The Camas Solar Project would be located in Puget Sound Energy's service territory, and would connect to the existing PSE distribution lines along Tjossem Road, on the northern boundary of the project site, where the switchyard is located (as illustrated in Figure 2.3-1). The interconnection would comprise a line tap on the existing electrical 12.47-kV distribution circuit Clymer-15, feeding into PSE's Clymer Substation. TUUSSO expects to finalize its Interconnection Agreement for the solar project with PSE by December 2017.

The major elements of the preliminary interconnection design required for the Camas Solar Project are likely to include:

- Install relay improvements or modifications, circuit breakers, and a new single phase line potential transformer within the Clymer Substation.
- Install one span of feeder conductor, gang operated switch, underground cable terminations, and underground cable from the existing feeder along Tjossem Road to the customer point of interconnection (POI).
- Install primary metering equipment at the project site.

The above described span of feeder conductor would connect from the Camas Solar Project switchyard to the existing 12.47-kV distribution circuit. Typically, such conduit would be strung with two to three new monopoles (typically wood). A typical wood monopole would be 30 to 45 feet tall, set 6 to 8 feet deep in the ground, and be 8 to 16 inches in diameter.

Site Access

There would be a single point of access to Camas A from Tjossem Road, and a separate point of access to Camas B from Tjossem Road. The point of access to Camas A would use the existing 20-foot gravel road running to the entry gate, which would be widened slightly from current conditions between Tjossem Road and the existing culvert, and would provide emergency access as well as access for maintenance and operation purposes. The point of access to Camas B would comprise a new, short span of 20-foot gravel road off of Tjossem Road leading to the entry gate for Camas B.

Fencing and Landscaping

The Camas Solar Project site would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped with razor wire surrounding the PV system and switchyard. The entrance gates for both Camas A and Camas B would be about 8 feet high, 12 feet wide, and set back from the edge of Tjossem Road to allow for fire department and maintenance access without disrupting traffic flows. All fencing would be placed at or above grade to ensure that drainage flows would be unobstructed.

Along the northern boundary of Camas A, the natural topography of the Camas Solar Project site and existing vegetation present a visual barrier for neighbors viewing the site from Tjossem Road. Along the northern boundary of Camas B, TUUSSO would plant a line of trees and/or shrubs up to 15 feet in height between Tjossem Road and the fence line, to provide neighbors a regionally appropriate visual barrier. Along the eastern boundary of the project site, the existing line of trees along Little Naneum Creek and Bull Ditch provides a visual barrier for other neighbors.

In the interior of the Camas Solar Project site, native plant species (e.g., bluegrass, fescue, and/or bentgrass) would be maintained beneath and around the arrays, mowed to a height of 12 inches or less. These plant species are indigenous to the area and have been recommended for use by BFI Native Seeds, to which TUUSSO was referred by WDFW. This seed mix would be carefully selected to provide low growth and low maintenance.

Drainage Design

Existing and proposed flows and volumes have been calculated for 2-, 10-, 25-, and 100-year storm events, and Standard Urban Stormwater Mitigation Plan (SUSMP) events to determine the quantity of stormwater to be retained on-site. Once constructed, the Camas Solar Project would not result in any significant change in surface hydrology on the site, nor runoff from the site. There would be less than 5% of impervious surface added, less than 100,000 square feet. Impervious areas would be associated with the limited all-weather access roads, the six inverter pads, piles for the solar panels and fencing, and a pad for the switchyard. Although the solar panels themselves are impermeable, they are small, disconnected from each other, and installed over the existing soil surface. Stormwater and snowmelt would drip from the panels and infiltrate the surface. Off-site flows have also been calculated and would bypass the site via the existing flow paths, which run throughout the site in poorly defined flow paths. The solar project has been laid out to minimize the area that would encroach into the flow paths.

In addition, as shown in Section 2.2.5.2, the Camas Solar Project has been laid out to avoid impacts to Little Naneum Creek, located along the eastern boundary of Camas A.

Current and Proposed Hydrology

Drainage on the Camas Solar Project site has been affected by development to the extent that natural watercourses no longer exist. Drainage in the area is subject to agricultural land and road infrastructure, with a network of canals, drains, and berms. Surface runoff on the solar site and vicinity drains locally northeast to the south on a gentle slope. An unnamed tributary makes up the southeastern boundary of the project site and appears to drain to the Yakima River via Wilson Creek. One other ditch crosses the project site's northeastern corner. Up-gradient drainage is largely controlled by agricultural development and channeled through other drains, canals, or creeks. Major roadways also border the project site and minimize or eliminate overland storm flows.

The Camas Solar Project site is located within the Upper Yakima subbasin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger Columbia River Basalt Group (CRBG). The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (U.S. Bureau of Reclamation [Reclamation] 2012). Reported "depth to water" levels are as shallow as 10 feet near river valley bottoms, to more than 200 feet. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River, southwest of the project site.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin. There is a short segment of the Yakima River mapped as impaired (U.S. Environmental Protection Agency [EPA] 2017). The impaired segment intersects with Wilson Creek, to which the Camas Solar Project's primary drainage is a tributary. There are also short impaired segments up-gradient of the project site, on Cooke Creek. These are located cross-gradient or up-gradient on different local drainage systems not connected to the site.

Well registry data (Washington State Department of Ecology [Ecology] 2017) identified no wells on the Camas Solar Project site. Two wells were located approximately 400 feet east of the project site. The wells had depths of 80 and 120 feet, but no depth to water or pump capacity was listed in the data files. Other wells in the vicinity had depths between 45 and 180 feet.

The layout for the Camas Solar Project has been designed to avoid impacts on Little Naneum Creek, and the facility incorporates a 40-foot setback from the edge of the creek for any electrical generation equipment. The layout has also been designed to avoid impacts to the existing drainage ditch and associated wetland along the western boundary of the project site, and the facility incorporates a 20-foot setback from the edge of the wetland to the electrical generation equipment. No inverters would be placed within the 100-year floodplain and very limited portions of the all-weather access road would cross the 100-year floodplain, resulting in minimal incremental impervious area within the flood zone.

2.3.3.2 Fumaria Solar Project Site

The proposed Fumaria Solar Project, a preliminary plan for which is provided in Figure 2.3-2, is a 4.99-MWac solar energy generation facility that would be located on Clarke Road, within a development envelope of approximately 35.24 acres. The setbacks to the fencing and to the electrical generating equipment follow Kittitas County guidelines and are depicted in Figure 2.3-2.

A total of approximately 18,000 PV panels would be arranged in approximately 250 rows, with center-to-center spacing of about 15 feet. The GCR is currently planned at approximately 33%. The final facility equipment numbers and locations would depend upon the results from technical studies (e.g., the Interconnection Facilities Study).

There would be approximately five inverter pads throughout the Fumaria Solar Project site, each of which would be approximately 15 by 30 feet and 1 to 2 feet thick, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer.

Aside from construction equipment traffic, there is little to no anticipated ground disturbance for the installation of the racking and solar modules on the Fumaria Solar Project site. The site has an overall grade change of less than 3% and is relatively flat, and the piles can be installed on the existing grades. There would be 5% or less of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with all-weather access roads running to the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard.

The only grading/earth moving expected on the Fumaria Solar Project site would be associated with grading/leveling required for the all-weather access roads; the small areas required for the concrete pads to support the inverters, transformers, and switch gear; and trenching for the DC and AC collection system. Other property improvements that would have only moderate impact/disturbance to in situ conditions would involve roadbed stabilization for the all-weather access roads.

Electrical Interconnection

The Fumaria Solar Project would be located in PSE's service territory, and would connect to the existing PSE distribution lines near PSE's Woldale Substation, located at the corner of McManamy Road and Interstate 97 (I-97). A roughly 2.6-mile generation tie line would run from the switchyard located near the southwestern corner of the project site to the adjacent PSE's Woldale Substation (see Section 2.2.5.2). The generation tie line would include up to 0.9 mile of new ROW, requiring new distribution poles and conductors or buried line (see Section 2.2.5.2). The remaining length would be installed along existing electric utility ROWs, and would include either mounting the new generation tie line on existing poles, or replacing the existing poles with new poles and placing the conductors on those new poles. The interconnection would comprise a line tap on the existing electrical 12.47-kV distribution circuit Woldale-15, feeding into PSE's Woldale Substation. TUUSSO expects to finalize its Interconnection Agreement for the solar project with PSE by December 2017.

The major elements of the preliminary interconnection design required for the Fumaria Solar Project are likely to include:

- Install relay improvements or modifications, circuit breakers, and a new single phase line potential transformer within the Woldale Substation.
- Install 2.6 miles of new generation tie line as described above, a gang operated switch, and cable terminations from the existing feeder adjacent to Woldale Substation to the customer POI.
- Install primary metering equipment at the project site.

Along those portions of the Fumaria Solar Project generation tie line within an existing utility ROW, sharing poles with that utility, the double-circuited poles would typically comprise pole classes H2 or H3, average spans of 250 feet between the poles, pole lengths of 60 to 65 feet (heights above ground of 50 to 55 feet), and groundline diameters of the poles between 16 and 24 inches. Along those portions of the generation tie line strung on new wood poles in a new ROW, the single-circuited poles would typically comprise pole classes 1 or 2, average spans of 300 to 350 feet between the poles, pole lengths of 40 to 45 feet (heights above ground of 30 to 40 feet), and groundline diameters of the poles between 16 and 20 inches.

Site Access

TUUSSO may incorporate one of two paths for accessing the Fumaria Solar Project site. The first potential site access would be provided from Clarke Road. This access route would use the existing 12-foot gravel and dirt road (up to the entry gates) to provide emergency access as well as access for maintenance and operation purposes. The second potential site access would be provided from Reecer Creek Road, as illustrated in Figure 2.3-2. This access route would utilize a new 12- to 20-foot-wide, approximately 0.5-mile-long gravel road up to entry gates on the east boundary of the project site, to provide emergency access as well as access for maintenance and operation purposes.

Fencing and Landscaping

The Fumaria Solar Project site would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped with razor wire surrounding the PV system and switchyard. The entrance gates for the project would be about 8 feet high and 12 feet wide to allow for fire department and maintenance access. All fencing would be placed at or above grade to ensure that drainage flows would be unobstructed.

The Fumaria Solar Project site is relatively isolated with few neighbors. Along the southern boundary of the project site, the existing line of trees provides a visual barrier for the project's neighbors located to the south, which would be further supplemented by an additional line of trees and/or shrubs up to 15 feet in height along the eastern portion of the southern boundary (as shown in Figure 2.3-2), to provide neighbors a regionally appropriate visual barrier.

In the interior of the Fumaria Solar Project site, TUUSSO plans to leave the current vegetation cover in place, mowed to a height of 12 inches or less. Where ground is disturbed during construction, native plant species (e.g., bluegrass, fescue, and/or bentgrass) would be planted. These species are indigenous to the area and have been recommended for use by BFI Native Seeds, to which TUUSSO was referred by WDFW. This seed mix would be carefully selected to provide low growth and low maintenance.

Drainage Design

Existing and proposed flows and volumes on the Fumaria Solar Project site have been calculated for 2-, 10-, 25-, and 100-year storm events, and SUSMP events to determine the quantity of stormwater to be retained on-site. Once constructed, the project would not result in any significant change in surface hydrology on the site, nor runoff from the site. There would be less than 5% of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with the limited all-weather access roads, the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard. Although the solar panels themselves are impermeable, they are small, disconnected from each other, and would be installed over the existing soil surface. Stormwater and snowmelt would drip from the panels and infiltrate the surface. Off-site flows have also been calculated and would bypass the site via the existing flow paths, which run throughout the site in poorly defined flow paths. The solar project has been laid out to minimize the area that would encroach into the flow paths.

Current and Proposed Hydrology

Drainage on the Fumaria Solar Project site has been affected by agricultural use to the extent that there are no pre-development watercourses. Drainage in the local area is generally subject to agricultural land and road infrastructure, with a network of canals, drains, and berms. Surface runoff on the project site and vicinity drains locally southward on a gentle slope. Several ditches in the area appear to collect overland sheet flow. A network of ditches and canals drains water from and distributes water to agricultural fields. The nearest named natural drainage is Reecer Creek, which crosses Clarke Road from north to south; several other unnamed tributaries flow roughly parallel with Reecer Creek and most join Reecer Creek south of the project site. Up-gradient drainage is largely controlled by agricultural development and channeled through other drainages, canals, or local creeks.

The Fumaria Solar Project site is located within the Upper Yakima subbasin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger CRBG. The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (Reclamation 2012). Reported "depth to water" levels are as shallow as 10 feet below ground surface (bgs) near river valley bottoms, to more than 200 feet bgs. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River, approximately 3 miles southwest of the project site.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin. There are no impaired reaches in, adjacent to, or up-gradient of the Fumaria Solar Project site (EPA 2017).

Well registry data (Ecology 2017) identified one well on the Fumaria Solar Project site (Well Log ID 339775), which had a recorded depth of 120 feet bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had depths between 80 and 170 feet bgs.

The Fumaria Solar Project site layout has been designed to avoid impacts on Reecer Creek. The layout has also been designed to avoid impacts to the existing drainage ditch along the southwestern boundary of the project site, and the facility incorporates a 60-foot setback from the edge of the wetland passing along the western edge of the site to the electrical generation equipment.

2.3.3.3 Penstemon Solar Project Site

The proposed Penstemon Solar Project, a preliminary plan for which is provided in Figure 2.3-3, is a 4.99-MWac solar energy generation facility that would be located at the intersection of Moe and Tjossem Roads, within a development envelope of approximately 39.38 acres. As depicted in Figure 2.3-3, the proposed solar project array layout includes a 15-foot setback from the western site boundary to the electrical generation equipment, a 20-foot setback from the northern and southern boundaries to the electrical generation equipment, and a 60-plus-foot setback from the creek along the eastern boundary of the site to the electrical generation equipment.

A total of approximately 20,000 PV panels would be arranged in approximately 270 rows, with center-to-center spacing of about 15 feet. The GCR is currently planned at approximately 33%. The final facility equipment numbers and locations would depend upon the results from technical studies (e.g., the Interconnection Facilities Study).

There would be approximately five inverter pads throughout the Penstemon Solar Project site, each of which is approximately 15 by 30 feet and 1 to 2 feet thick, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer.

Aside from construction equipment traffic, there would be little to no anticipated ground disturbance for the installation of the racking and solar modules. The Penstemon Solar Project site has an overall grade change of less than 2% and is relatively flat, and the piles can be installed on the existing grades. There would be 5% or less of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with all-weather access roads running to the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard.

The only grading/earth moving expected on the Penstemon Solar Project site would be associated with grading/leveling as required for the all-weather access roads; the small areas required for the concrete pads to support the inverters, transformers, and switch gear; and trenching for the DC and AC collection system. Other property improvements that would have only moderate impact/disturbance to in situ conditions would involve roadbed stabilization for the all-weather access roads.

Electrical Interconnection

The Penstemon Solar Project would be located in PSE's service territory, and would connect to the existing PSE distribution transmission lines along Tjossem Road, on the northern boundary of the project site, where the switchyard would be located (as illustrated in Figure 2.3-3). The interconnection would comprise a line tap on the existing electrical 12.47-kV distribution circuit KIT-22, approximately 5.0 circuit miles from PSE's Kittitas Substation. TUUSSO expects to finalize its Interconnection Agreement for the solar project with PSE by December 2017.

The major elements of the preliminary interconnection design required for the Penstemon Solar Project include:

- Install relay improvements or modifications within the Kittitas Substation.
- Replace the 15-kV power circuit breaker within the Kittitas Substation with a new smart breaker.
- Install a new single phase line potential transformer (PT) within the Kittitas Substation.
- Install one span of feeder conductor, gang operated switch, underground cable terminations, and underground cable from the existing feeder along Tjossem Road to the customer POI.
- Install primary metering equipment at the project site.

The above described span of feeder conductor would connect the Penstemon Solar Project switchyard to the existing 12.47-kV distribution circuit. Typically, such conduit would be strung with two to three new monopoles (typically wood). A typical wood monopole would be 30 to 45 feet tall, set 6 to 8 feet deep in the ground, and be 8 to 16 inches in diameter.

Site Access

The single point of site access for the Penstemon Solar Project would be provided from Tjossem Road. The point of access would be a short paved or gravel driveway leading up to the entry gates from Tjossem Road, to provide emergency access as well as access for maintenance and operation purposes.

Fencing and Landscaping

The Penstemon Solar Project site would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped with razor wire surrounding the PV system and switchyard. The entrance gates for the project would be about 8 feet high, 12 feet wide, and would be set back from the edge of Tjossem Road, to allow for fire department and maintenance access without disrupting traffic flow. All fencing would be placed at or above grade to ensure that drainage flows would be unobstructed.

Along the northern boundary of the Penstemon Solar Project site, TUUSSO would plant a line of trees and/or shrubs up to 15 feet in height between Tjossem Road and the fence line, to provide neighbors a regionally appropriate visual barrier. Similarly, TUUSSO would plant a line of trees and/or shrubs up to 15 feet in height along the western boundary of the Penstemon Solar Project site. Along the eastern boundary of the project site, the existing line of trees along Coleman Creek provides a visual barrier for neighbors viewing the site from Moe Road.

In the interior of the Penstemon Solar Project site, native plant species (e.g., bluegrass, fescue, and/or bentgrass) would be maintained beneath and around the arrays, mowed to a height of 12 inches or less. These species are indigenous to the area and have been recommended for use by BFI Native Seeds, to which TUUSSO was referred by WDFW. This seed mix would be carefully selected to provide low growth and low maintenance.

Drainage Design

Existing and proposed flows and volumes for the Penstemon Solar Project have been calculated for 2-, 10-, 25-, and 100-year storm events, and SUSMP events to determine the quantity of stormwater to be retained on-site. Once constructed, the project would not result in any significant change in surface hydrology on the site, nor runoff from the site. There would be less than 5% of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with the limited all-weather access roads, the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard. Although the solar panels themselves are impermeable, they are small, disconnected from each other, and installed over the existing soil surface. Stormwater and snowmelt would drip from the panels and infiltrate the surface. Off-site flows have also been calculated and would bypass the site via the existing flow paths, which run throughout the site in poorly defined flow paths. The project has been laid out to minimize the area that would encroach into the flow paths.

In addition, as shown in Figure 2.3-3, the Penstemon Solar Project has been laid out to avoid impacts to Coleman Creek, located near the eastern boundary of the project, with an average distance of 115 feet from the electrical generating equipment to the edge of the creek.

Current and Proposed Hydrology

Drainage on the Penstemon Solar Project site has been affected by development, to the extent that natural watercourses no longer exist. Drainage in the area is subject to agricultural land and road infrastructure, with a network of canals, drains, and berms. Surface runoff on the project site travels toward the central drainage ditch, which flows south, then east to Coleman Creek. The greater vicinity appears to gently slope to the southwest. Coleman Creek connects with Wilson Creek and the Yakima River, within approximately 3 river miles of the project site. Up-gradient drainage is largely controlled by agricultural development and channeled through other drains, canals, or creeks. Roadways also border the project site and minimize or eliminate overland storm flows.

The Penstemon Solar Project would be located within the Upper Yakima sub-basin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger CRBG. The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (Reclamation 2012). Reported "depth to water" levels are as shallow as 10 feet near river valley bottoms, to more than 200 feet. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River, southwest of the project site.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin. There is a short segment of the Yakima River mapped as impaired (EPA 2017). The impaired segment intersects with Wilson Creek, of which the Penstemon Solar Project's primary drainage is a tributary. There are also short impaired segments up-gradient of the project site, on Cooke Creek. These are located cross-gradient or up-gradient on a different local drainage system not connected to the project site.

Well registry data (Ecology 2017) identified no wells on the Penstemon Solar Project site. Two wells were mapped approximately 700 feet east and north of the project site. The wells had depths of 125 to 150 feet bgs, but no depth to water or pump capacity was listed in the data files. Other wells within 1 mile of the project site had depths between 12 and 335 feet bgs.

The Penstemon Solar Project layout has been designed to avoid impacts on Coleman Creek, and the facility incorporates a greater than 100-foot average setback from the edge of the creek for any electrical generation equipment. No inverters would be placed within the 100-year floodplain and none of the all-weather access roads would be built within the 100-year floodplain, resulting in minimal incremental impervious area within the flood zone.

2.3.3.4 Typha Solar Project Site

The proposed Typha Solar Project, a preliminary plan for which is provided in Figure 2.3-4, is a 4.99-MWac solar energy generation facility that would be located off Thorp Highway South, within a development envelope of approximately 54.29 acres. The proposed array layout includes a greater than

100-foot setback from the Yakima River to any electrical generation equipment, a 30-foot setback from the wetlands located within the site to any electrical generation equipment, and other setbacks as shown in Figure 2.3-4.

A total of approximately 20,000 PV panels would be arranged in approximately 300 rows, with center-to-center spacing of about 15 feet. The GCR is currently planned at approximately 33%. The final facility equipment numbers and locations would depend upon results from technical studies (e.g., the Interconnection Facilities Study).

There would be approximately five inverter pads throughout the Typha Solar Project site, each of which would be approximately 15 by 30 feet and 1 to 2 feet thick, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer.

Aside from construction equipment traffic, there would be little to no anticipated ground disturbance for the installation of the racking and solar modules. The Typha Solar Project site has an overall grade change of less than 1% and is relatively flat, and the piles can be installed on the existing grades. There would be 5% or less of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with all-weather access roads running to the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard.

The only grading/earth moving expected on the Typha Solar Project site would be associated with: 1) the improvement of the existing land bridge near the entrance to the site (e.g., by excavation of 8 to 12 inches of topsoil, placement of geotextile fabric in the excavation, and filling the excavation with quarry spalls); 2) the filling of a small on-site watering pond; 3) grading/leveling as required for the all-weather access roads and the small areas required for the concrete pads to support the inverters, transformers, and switch gear; 4) trenching for the DC and AC collection system; and 5) improvement/widening of the existing gravel road leading from Thorp Highway South to the gated site entrance. Other property improvements that would have only moderate impact/disturbance to in situ conditions involve roadbed stabilization for the all-weather access road.

Electrical Interconnection

The Typha Solar Project would be located in PSE's service territory, and would connect to the existing PSE distribution transmission lines running along Thorp Highway South. A roughly 0.5-mile generation tie line would run from the switchyard located near the southwestern corner of the project site to Thorp Highway South (see Figure 2.3-4). The generation tie line would include a very short section of new ROW requiring new distribution wood poles and conductor, or buried line (see Figure 2.3-4). The remaining length would be installed along existing electric utility ROWs and would involve mounting the new generation tie line on existing wood poles, or replacing the existing poles with new poles and mounting the new generation tie line on those new poles. The interconnection would comprise a line tap on the existing electrical 12.47-kV distribution circuit Woldale-13, feeding into PSE's Woldale Substation. TUUSSO expects to finalize its Interconnection Agreement for the solar project with PSE by December 2017.

The major elements of the preliminary interconnection design required for the Typha Solar Project are likely to include:

- Install relay improvements or modifications, circuit breakers, and a new single phase line potential transformer within the Woldale Substation.
- Install 0.45 mile of new generation tie line, as described above, a gang operated switch, and cable terminations from the existing feeder along Thorp Highway South to the customer POI.

- Install primary metering equipment at the project site.

Along those portions of the Typha Solar Project generation tie line within an existing utility ROW, sharing poles with that utility, the double-circuited poles would typically comprise pole classes H2 or H3, average spans of 250 feet between the poles, pole lengths of 60 to 65 feet (heights above ground of 50 to 55 feet), and groundline diameters of the poles between 16 and 24 inches. Along those portions of the generation tie line strung on new poles in a new ROW, the single-circuited poles would typically comprise pole classes 1 or 2, average spans of 300 to 350 feet between the poles, pole lengths of 40 or 45 feet (heights above ground of 30 to 40 feet), and groundline diameters of the poles between 16 and 20 inches.

Site Access

The single point of site access for the Typha Solar Project site would be provided from Thorp Highway South. This access route would use the existing 12-foot gravel and dirt road (up to the entry gates) to provide emergency access as well as access for maintenance and operations purposes. TUUSSO is in consultation with local fire authorities, and may widen the existing road to 20 feet based on the final requirements agreed upon in consultation with such authorities. An existing bridge along this road over the EP Canal would also need to be improved in one of three ways: 1) reinforce, improve, and/or replace existing bridge supports to accommodate the truck traffic to the project site; 2) completely remove and replace the existing bridge with a new bridge; or 3) install a temporary bridge over the existing bridge during the construction period to accommodate the heavy truck traffic.

Fencing and Landscaping

The Typha Solar Project site would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped with razor wire surrounding the PV system and switchyard. The entrance gates for the project would be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access. All fencing would be placed at or above grade to ensure that drainage flows would be unobstructed.

The existing trees surrounding much of the Typha Solar Project site, as well as the topography of the site, provide a significant visual barrier for the project's neighbors. Along a portion of the eastern boundary of the project site closest to the nearby golf course, a line of trees and/or shrubs up to 15 feet in height would be planted to provide neighbors a regionally appropriate visual barrier.

In the interior of the Typha Solar Project site, native plant species (e.g., bluegrass, fescue, and/or bentgrass) would be maintained beneath and around the arrays, mowed to a height of 12 inches or less. These species are indigenous to the area and have been recommended for use by BFI Native Seeds, to which TUUSSO was referred by WDFW. This seed mix would be carefully selected to provide low growth and low maintenance.

Drainage Design

Existing and proposed flows and volumes on the Typha Solar Project site have been calculated for 2-, 10-, 25-, and 100-year storm events, and SUSMP events to determine the quantity of stormwater to be retained on-site. Once constructed, the project would not result in any significant change in surface hydrology on the site, nor runoff from the site. There would be less than 5% of impervious surface added to the site, less than 100,000 square feet. Impervious areas would be associated with the limited all-weather access roads, the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard. Although the solar panels themselves are impermeable, they are small, disconnected from each other, and installed over the existing soil surface. Stormwater and snowmelt would drip from the panels and infiltrate the surface. Off-site flows have also been calculated and would bypass the site via the existing flow paths, which run throughout the site in poorly defined flow paths. The project has been laid out to minimize the area that would encroach into the flow paths.

Current and Proposed Hydrology

Drainage on the Typha Solar Project site has been affected by agricultural use to the extent that pre-development watercourses do not exist. Drainage in the local area is generally subject to agricultural land grading, with a network of canals, drains, and berms. Surface runoff on the project site and vicinity drains locally east and southeast along a gentle slope. The Yakima River abuts the project site's northeastern border. A ditch that wraps around the site's western and southern boundaries connects with other canals, which distribute or collect water to or from agricultural fields. This ditch later flows into the Yakima River. Up-gradient drainage is largely controlled by agricultural development and channeled through other drains, canals, or local creeks.

The Typha Solar Project site is located within the Upper Yakima subbasin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger CRBG. The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (Reclamation 2012). Reported "depth to water" levels are as shallow as 10 feet near river valley bottoms, to more than 200 feet. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River, which directly abuts the project site.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin. There are no impaired reaches in, adjacent to, or up-gradient of the project site (EPA 2017).

Well registry data (Ecology 2017) identified one well on the Typha Solar Project site (Well Log ID 339775), which had a recorded depth of 120 feet bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had recorded water depths between 80 and 170 feet bgs.

The Typha Solar Project layout has been designed to avoid impacts on the Yakima River, including a greater than 100-foot setback from the Yakima River to any electrical generation equipment, and a 30-foot setback from the wetlands located within the site to any electrical generation equipment. No inverters would be placed within the 100-year floodplain, and a limited portion of the all-weather access roads would be built within the 100-year floodplain, resulting in minimal incremental impervious area within the flood zone.

2.3.3.5 Urtica Solar Project Site

The proposed Urtica Solar Project, a preliminary plan for which is provided in Figure 2.3-5, is a 4.99-MWac solar energy generation facility that would be located near the intersection of Umptanum and Manastash Roads, within a development envelope of approximately 51.94 acres. The proposed array layout would include 40-foot setbacks from nearby wetlands to the electrical generation equipment, as depicted in Figure 2.3-5.

A total of approximately 20,000 PV panels would be arranged in approximately 320 rows on the Urtica Solar Project site, with center-to-center spacing of about 15 feet. The GCR is currently planned at approximately 33%. The final facility equipment locations would depend upon the results from the technical studies (e.g., the Interconnection Facilities Study).

There would be approximately five inverter pads throughout the Urtica Solar Project site, each of which would be approximately 15 by 30 feet and 1 to 2 feet thick, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer.

Aside from construction equipment traffic, there would be little to no anticipated ground disturbance for the installation of the racking and solar modules. The Urtica Solar Project site has an overall grade change of less than 2% and is relatively flat, and the piles can be installed on the existing grades. There would be 5% or less of impervious surfaces added to the site, less than 100,000 square feet. Impervious areas would be associated with all-weather access roads running to the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard.

TUUSSO would use the existing 12-foot gravel/dirt road to access much of the Urtica Solar Project site. The only grading/earth moving expected would be associated with grading/leveling as required for new all-weather access roads running to the inverter pads; the small areas required for the concrete pads to support the inverters, transformers, and switch gear; and trenching for the DC and AC collection system. Other property improvements that would have only moderate impact/disturbance to in situ conditions would involve roadbed stabilization for the all-weather access roads.

Electrical Interconnection

The Urtica Solar Project would be located in PSE's service territory, and would connect to the existing PSE distribution transmission lines along Umptanum Road, on the eastern boundary of the project site, where the switchyard is located (as illustrated in Figure 2.3-5). The interconnection would comprise a line tap on the existing electrical 12.47-kV distribution circuit CLY-16, running from PSE's Clymer Substation. TUUSSO expects to finalize its Interconnection Agreement for the solar project with PSE by December 2017.

The major elements of the preliminary interconnection design required for the Urtica Solar Project include:

- Install relay improvements or modifications within the Clymer Substation.
- Replace the 15-kV power circuit breaker within the Clymer Substation with a new smart breaker.
- Install a new single phase line PT within the Clymer Substation.
- Install one span of feeder conductor, gang operated switch, underground cable terminations, and underground cable from the existing feeder along Umptanum Road to the customer POI.
- Install primary metering equipment at the project site.

The above described span of feeder conductor would connect from the Urtica Solar Project switchyard to the existing 12.47-kV distribution circuit. Typically, such conduit would be strung with two to three new monopoles (typically wood). A typical wood monopole would be 30 to 45 feet tall, set 6 to 8 feet deep in the ground, and be 8 to 16 inches in diameter.

Site Access

The single point of access to the Urtica Solar Project site would be provided from Umptanum Road. The point of access would be a short paved or gravel driveway leading up to the entry gates from Umptanum Road, to provide emergency access as well as access for maintenance and operation purposes.

Fencing and Landscaping

The Urtica Solar Project site would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped with razor wire surrounding the PV system and switchyard. The entrance gates for the project would be about 8 feet high, 12 feet wide, and would be set back from the edge of Umptanum Road, to allow for fire department and maintenance access without disrupting traffic flow. All fencing would be placed at or above grade to ensure that drainage flows would be unobstructed.

Along a portion of the eastern boundary of the Urtica Solar Project site, TUUSSO would plant a line of trees and/or shrubs up to 15 feet in height between Umptanum Road and the fence line, to provide neighbors a regionally appropriate visual barrier. Along a portion of the northern boundary of the project site, TUUSSO would plant another line of trees and/or shrubs up to 15 feet in height outside of the fence line, to provide neighbors with another regionally appropriate visual barrier.

In the interior of the Urtica Solar Project site, native plant species (e.g., bluegrass, fescue, and/or bentgrass) would be maintained beneath and around the arrays, mowed to a height of 12 inches or less. These species are indigenous to the area and have been recommended for use by BFI Native Seeds, to which TUUSSO was referred by WDFW. This seed mix would be carefully selected to provide low growth and low maintenance.

Drainage Design

Existing and proposed flows and volumes on the Urtica Solar Project site have been calculated for 2-, 10-, 25-, and 100-year storm events, and SUSMP events to determine the quantity of stormwater to be retained on-site. Once constructed, the project would not result in any significant change in surface hydrology on the site, nor runoff from the site. There would be less than 5% of impervious surfaces added to the site, less than 100,000 square feet. Impervious areas would be associated with the limited all-weather access roads, the five inverter pads, piles for the solar panels and fencing, and a pad for the switchyard. Although the solar panels themselves are impermeable, they are small, disconnected from each other, and installed over the existing soil surface. Stormwater and snowmelt would drip from the panels and infiltrate the surface. Off-site flows have also been calculated and would bypass the site via the existing flow paths, which run throughout the site in poorly defined flow paths. The solar project has been laid out to minimize the area that would encroach into the flow paths.

In addition, as shown in Figure 2.3-5, the Urtica Solar Project has been laid out to avoid impacting the nearby ponds or the on-site ditch which flows through the northeastern portion of the property.

Current and Proposed Hydrology

Drainage on the Urtica Solar Project site has been affected by agricultural use to the extent that pre-development watercourses remain, but do not exist in their natural state. Drainage in the local area is generally subject to agricultural land grading, with a network of canals, drains, and berms. Surface runoff on the project site and vicinity drains locally east along a gentle slope to Fogarty Ditch and the Yakima River, which is located approximately 0.25 mile from the project site. Up-gradient drainage is also largely controlled by agricultural development and channeled through other drains, canals, or local creeks.

The Urtica Solar Project site would be located within the Upper Yakima subbasin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger CRBG. The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (Reclamation 2012). Reported “depth to water” levels are as shallow as 10 feet near river valley bottoms, varying to more than 200 feet. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River, which directly abuts the project site.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin. There are no impaired reaches in, adjacent to, or up-gradient of the project site (EPA 2017).

Well registry data (Ecology 2017) identified one well on the project site (Well Log ID 339775), which had a recorded depth of 172 feet below bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had depths between 15 and 290 feet bgs.

No inverters would be placed within the Urtica Solar Project site 100-year floodplain and limited portions of the all-weather access roads would be built within the 100-year floodplain, resulting in minimal incremental impervious area within the flood zone.

2.4 Energy Transmission Systems 463-60-155

The application shall identify the federal, state, and industry criteria used in the conceptual design, route selection, and construction for all facilities identified in RCW 80.50.020 (6) and (7), and shall indicate how such criteria are met.

Pursuant to RCW 80.50.020 (7), all on-site improvements to the five Columbia Solar Project sites are described in Section 2.3.

With respect to off-site improvements, of the five proposed TUUSSO Columbia Solar Project sites, only two would have off-site generation tie lines of significant length that tie into the PSE's distribution transmission line network, namely the Fumaria and Typha Solar Project sites, as described in Section 2.2.5.2. The design, route selection and construction of the generation tie lines have been selected to meet the following criteria: 1) safety; 2) minimal environmental impact by locating such lines, where possible, within existing distribution line corridors; 3) shortest possible route to proposed POI; 4) available access across landowners' properties; and 5) overall construction impacts.

2.5 Electrical Transmission Facilities 463-60-160

(1) Prior to submitting an application for site certification for an electric transmission facility under RCW 80.50.060(3) an applicant shall follow the procedure as set in chapter 463-61 WAC.

TUUSSO is not submitting an ASC for an electric transmission facility, and therefore this section is not applicable.

(2) An application for an electric transmission facility shall include the information required by this chapter unless the requirement may not be applicable to such a facility.

TUUSSO is not submitting an ASC for an electric transmission facility, and therefore this section is not applicable.

(3) An application for an electrical transmission facility shall include the results of any pre-application negotiations including any agreements between the applicant and cities, towns, or counties where the electrical transmission facility is proposed to be located.

TUUSSO is not submitting an ASC for an electric transmission facility, and therefore this section is not applicable.

2.6 Water Supply 463-60-165

(1) Water intake and conveyance facilities. The application shall describe the location and type of water intakes, water lines, pipelines and water conveyance systems, and other associated facilities required for providing water to the energy facility for which certification is being requested.

None of the five Columbia Solar Projects would require or use water intake or conveyance structures. If the projects use existing on-site water resources, they would be conveyed using existing piping systems or would be trucked from such systems.

(2) Water supply and usage alternatives.

(a) The applicant shall consider water supply alternatives, including use of reclaimed water, water reuse projects, and conservation methods. The application shall describe all supply alternatives considered, including the associated cost of implementing such alternatives, and the resulting benefits and penalties that would be incurred.

2.6.1 Construction Water Use

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, soil compaction, and for dust control on access roads. In addition, non-toxic soil binding agents may be employed to help with soil stabilization during construction.

Construction activities for the five proposed Columbia Solar Projects are conservatively estimated to generate an average water demand of 100,000 gallons per day. The daily water demand estimate assumes that on an average construction day, 20 acres of the solar project sites are in active construction, requiring 10 continuous hours of water using five 4,000-gallon-capacity water trucks making five roundtrips to get water. A 4,000-gallon water truck, such as a Kenworth T440 with a Ledwell 4,000-Gallon Water Tank, would likely be used. Construction time for the Columbia Solar Projects would require approximately 6 months, or 156 work days (Monday to Saturday), to complete. Based upon these parameters, the construction water demand for the proposed Columbia Solar Projects is very conservatively estimated to total 15.6 million gallons, or 47.87 acre-feet (1 acre-foot is equal to 325,851 gallons), or approximately 10 acre-feet per project.

TUUSSO has considered a number of water supply alternatives for construction purposes. TUUSSO has explored using on-site existing water allocations for construction, but water restrictions prevent these uses. TUUSSO has also explored the use of greywater sources (including those in the Kittitas Valley) for construction, as water for construction activities can be of non-potable quality. However, greywater availability is limited in Kittitas County. Finally, TUUSSO has discussed with the City of Ellensburg the availability of municipal water for construction purposes. Based on this array of possible water sources, TUUSSO intends to use water trucked in from municipal water sources or from other off-site vendors with a valid water right for all of the projects. In particular, water needs related to construction would be procured by TUUSSO's construction contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks.

The distances of the five truck trips made by five water trucks each day would vary based on the site under active construction, and that site's proximity to the nearest filling station, as determined by TUUSSO's construction contractor. Table 2.6-1 identifies the site, a conservative estimate for the roundtrip distance to the nearest filling station, the number of days of construction water needed for the site, the number of roundtrips during the construction period, and the total miles traveled by 4,000-gallon-capacity water trucks. Overall, approximately 78,000 miles would be traveled by water trucks during the construction period.

Table 2.6-1. Estimated Distance Traveled by Water Trucks during Construction

Project Site	Estimated Roundtrip Distance (miles)	Days of Water	Total Roundtrips	Total Miles
Camas	20	35	875	17,500
Fumaria	20	16	400	8,000
Penstemon	20	35	875	17,500
Urtica	20	35	875	17,500
Typha	20	35	875	17,500

TUUSSO would also incorporate water conservation methods wherever possible. For example, water would not be used for concrete hydration on-site because the concrete is expected to be delivered to the site already hydrated. Less water-intensive methods of dust suppression are also under review, including use of soil stabilizers, tightly phasing construction activities, staging grading and other dust-creating activities, and/or compressing the entire construction schedule to reduce the time period over which dust-suppression measures would be required.

2.6.2 Operational Water Use

On an ongoing basis, water would be used for cleaning PV panels and controlling dust (less than 1 acre-foot per year per project site). Water would also be necessary to establish the tree/shrub visual buffers along portions of the Columbia Solar Project sites, as described above, as well as the native plant species throughout the solar project sites. Project landscaping would consist of native and drought-tolerant species. Once established, the species would not require ongoing irrigation. The irrigation needs for landscaping establishment are assumed to last for 3 consecutive years following installation.

Based on feedback from farmers familiar with growing conditions in Kittitas Valley (including landowners familiar with the conditions on the five Columbia Solar Project sites), assuming periodic irrigation for establishment purposes over a 3-year period, it is estimated that approximately 400 acre-feet of water per site per year would be needed at a maximum over this period to ensure plant establishment on the solar project sites. These water needs are the same as the current water needs on the actively farmed project sites.

With respect to operational water supply, as with the construction water supply, TUUSSO has considered a number of alternatives. Each of the Columbia Solar Project sites, except for the Fumaria Solar Project site, has on-site existing water allocations that TUUSSO would be able to use during operation for irrigation purposes. Given the costs of trucking water from an external source to each of the sites, TUUSSO would only pursue such a water source for the very limited irrigation needs for the Fumaria Solar Project site. Given the limited water needed for cleaning PV panels, TUUSSO will likely truck in water from municipal water sources or from other off-site vendors with a valid water right for all of the solar projects for this purpose. In particular, water needs related to operation would be procured by TUUSSO's operations and maintenance (O&M) contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks. As described above, a 4,000-gallon water truck, such as a Kenworth T440 with a Ledwell 4,000Gallon Water Tank, would likely be used for water that will be trucked to the sites during operation.

The water needs for each of the five solar project sites during operation, the source of the water, the total truck trips during the year needed to meet these needs, a conservative estimate for the roundtrip distance to the nearest filling station, as well as the total mileage traveled are given in Table 2.6-2. As shown in the table, approximately 5,000 total miles would be traveled by 4,000-gallon water trucks to meet the water needs during the first 3 years of the projects' operation, after which approximately 1,000 miles per year would be traveled.

Table 2.6-2. Estimated Distance Traveled by Water Trucks during Operation

Project Site	Water Use	Source of Water	Estimated Roundtrip Distance	Annual Water Needs (Roundtrips)	Total Miles
Camas	Irrigation[1]	On-site: Bull Ditch Irrigation Company and Town Ditch[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Fumaria	Irrigation	Off-site vendor	20	800,000 gallons (200)	4,000
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Penstemon	Irrigation	On-site: Town Ditch[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Urtica	Irrigation	On-site: Westside Ditch Company[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Typha	Irrigation	On-site: Packwood Canal[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site Vendor	20	40,000 gallons (10)	200

1. Note that irrigation will only be required for the first 3 years.
2. The on-site water sources are based on existing water allocations held by the site lessors.

TUUSSO has incorporated water conservation methods into its operational water plan as well. Where feasible, TUUSSO would work with the current landowners to incorporate more efficient irrigation systems, such as drip lines, to water the trees and shrubs forming the visual buffers. TUUSSO has used native and drought-tolerant species to ensure that the landscaping can be established quickly with water needs similar to or below current water usage, and once established, would not require any further watering except in extreme drought conditions. TUUSSO would also investigate using sprinkler systems on the Columbia Solar Project sites to irrigate the native ground cover (instead of the current flood irrigation methods used on the solar project sites).

(b) The application shall include detailed information regarding using air cooling as an alternative to consumptive water use, including associated costs.

The five Columbia Solar Projects do not, by design, require consumptive water cooling. Thus, air cooling versus water cooling is not an issue for these facilities.

(c) The application shall describe water conservation methods that will be used during construction and operation of the facility.

During construction, TUUSSO would incorporate water conservation methods wherever possible. For example, water would not be used for concrete hydration on-site because the concrete is expected to be delivered to the site already hydrated. Less water-intensive methods of dust suppression are also under review, including use of soil stabilizers, tightly phasing construction activities, staging grading and other dust-creating activities, and/or compressing the entire construction schedule to reduce the time period over which dust-suppression measures would be required.

TUUSSO has incorporated water conservation methods into its operational water plan as well. Where feasible, TUUSSO would work with the current landowners to incorporate more efficient irrigation systems to water the trees and shrubs forming the visual buffers. TUUSSO has used native and drought tolerant species to ensure that the landscaping can be established quickly with minimal water needs, and once established, would not require any further watering except in extreme drought conditions. TUUSSO would also investigate using sprinkler systems on the Columbia Solar Project sites to irrigate the native ground cover (instead of the current flood irrigation methods used on the solar project sites).

(3) Water rights and authorizations. An applicant proposing to use surface or groundwater for the facility shall describe the source and the amount of water required during construction and operation of the energy facility and shall do one or more of the following:

As described above, TUUSSO is proposing to use water supplied under existing water allocations or from municipal water sources for all but the Fumaria Solar Project site (which is limited to water supplied from municipal water sources). For each of these sites, TUUSSO is conservatively estimating approximately 10 acre-feet would be needed for construction, and (with the exception of the Fumaria Solar Project site) based on very conservative water estimates, 400 acre-feet would be needed per site per year during the first 3 years of operation. After the initial 3 years of operation, TUUSSO would require less than 1 acre-foot of water per site per year.

(a) Submit a water use authorization or a contractual right to use water supplied by a municipal corporation or other water purveyor; or

Water needs related to construction would be purchased by TUUSSO's construction contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks. Similarly, water needs related to operations (except the irrigation water needs described below) would be procured by TUUSSO's O&M contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks. The irrigation water needs for each of the solar project, except for the Fumaria Solar Project, would be met by existing water rights held by the land lessors.

(b) Submit a water right permit or water right certificate issued by the department of ecology for the proposed facility in an amount sufficient to meet the need of the facility. If the permit and/or certificate has been issued five years prior to the submittal date, the applicant shall provide evidence that the water right permit is in good standing, or that the certificate has not relinquished through nonuse; or

Not applicable.

(c) For applications for new surface or groundwater withdrawals, or applications for water right changes or transfers of existing rights or certificates for withdrawal, the applicant shall submit appropriate application(s) for such rights, certificates or changes in rights and certificates, to the department of ecology prior to submittal of the application for site certification to the council. The application for site certification shall include report(s) of examination, identifying the water rights, or water right changes, submitted to and under review by the department of ecology, the quantities of water in gallons per minute and acre feet per year that are eligible for change, together with any limitations on use, including

time of year. The report(s) of examination shall also include comments by the Washington state department of fish and wildlife with respect to the proposed water right applications under review by the department of ecology.

Not applicable.

(d) Mitigation. The application shall contain a description of mitigation proposed for water supply, and shall include any and all mitigation required by the department of ecology pursuant to the review of water rights or certificates, or changes to water rights or certificates required in (c) of this subsection.

Not applicable.

2.7 System of Heat Dissipation 463-60-175

The application shall describe both the proposed and alternative systems for heat dissipation from the proposed facilities.

The five Columbia Solar Projects do not, by design, require cooling or heat dissipation. Thus, air cooling versus water cooling is not an issue for these facilities.

2.8 Characteristics of Aquatic Discharge Systems 463-60-185

(1) Where discharges into a watercourse are involved, the applicant shall identify outfall configurations including:

(a) Location(s) of water discharge pipeline or conveyance system, the outfall, and any associated dilution systems;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(b) Average and maximum discharge rate;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(c) Extent of the dilution zone if necessary;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(d) Width of the receiving water body at the outfall location;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(e) Dimension(s), and rated and maximum carrying capacity of the water discharge pipeline or conveyance system, the outfall structure and any associated dilution systems;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(f) Depth and width of the receiving water body at the discharge point;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(g) Average, minimum and maximum water velocity of the receiving water body at the discharge point, and the times when the maximum and minimum flows occur.

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(2) Where discharges are into a water-course via an existing discharge system for which certification is not being sought, the applicant shall also provide the following information:

(a) Ownership of the discharge conveyance system;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(b) A description of, and the terms and duration contained in, the use agreement that allows the applicant to use the discharge conveyance system;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(c) Identification of the party responsible for operation and maintenance of the discharge conveyance system;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(d) NPDES or state wastewater discharge permit number for the existing system discharge;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(e) Location of connection point into the existing discharge system;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(f) Diameter and rated and maximum volume capacity of the wastewater line or conveyance system into which discharge is being proposed;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(g) Existing, rated and maximum flow levels in the wastewater line or conveyance system into which the discharge is being proposed;

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

(h) Where a discharge is proposed to a publicly owned treatment works, in addition to the items provided in subsections (1) and (2) of this section, the applicant shall provide an engineering analysis showing that the proposed discharge will not cause the waste treatment facility to exceed capacities or to violate its authorized discharge limits, including both the quality of the discharge and the volume of the discharge, or to violate the permits governing its operation.

The five Columbia Solar Projects do not, by design, require aquatic discharge systems. Thus, this section does not apply to them.

2.9 Wastewater Treatment 463-60-195

(1) The application shall describe each wastewater source associated with the facility and for each source, the applicability of all known, available, and reasonable methods of wastewater control and treatment to ensure it meets current waste discharge and water quality regulations.

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(2) Where wastewater control involves collection and retention for recycling and/or resource recovery, the applicant shall show in detail the methods selected, including at least the following information:

(a) Waste source(s);

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(b) Average and maximum daily amounts and composition of wastes;

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(c) The type of storage vessel and the storage capacity and duration; and

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(d) Any bypass or overflow facilities to the wastewater treatment system(s) or the receiving waters.

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(3) Where wastewaters are discharged into receiving waters, the applicant shall provide a detailed description of the proposed treatment system(s), including:

(a) Appropriate flow diagrams and tables showing the sources of all tributary waste streams:

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(b) Their average and maximum daily amounts and composition;

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(c) Individual treatment units and their design criteria;

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(d) Major piping (including all bypasses); and

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

(e) Average and maximum daily amounts and composition of effluent(s).

The five Columbia Solar Projects do not, by design, require wastewater treatment systems. Thus, this section does not apply to them.

2.10 Spillage Prevention and Control 463-60-205

The application shall describe all spillage prevention and control measures to be employed regarding accidental and/or unauthorized discharges or emissions, relating such information to specific facilities, including but not limited to locations, amounts, storage duration, mode of handling, and transport. The application shall describe in general detail the content of a Construction Phase and an Operational Phase Spill Prevention, Control and Countermeasure Plan (chapter 40 C.F.R. Part 112 and Hazardous Waste Management Plan) that will be required prior to commencement of construction.

2.10.1 Construction Phase Spill Prevention, Control, and Countermeasure Plan

This section describes measures that would be taken to prevent and mitigate any accidental spills or discharges. A detailed construction Spill Prevention, Control, and Countermeasure (SPCC) Plan would be developed by TUUSSO's engineering, procurement, and construction (EPC) contractor and submitted to EFSEC for review prior to construction. EFSEC, as well as pertinent local emergency response organizations, where appropriate, would review and approve all plans before they are implemented. The plan would address prevention and clean-up of any potential spills from construction activities.

Petroleum fuels are the only potentially hazardous materials that would be used in any significant quantity during construction of the Columbia Solar Projects. Construction of the projects would require the use of diesel fuel for operating construction equipment and vehicles. Measures to prevent and contain any accidental spills resulting from this fuel storage and use are described in detail below in Construction Spill Prevention, below. Construction of the projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law.

2.10.1.1 Construction Spill Prevention

Fuel and lubricating oils from construction vehicles and equipment and, if the transformers used are not dry-type, then the mineral oil used to fill the transformers are the only potential sources for a spill. The EPC contractor would be responsible for training its personnel in spill prevention and control and, if an incident occurs, would be responsible for containment and cleanup.

2.10.1.2 Fuel Spill Prevention

During construction, the EPC contractor would utilize fuel trucks for refueling of construction vehicles, fuel storage tanks and equipment on site. The fuel trucks would be properly licensed and would incorporate features in equipment and operation, such as automatic shut-off devices, to prevent accidental spills. Some construction vehicles, such as pickup trucks, would be fueled in town at gas stations. Any spills would be addressed in accordance with the Construction Spill Prevention Plan that would be developed by the EPC contractor and would be submitted to EFSEC for review and approval prior to construction.

Potential risks would be additionally mitigated by using dedicated fuel-delivery trucks driven by professional, appropriately licensed drivers and by ensuring adherence to site speed limits. No other equipment fueling plan is anticipated. A fuel tanker accident would trigger activation of the SPCC Plan. The SPCC Plan would include a description of procedures that would be followed in the event of a fuel tanker spill and would contain a list of equipment that would be on-site for spill response emergencies.

2.10.1.3 Lubricating Oils

Lubricating oils used during construction would mostly be contained in the vehicles and equipment for which they are used. Small quantities of lubricating oils may also be stored in appropriate containers at the construction staging area. The details of storage and containment of lubricating oils and other materials at the construction staging area would be addressed in the construction-phase SPCC Plan, which would be developed by the EPC contractor and submitted to EFSEC prior to construction for review and approval. Appropriate measures would be taken to ensure these materials are not spilled and that if a spill does occur, it is promptly cleaned up and reported to the proper agencies.

2.10.1.4 Transformer Mineral Oil

The pad-mounted transformers found throughout each of the five Columbia Solar Project sites would likely be filled with mineral oil at the factory and not at the site during construction. Appropriate measures would be taken to ensure these materials are not spilled and that if a spill does occur, it is promptly cleaned up and reported to the proper agencies.

2.10.2 Operational Phase Spill Prevention, Control, and Countermeasure Plan

An operational-phase SPCC Plan would be developed and submitted to EFSEC prior to the commencement of Columbia Solar Project operations. Operation of the projects would not require the storage or use of significant quantities of fuel or other materials that could cause a spill or other accidental release.

Columbia Solar Project operations would not require the use of a permanent fuel storage tank, as fuel use during operations is limited to maintenance vehicle fueling, which would be done at existing licensed gas stations in nearby communities. The potential for accidental spills during operations is minimal, as the sole source of potential spills on-site would be the small amounts of mineral oil contained within the pad-mounted transformers. The transformers are designed to meet stringent electrical industry standards, including containment tank welding and corrosion protection specifications.

2.11 Surface-Water Runoff 463-60-215

The application shall describe how surface-water runoff and erosion are to be controlled during construction and operation to assure compliance with state water quality standards. The application shall describe in general detail the content of the construction and operational storm water pollution prevention plans that will be prepared prior to commencement of construction and/or operation of the facility.

2.11.1 Short-term Construction

Construction of the five Columbia Solar Projects has the potential to generate water pollutants during the construction phase unless best management practices (BMPs) are implemented. Stormwater runoff from the solar project sites could contain pollutants such as soils and sediments that are released during grading activities, as well as chemical and petroleum-related pollutants due to spills or leaks from heavy equipment and machinery. Other common pollutants that may result from construction activities include solid or liquid chemical spills; concrete and related cutting or curing residues; wastes from paints, sealants, solvents, detergents, glues, acids, lime, plaster, and cleaning agents; and heavy metals from equipment.

Hazardous materials (such as fuels, solvents, and coatings, among others) associated with the Columbia Solar Project construction activities would be stored and used in accordance with the manufacturer's specifications and applicable hazardous material regulations. In addition, spill kits would be required for all construction equipment in order to immediately manage any spills from fueling or equipment breakdown. However, soil disturbances (from construction activities associated with the limited site grading, mounting of the solar panels, equipment installation, electrical conduit trenching, and scraping for the all-weather access roads) could cause soil erosion and the eventual release of sediment into stormwater runoff.

The National Pollutant Discharge Elimination System (NPDES) permit program was established to control water pollution by regulating point sources that discharge pollutants into "Waters of the U.S." Pursuant to Clean Water Act (CWA) Section 402(p), which requires regulations for permitting of certain stormwater discharges, Ecology has issued the statewide NPDES General Permit for Stormwater Discharges Associated with the Construction and Land Disturbance Activities.

Under this Construction General Permit, individual NPDES permits or Construction General Permit coverage must be obtained for discharges of stormwater from construction sites with a disturbed area of 1 or more acres, and those undertaking construction are required to either obtain individual NPDES permits for stormwater discharges or be covered by the Construction General Permit.

Coverage under the Construction General Permit is accomplished by completing and filing a Permit Registration Document (PRD) with Ecology prior to commencement of construction activities. The PRD consists of a Notice of Intent (NOI); a Risk Assessment; a site map; a Stormwater Pollution Prevention Plan (SWPPP); an annual fee; and a signed certification statement. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction. Encompass Engineering & Surveying has prepared a preliminary SWPPP for the Columbia Solar Projects, but this has not yet been approved by Ecology. A copy of the preliminary SWPPP is included in the materials submitted with this ASC.

The preliminary SWPPP describes a number of BMPs to assure compliance with state water quality standards, including the following:

- Preserving natural vegetation.
- Establishing buffer zones to protect existing wetlands and to relieve potential downstream impacts.
- Providing a single, stabilized construction entrance to prevent soil and sediment from tracking off the site.
- Controlling flow rates leaving the site via full on-site dispersion.
- Installing a silt fence at all areas downslope of disturbed areas, and upslope of existing waterbodies.
- Stabilizing soils when necessary, including the use of plastic covering to protect soil stockpiles.
- If necessary, utilizing a wheel wash at the site exit if sediment may be tracked off-site.

The installed BMPs would be visually monitored at least once per week, and within 24 hours of any stormwater or non-stormwater discharge from the site. Turbidity sampling would also be required at least once per week as applicable to ensure that the Columbia Solar Projects do not exceed 25 nephelometric turbidity units and a transparency of less than 33 cm.

Obtaining coverage under, and ensuring compliance with, the Construction General Permit requirements (including implementation of appropriate BMPs and consistent record keeping of the SWPPP) would ensure that temporary water quality impacts associated with construction activities would not cause any significant downstream or off-site impacts.

2.11.2 Long-term Operation

Operation of the five proposed Columbia Solar Projects would include infrequent site visits for inspection and maintenance. Maintenance activities would include washing the PV panels to remove accumulated airborne dust and debris using a truck with a water tank and sprayer, and mowing or otherwise managing the native vegetation to maintain buffers around the site and vegetation height within the site. Panel washing would occur between one and four times per year, depending on the accumulation of dust on the surfaces of the panels, and vegetation management would occur at a similar frequency based on rainfall and yearly plant growth.

Table 2.11-1 presents a summary of typical pollutants associated with commercial developments and their likelihood of being generated at the project site. As shown, due to annual maintenance activities, pollutants such as pesticides, trash, and oil/grease are anticipated to be generated from project implementation. However, because the project site would be an unmanned site and would only be subject to maintenance a couple of times per year, the potential for pollutants would be greatly reduced when compared to a typical commercial or industrial land use.

As shown in Table 2.11-1, no Columbia Solar Projects–generated pollutants are expected to impact downstream receiving waters, and project flows would not discharge to any receiving waterbody that is listed for water quality impairment.

As the five Columbia Solar Projects would not generate any pollutants of concern, impacts would be less than significant. However, BMPs are incorporated into the project to address water quality impacts on site and at downstream receiving waters. The five proposed solar projects would include vegetation throughout the sites such that full dispersion and infiltration would treat and control the runoff for the area within the panel arrays.

Other water quality BMPs include: 1) protecting slopes and channels through the preservation of existing site drainage patterns; 2) the absence of chemical storage and pollution generating surfaces on-site; 3) maintaining BMPs regularly, including annual inspections of the entire site and maintenance of inspection records; 4) regular maintenance of any bare soil or gravel surfaces, such as the all-weather access roads, to ensure that they are properly stabilized; and 5) training for Columbia Solar Projects operators and contractors, and the provision of educational materials for project personnel, regarding housekeeping practices that prevent pollutant loading in on-site runoff and BMP maintenance.

Table 2.11-1. Potential Columbia Solar Project Pollutants

Associated Project Pollutants			Is a Pollutant?	
Pollutants	**Status**	**Notes**	**303(d) listed***	**Total Maximum Daily Load**
Sediment/Turbidity	Potential	Open areas	No	No
Nutrients	Potential	Open areas	No	No
Organic Compounds	Expected	Pesticides and hydrocarbons	No	No
Trash and Debris	Potential	Windblown litter	No	No
Oxygen Demanding Substances	Potential	Open areas	No	No
Bacteria and Viruses	No	No paved parking areas	No	No
Oil and Grease	Potential	Petroleum hydrocarbons	No	No
Pesticides	Potential	Open areas	No	No
Metals	No	Materials at the site are designed to be exposed to the elements	No	No

*Under Section 303(d) of the Clean Water Act, states are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by states, territories, or authorized Tribes. The law requires that states establish priority rankings for waters on the lists and calculate the Total Maximum Daily Load (TMDL) for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

Further, any cleaning agents or additives used to clean the PV panels would be biodegradable, non-toxic, and non-hazardous to plants, animals, and groundwater. Therefore, the use of water to clean the PV panels would have a less than significant impact on surface water and groundwater quality.

2.12 Emission Control 463-60-225

(1) The application shall describe and quantify all construction and operational air emissions subject to regulation by local, state or federal agencies.

Construction emissions for each of the proposed Solar Projects have been quantified and shown in Section 3.2.6.1 of this application. The proposed Columbia Solar Projects are PV facilities and would not be a source of any air emissions during operation.

(2) The application shall identify all construction and operational air emissions that are exempt from local, state and federal regulation, and the regulatory basis for the exemption.

Per WAC 173-400-110 a notice of construction application must be submitted for new and stationary sources of air emissions. WAC 173-400-110(4) exempts certain emission units and activities from new source review and the filing of a notice of construction application. Construction activities that do not result in new or modified stationary sources or portable stationary sources are one of the exemptions (WAC 173-400-110[4][x]). The five proposed Columbia Solar Projects would only have minimal dust and vehicular air emissions during construction, and no air emissions during operation. Thus, the Columbia Solar Projects would not result in new sources of air emissions. Per WAC 173-400-110(4)(x), the Columbia Solar Projects are exempt from new source review and filing a notice of construction application.

Once operational, the five proposed Columbia Solar Projects would not be a source of air emissions. Therefore, the projects would not be subject to air emission regulations. There would not be any applicable air emission regulations to be exempted from.

(3) The applicant shall demonstrate that the highest and best practicable treatment for control of emissions will be utilized in facility construction and operation.

Once operational, the five proposed Columbia Solar Projects would not be a source of air emissions. Construction emissions would be temporary and transient in nature. Dust from access roads would be controlled by applying gravel or watering, as necessary.

(4) The application shall identify all state and federal air emission permits that would be required after approval of the site certification agreement by the governor, and the timeline for submittal of the appropriate applications for such permits.

The five proposed Columbia Solar Projects would be PV facilities and would not be a source of air emissions. No further air emission permits would be required for the Columbia Solar Projects after approval of the site certification agreement.

(5) In the case of fossil-fuel fired energy plants, the application shall describe and quantify all emissions of greenhouse gases.

Because TUUSSO is proposing the five Columbia Solar Projects, and not a fossil-fueled plant, this requirement does not apply.

(6) In the case of a nuclear-fueled plant, the applicant shall address optional plant designs as these may relate to gaseous emissions.

Because TUUSSO is proposing the five Columbia Solar Projects, and not a nuclear-fueled plant, this requirement does not apply.

2.13 Carbon Dioxide Mitigation 463-60-230

For thermal electric energy facilities, the application shall include a carbon dioxide mitigation plan and information required by chapter 463-80 WAC.

Because TUUSSO is proposing the five Columbia Solar Projects, which are PV facilities without carbon dioxide emissions, not thermal electric energy facilities, WAC 463-80 does not apply to the proposed projects. The Columbia Solar Projects would not be a source of carbon dioxide (CO_2) emissions and thus would not have any CO_2 emissions to mitigate.

2.14 Greenhouse Gases Emissions Performance Standards 463-60-232

For baseload electric generating facilities, the application shall provide information required by, and describe how the requirements of chapter 463-85 WAC will be met.

As these five Columbia Solar Projects are PV facilities, not baseload electric generating facilities, WAC 463-85 is not applicable to the projects. The operation of Columbia Solar Projects would not emit any greenhouse gases. However, it is notable that the implementation of the projects would result in a net regional and global reduction of greenhouse gas (GHG) emissions compared with the existing conditions.

2.15 Construction and Operation Activities 463-60-235

The application shall: Provide the proposed construction schedule, identify the major milestones, and describe activity levels versus time in terms of craft and noncraft employment; and describe the proposed operational employment levels.

2.15.1 *Project Phases and Schedule*

Construction of the five Columbia Solar Projects is anticipated to commence in second quarter 2018 and would require approximately 6 to 9 months to complete. For each project, approximately 3 months of actual construction time would be needed. However, when possible, specialized work crews would be moved from site to site to efficiently move through and manage the phases of construction on each project. Table 2.15-1 provides the proposed schedule for the projects' construction. While the schedule may be modified due to the date of EFSEC's approval as well as other approvals/permits, this table illustrates the approximate duration of major project activities. Construction activities would occur between the hours of 7:00 a.m. and 10:00 p.m., Monday through Saturday.

Table 2.15-1. Columbia Solar Projects Construction Schedule

Project Activity	Schedule
Approval of all other required non-discretionary permits	1st quarter 2018
Approval of all administrative permits	1st quarter 2018
Approved Site Certification Agreements	March 2018
Construction begins	2nd quarter 2018
Completion of construction	4th quarter 2018
Projects operational	4th quarter 2018

Project construction would include several phases occurring simultaneously across the five Columbia Solar Project sites, including:

1. the grading and construction of a temporary gravel construction entrance/exit at the entry gates of each site;
2. the installation of silt fencing;
3. the pile driving of piers or posts, and the placement of trackers on support piers;

4. the trenching and installation of the DC and AC collection system, including the installation of the inverter enclosures;
5. the installation of the PV panels;
6. the construction of electrical interconnection facilities, including the construction of the interconnection and generation tie lines;
7. the mowing, application of herbicide treatment, discing/tilling, and planting of native plant species on the sites, as well as the planting of landscaping species (e.g., trees and bushes along certain boundaries of the sites); and
8. the grading, compaction, and placement of gravel (as necessary) for all-weather access roads.

2.15.2 *Construction Workforce and Workspace*

Construction of the five Columbia Solar Projects would employ up to 100 workers per day during the peak construction period, with roughly 80% non-craft laborers and 20% craft mix laborers. Based on prior experience, approximately 80% of the workers would be local hires. For each site, the projects would host up to 50 workers per day during the peak construction period.

Vehicular trip generation for employees and delivery trucks would vary depending on the phase of construction. It is estimated that a total of approximately 1,500 trips would be made to each site during the 3-month construction period, with conservatively 25% of those trips made by heavy trucks. Thus, on average, approximately 25 trips per site per day would be generated during construction. During the peak of construction, a typical day would include the transportation of workers, movement of heavy equipment, and transportation of materials.

Construction staging and material lay-down areas would be set up for each section of each Columbia Solar Project site, to allow for efficient distribution of components to different parts of each project site. These lay-down areas would be temporarily fenced and would cover approximately 1.5 acres each within the project boundaries.

2.15.3 *Site Preparation and Grading Activities*

Construction of the five Columbia Solar Projects would involve:

- limited clearing and grubbing of the existing vegetation for construction;
- limited grading, if necessary, for the construction of all-weather access roads and the installation and operation of the PV system;
- trenching for the electrical DC and AC collection system, including the telecommunication lines;
- installation of the inverter enclosures and associated transformers;
- construction of an underground 12.47-kV line for each collection system leading to each project switchyard;
- installation of the interconnection equipment; and
- for the Typha and Fumaria Solar Projects, installation of the generation tie lines.

It is anticipated that there would be no import or export of soils for the projects. To prepare each of the five Columbia Solar Project sites, temporary gravel construction entrance/exits at the entry gates of each site would be constructed, and silt fencing would be installed (as illustrated in the respective site layouts).

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, soil compaction, and for dust control on access roads. In addition, non-toxic soil binding agents may be employed to help with soil stabilization during construction. Water may be trucked in from municipal water sources or may be supplied on-site based on existing water allocations.

2.15.4 Ongoing Operations and Maintenance

2.15.4.1 Operations Workforce

The workforce performing ongoing O&M would be relatively small and would typically be off-site. The workforce would consist of general labor for cleaning purposes, skilled electricians for visual inspections and performance testing, and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. Because the facilities would be monitored remotely in real time, as described in detail below, it is anticipated that four to five O&M personnel would make roughly two to three visits per year to each of the five Columbia Solar Project sites to conduct the on-site O&M functions.

Other than O&M, general landscape labor would perform vegetation maintenance based on the weather and vegetation growth, to maintain ground cover and remove unwanted vegetation.

Skilled O&M personnel would review the information provided by the SCADA system. In addition, if a fault or an error occurs, an automatically generated email would be sent to monitoring personnel to alert them. The monitoring personnel would assess the fault or error information to determine what corrective actions would be needed. In most cases with PV systems, the fault is auto-correctable and does not require reactive repair at the site.

2.15.4.2 Facility Maintenance

PV facilities contain very few moving parts and have limited ongoing maintenance requirements. Maintenance activities would consist of checking electrical performance parameters via remote monitoring, performing periodic inspections and maintenance of transformers and inverters, responding to any problems detected by remote monitoring, conducting weed abatement, mowing vegetation cover, performing dust control activities, cleaning PV panels, and maintaining all-weather access roads. Water would be used for cleaning PV panels and controlling dust as well as to establish landscaping (both for the trees and shrubs, forming a visual buffer along the boundaries of some of the sites, and the native vegetation cover) during the first 3 years, but no water would be used by the facility for the production of electricity. No major equipment is anticipated to be required for maintenance of the facility except as necessary for maintenance of the all-weather access roads.

2.15.4.3 Site Security

Site security could be provided by fencing, monitoring cameras, and security staff, who may periodically drive along the site perimeter security fence. As mentioned above, lighting would also be installed around the perimeter of each of the five Columbia Solar Project sites to deter criminal activities.

2.15.4.4 Dust Control

The facilities would be constructed within the existing contours and topography of the land. For those limited areas that are cleared and grubbed, water trucks would be employed to keep dust to a minimum. As the roads are compacted for construction, soil binding agents and/or aggregate would be laid down to control the dust. After construction is complete, interior roads other than the all-weather access roads would be plowed and re-seeded with a native, low-lying seed mix that requires little maintenance and would help control dust.

2.16 Construction Management 463-60-245

The application shall describe the organizational structure including the management of project quality and environmental functions.

For the construction of the five proposed Columbia Solar Projects TUUSSO plans to utilize a standard turnkey EPC contract structure, which would cover construction of all generating facilities and any necessary civil infrastructure and interconnection such as the all-weather access roads, project switchyards, etc. TUUSSO or the primary financial sponsor would act as the owner in the EPC contract, with construction oversight responsibilities. As part of the EPC contract, the contractor would be required to design and implement a safety plan, a quality assurance/quality control (QA/QC) plan, and an environmental protection plan, including a SWPPP and any erosion control measures.

2.16.1 Construction Management and Organizational Structure

The detailed Columbia Solar Projects management organizational structure would be decided by the final EPC contractor, but would typically include three primary management structures on the contractor side: management of engineering and design, management of supply chain and logistics, and construction project management (Figure 2.16.-1).

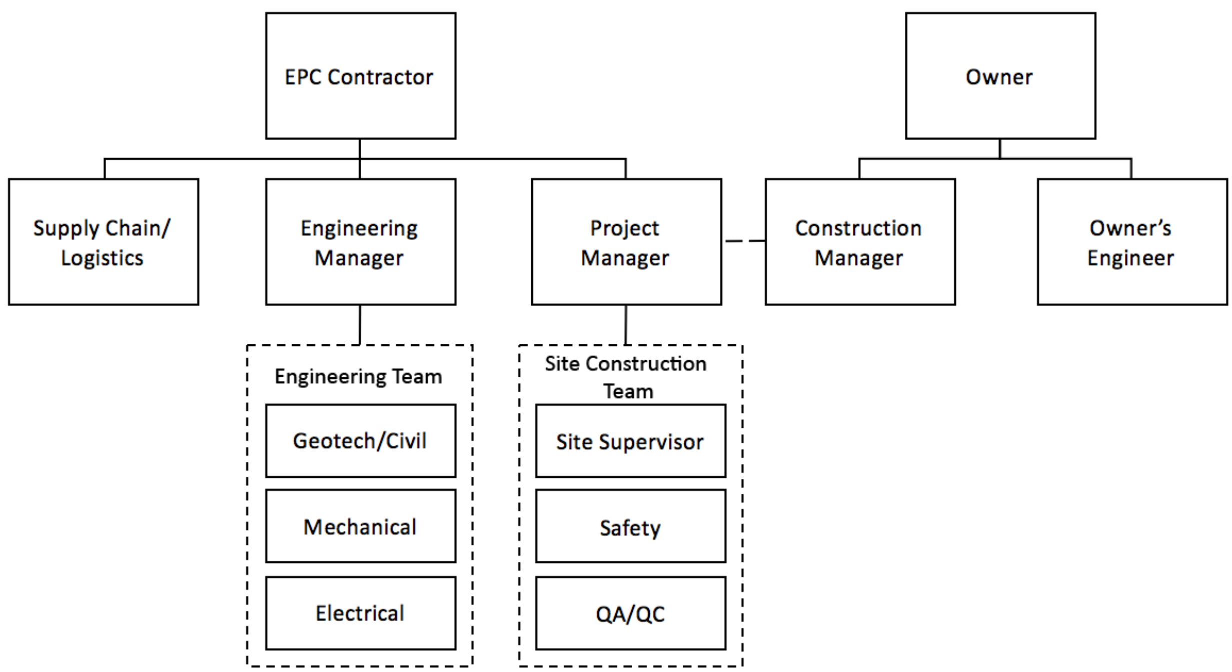


Figure 2.16-1. Columbia Solar Projects management structures.

The engineering and design team is responsible for selecting the generating equipment, the detailed plant design, and construction specifications for QA/QC of the various portions of the Columbia Solar Projects.

The engineering team, in conjunction with the supply chain team, would review proposals from multiple suppliers for key equipment such as panels, trackers, and inverters to ensure that the equipment selected is best suited for the site and project performance goals. The engineering team also would ensure that the detailed design would meet the required codes and standards applicable to each project.

The supply chain team would ensure that the procurement and delivery of key generating equipment and construction equipment to each project site are on time and within the project budget.

Finally, the project manager would be responsible for planning and executing all aspects of field activities, including scheduling and staffing of site work, safety, and field QA/QC. The project manager would also be responsible for specification and procurement of any construction equipment required on-site. As part of their overall responsibilities, the project manager would manage any required construction subcontractors including civil subcontractors involved in site preparation, interior roads, and post installation; any mechanical subcontractors working on trackers and other moving parts; and any electrical subcontractors required for the DC/AC installation and commissioning. The project manager would be assisted by a site supervisor or foreman, a safety manager, and a QA/QC team that would work together to ensure that the work is performed safely to the design specifications and conforms to best industry practices.

On the owner’s side, the construction manager would act as the primary liaison with the EPC project manager to ensure schedule and other performance metrics meet targets. The construction manager would be assisted by the owner’s engineer, who would provide independent verification in conjunction with the Columbia Solar Projects’ field QA/QC team.

While this organizational structure represents a typical structure for solar power plant construction, the exact organization may change after award of the EPC contract and other subcontracts.

2.16.2 Quality Assurance/Quality Control

A QA/QC Plan would be implemented and maintained during the duration of the five Columbia Solar Projects, to ensure that the construction and commissioning of each plant is completed as specified. QA/QC inspections would typically include, but not be limited to, the following checks and review:

Supplier QA/QC

- Review and inspection of third party test verification reports for panels and inverters
- Review and inspection of manufacturer’s QA/QC procedures for International Organization for Standardization (ISO) compliance
- Review of logistics procedures and handling

Field QA/QC

- Review of equipment and material delivery acceptance inspection procedures
- Inspection of post galvanization finishing and protection
- Overall visual inspection (including assembly, fastening systems, and any welding)
- Field verification of road locations compared to site plan and survey markings
- Review of clearing and grubbing and compaction process
- Verification of road materials and compaction
- Field verification of concrete pouring and concrete testing
- Field verification of post locations and heights compared to site plan and relative to survey markings
- Verification of all mechanical assembly work for trackers and racking

- Verification of field wiring and tagging
- Inspection of cables and trenches prior to burial and backfilling
- Witness of proper backfilling procedures
- Inspection of terminations and termination hardware
- Verification of polarity, cable marking, grounding system tests
- Witness and/or review of all electrical tests

Safety QA/QC

- Review of safety procedures
- Observation and attendance of safety training for supervisors and field staff including daily safety debriefings
- Review of construction safety techniques and implementation

The owner's engineer would work directly with the QA/QC team on site to ensure that the QA/QC plan is implemented and maintained satisfactorily.

2.16.3 Environmental Protection

An Environmental Protection and Compliance Program would be developed by the EPC contractors to ensure that all construction activities meet the conditions, limits, and specifications set in environmental standards established in the Site Certification Agreement and all other federal, state and local environmental regulations. The Environmental Protection and Compliance Program would cover avoidance of wetlands, and any other sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by state and county regulation. Copies of the plan and all applicable construction permits would be kept on-site. The project manager would be responsible for ensuring that all the requirements in the Environmental Protection and Compliance Plan and the construction permits are adhered to, and that any deficiencies are promptly corrected.

2.17 Construction Methodology 463-60-255

The application shall describe in detail the construction procedures, including major equipment, proposed for any construction activity within watercourses, wetlands and other sensitive areas.

Table 2.17-1 lists the typical construction equipment commonly associated with the construction of solar facilities.

Table 2.17-1. Construction Equipment

Type of Equipment	Construction Use
Heavy Vehicles	
Boom Truck/Truck Mounted Crane	Moving materials
Bore/Drill Rigs	Drilling holes into the ground
Concrete Mixing Trucks	Delivering concrete used for any slabs and foundations
Dump Trucks	Delivering and spreading aggregates
Excavators	Trenching and foundations
Graders	Access road and driveway leveling
Paving Equipment	Paving, if required
Pile/Vibratory Drivers	Driving structure posts

Type of Equipment	Construction Use
Rollers	Compacting access roads and driveways
Semi-Tractor Trailers	Moving materials and equipment
Non-heavy Vehicles	
Forklifts	Moving materials, loading and unloading of trucks
Personnel transport vehicles	Transporting workers
Other Material Handling Equipment	Moving materials
Service Trucks	Maintaining heavy equipment
Skid Steer Loaders	Light soil work for slabs and foundations
Sweepers/Scrubbers	Dust control on paved areas
Tractors/Loaders/Backhoes	Clearing and grubbing and moving soil
Trenchers	Light trench work
Water Trucks	Dust control
Other Equipment	
Disposal Containers	Disposing of and removing construction debris
Other General Industrial Equipment	Assembling structures
Plate Compactors/Jumping Jacks	Compacting soil under concrete slabs and foundations
Pressure Washers	Cleaning
Storage Containers	Storing on-site materials
Welders	Assembling structures

Construction of each project would be undertaken in accordance with all state and local authority having jurisdiction (AHJ) requirements and civil, electrical, mechanical codes and standards as applicable. Construction procedures would utilize industry best practices for low-impact construction and would be carried out in conjunction with a safety plan, a QA/QC plan, and a comprehensive environmental protection plan, as described in Section 2.16.3. The major steps in construction and associated procedures are outlined in the following sections.

2.17.1 Pre-construction and Site Preparation Including Revegetation Activities

Prior to start of construction, pre-construction activities would be undertaken, including detailed project management and scheduling, crew sizing, and recruitment plans, construction equipment procurement, in parallel with administrative permitting. Following administrative permits, preliminary site preparation activities would also be completed at that time. This would include any utility locates, demarcation of staging areas, local temporary construction office installation, and commencement of site revegetation activities in accordance with the Revegetation Plan. The site would be mowed, grubbed as necessary, and any weed control measures would be started at that time.

2.17.2 Grade and Install Construction Entrance and Fencing

The sites for the five Columbia Solar Projects are relatively flat, and there are no grades within the design areas that exceed solar racking longitudinal or cross-slope mechanical tolerances. In addition, the existing hydrological flows on-site would not be altered for any drainage or stormwater management, and as a result, overall grading would be restricted to that which may be required for the site entrance and all-weather access roads. Motor graders with typical blade lengths of 12 feet would be used to level the entrance area off the roadway, as per the design, and maintain the slope within design parameters. The entrance area soil would be stabilized, including potential use of binders, geotextiles, and mats, overlaid with aggregate and compacted using equipment such as vibratory rollers and soil compactors. Native soils would be utilized for the minimal fill that may be required, and no export of topsoil is anticipated. Fencing would be installed around the perimeter of the sites, as per the design for each project.

At that time, the temporary laydown area would also be demarcated, grubbed, and stabilized with erosion control measures as necessary.

2.17.3 Install SWPPP Measures Including Perimeter Protection

Interior perimeter protection (including silt fencing, sandbags, straw bales or other BMPs) would then be installed as per the SWPPP and Temporary Erosion and Sediment Control (TESC) Plan. Any existing storm drains and culverts would be inspected for clear flows and brought up to maintenance standards.

2.17.4 Install Interior All-weather Access Roads

Interior all-weather access roads would be located and demarcated, as per the design, utilizing standard surveying equipment. The road areas would be graded using a motor grader or similar, then stabilized and compacted using vibratory rollers and plate compactors. If necessary, these all-weather access roads might be overlaid with aggregate and then compacted. No export of topsoil is anticipated, as per the design.

2.17.5 Layout Arrays, Combiner Box, Trenching, and Inverter Locations

Pier locations would be identified and demarcated using string lines, as per the array design, using standard laser surveying equipment and site boundary survey reference points. Pier locations are further identified as corners, motor mounts, and interior piers as per the design, as these are structurally distinct from each other. At this time, the detailed DC collection system path, combiner box locations, inverter pad locations, AC collection system routing, and interconnection point would be established and demarcated. Inverter locations include the appropriate clearances and setbacks that provide for safety as per code and provide for adequate inverter pad access during installation and maintenance.

2.17.6 Install Piles

Using flatbed trucks, boom trucks, and forklifts, the wide-channel, galvanized-steel piles for the arrays would be transported to the pier locations and laid out for the civil crew who would drive them into the ground to support the trackers. Using laser beacons and global positioning system (GPS)-enabled vibratory pile drivers in conjunction with previously demarcated pier locations, piles would be driven into the ground within mechanical tolerance requirements. The pile drivers are specifically designed for solar array construction and consist of a high frequency vibratory hammer that operates at around 1,500 beats per minute, with plumb line and pile height controls. Typically, a crew of two to three people operate a single pile driver, driving in a post every 1 to 2 minutes with 3- to 5-minute transitions between locations. Grounding of panels is achieved through the piles via the tracking mechanism.

2.17.7 Install Trackers

The parts for the tracker cross-beams, which support the panels and are also referred to as the torque tubes, would be transported to the array locations by flatbed trucks, boom trucks, and forklifts. These torque tube sub-assemblies would be lifted onto the installed supporting piles and connected to the piles using bracket-mounted bearings, torsional limiters, and tracking actuators, which consist of DC motors with slew gear assemblies. Trackers would typically then be field assembled by three- to five-person crews utilizing specialty tools, allowing for rapid installation. The wireless mesh tracker control systems would then be installed at the center drive posts, with an ability to measure inclination and use that to control position in accordance with tracking algorithms.

2.17.8 Install Panels and Complete Racking

Galvanized steel and aluminum tubes and purlins are used for attaching the modules to trackers. These components would be transported to the assembled trackers, and attached using bolts and specifically designed brackets. Modules would then be transported to the trackers for installation on the purlins and mounting rails. Modules are attached to the rails and purlins using specialized fasteners and clamps, such as pressure mounting clips, that also provide ability for grounding. The modules typically have junction boxes with multi-contact connectors for the DC collection system.

2.17.9 Trenching for AC and DC Cabling

Trenches for the DC cabling would be dug from the array combiner box locations to the inverter pads using excavators and trenchers. Trenches for the AC collection system would also be dug from the inverter pad locations to the plant switchgear and POI. Trench sizes are typically determined by electrical code requirements for the type and size of cabling to be buried. Trenches may contain circuits of different systems as long as proper separation is maintained. Trenching would be performed in a manner that minimizes impact to the surrounding area, and the area surrounding open trenches during the installation would be identified and protected as required for safety.

Cables would be installed in the finished trenches. Cabling would be supplied to the site in spools, either as cable in conduit or base cable. Spools are typically transported to the trenches using special mounting structures on trucks or tractors and cables are pulled into trenches by the electrical crew. All buried cables would be in metal sheath, polyvinyl chloride (PVC), or similar conduit, or are direct buried, with appropriate rating and environmental protection as per code and best practices. Minimum AC and DC collector system cover depth throughout the entire project site would be in accordance with acceptable solar energy standards, the National Electrical Code (NEC), and the state and local AHJ requirements.

Completed cabling would then be tested and carefully identified and marked during all phases of construction. The area of the trench and surrounding area would be cleaned up and restored to its prior condition as soon as cable installation and trenching were completed.

2.17.10 Install Medium Voltage DC Collection System

Electrical crews would install the combiner boxes and the medium voltage DC collection system cables from the combiners to the inverter pad. Combiner boxes include DC disconnectors that are left open to enable safe connection of the modules. The electrical crews would then complete string assembly of the panels in series using ultraviolet (UV)-rated wiring and connectors, and combine the strings in parallel at the combiner boxes to complete the medium voltage DC system.

2.17.11 Install Inverters

Inverters are typically either fully assembled with the transformers and skid-mounted off-site for delivery via flatbed or assembled on-site onto poured concrete slab foundations. If the latter method is used, then slabs, often steel reinforced, would be designed, taking into account inverter mounting and cabling conduit requirements, appropriate load bearing capacity, and plant lifetime. Areas around the slab foundation would be stabilized and compacted. Excavators and graders would be used to create the appropriate foundation trench with cabling entry and exit points. Concrete mixers would be driven to the inverter locations, and the concrete pads would be poured and cured over the required time.

The inverters and transformers would then be delivered to the pad locations on pallets using flatbed trucks. Various lifting methods would be used to move the equipment onto the mounting structures on the pads, including forklifts, truck-mounted cranes, and crane forks. Electrical crews would then terminate the MV DC collection system at the inverters, and connect the inverters and transformer sub-assemblies.

2.17.12 Install AC Collection System

The AC cabling, typically aluminum cable, would be installed, with transformers from multiple inverter pads connected in series and terminating at the pad-mounted circuit breaker and pad-mounted recloser of the interconnection switchyard. Cabling would be tested again for continuity and conformance to design parameters. This would complete the installation of the AC collection system.

2.17.13 Construction of Interconnection Facilities

A small area at the POI would be used for the interconnection facilities. This area would be graded using excavators and graders, and foundation trenches dug, with cabling entry and exit points for any pad-mounted equipment. The pad-mounted equipment, such as circuit breakers, reclosers, relays, etc., would be brought to the location using flatbeds and lifted into place using boom trucks, truck-mounted cranes, or similar equipment. The AC collection system termination would then complete the customer side of the interconnection. The wood monopole(s) required for connection to the utility lines would be transported to the POI using a flatbed truck and installed using auger drills, boom trucks, and truck-mounted cranes.

2.17.14 Site Restoration

At the completion of construction, following successful testing and before final plant commissioning, areas requiring any intensive restoration and remediation would be identified. These might include areas such as the laydown area that have experienced unexpected erosion from traffic or vegetation that has been disturbed by construction equipment or on-site stored generating equipment pallets. Any such areas would be restored to pre-construction levels using any fill or revegetation as may be required.

2.18 Protection from Natural Hazards 463-60-265

The application shall describe the means to be employed for protection of the facility from earthquakes, volcanic eruption, flood, tsunami, storms, avalanche or landslides, and other major natural disruptive occurrences.

The five Columbia Solar Project sites are not subject to any significant risk of avalanche, tsunami, landslides, or flood. The size, mounting depth, and other characteristics of the mounting structures would meet the American Society of Civil Engineers (ASCE) requirements for general structural design for wind, snow, rain, atmospheric ice, and earthquake loads, as well as combinations thereof. The requirements are based on site-specific conditions and would be adhered to in the final detailed design of the mounting structures.

2.18.1 Earthquakes

The 2015 International Building Code recognizes the ASCE for seismic site class definitions. In accordance with Table 20.3-1 of the *ASCE Minimum Design Loads for Building and Other Structures manual*, Site Class D would be used by TUUSSO for the design of the five Columbia Solar Projects.

Based on the soil conditions discovered during geotechnical analyses, the five Columbia Solar Project sites have very low susceptibility to liquefaction.

2.18.2 Volcanic Eruption, Tsunami, Avalanches, or Landslides

TUUSSO has not taken any special precautions to protect the facilities from these potential disasters. However, the facilities would be built to meet building codes and would be appropriately insured.

2.18.3 Floods/Storm Events

Portions of the Camas, Typha, and Urtica Solar Project sites would be located within 100-year flood hazard areas, as determined by the Federal Emergency Management Agency (FEMA). The FEMA flood hazard is categorized as a Zone “A,” meaning this area is subject to a 1% annual chance flood, also known as a 100-year storm event. The flood hazard areas are shown in the site layouts for each of these projects (Appendix L).

To protect the five Columbia Solar Projects from flood impacts, TUUSSO would not locate any of the inverter pads within these flood zones, and would raise the perimeter fence 6 to 12 inches above grade to prevent a build-up of debris along the fence lines during a flooding event.

2.19 Security Concerns 463-60-275

The application shall describe the means employed for protection of the facility from sabotage, terrorism, vandalism and other security threats.

2.19.1 Fencing

The five proposed Columbia Solar Project sites would be secured using 6- to 8-foot-high, perimeter, chain-link fencing topped by razor wire surrounding the PV system and switchyard. The entrance gates for each of the solar sites would be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access. “Warning High Voltage” signs would be placed on the fencing at about 100-foot intervals and at each gate.

2.19.2 Lighting/Cameras

Lighting would be installed on metal poles, up to 20 feet tall, located around the periphery of each of the five Columbia Solar Project sites, as well as at the inverter pads, as required for nighttime security purposes. Lighting would consist of modern, low-intensity, downward-shielded fixtures that are motion activated, and would be directed onto the immediate site. For each site, between five and 10 lights would be installed and fed by direct buried underground electrical supply lines. Security cameras may also be installed by TUUSSO on those same lighting poles.

2.20 Study Schedules 463-60-285

The application shall furnish a brief description of all present or projected schedules for additional environmental studies. The studies descriptions should outline their scope and indicate projected completion dates.

2.20.1 Natural Resources Site Visits with the Washington Department of Fish and Wildlife (April 12, 2017)

On April 12, 2017, SWCA Environmental Consultants (SWCA) conducted site visits of all five proposed Columbia Solar Project sites with Scott Downes and Brent Renfrow, WDFW staff, to review the natural resources on each site and to obtain their input about potential site impacts, buffers, and mitigation. These site visits provided the bases for subsequent email exchanges with WDFW (see Section 1.12 for a summary of those exchanges).

2.20.2 Natural Resource Surveys (April 3–12, 2017)

Natural resources field surveys were conducted from April 3 to 12, 2017, to document flora and fauna in the vicinity of each of the five solar project sites, as well as different vegetation communities and habitat. Visual observations were recorded within 200 feet of each project site, and included wildlife and habitat data. A Trimble Geo XT GPS unit was used by the biological field team to assist in identifying the site boundaries and to record site spatial data. This device was capable of submeter accuracy. The full extent of each solar project site was covered by the biological field team. Photographs were taken and wildlife observations and vegetation characteristics were documented. The spatial locations of some features observed outside of the solar project sites were approximated using field observations and aerial imagery to determine their extent. Geographic information system (GIS) software was used to analyze data and to produce habitat map figures.

2.20.3 Wetland Delineations (April 3–12, 2017)

Each solar project site was surveyed for wetlands from April 3 to 12, 2017, in accordance with the current methodology of the U.S. Army Corps of Engineers' (USACE's) *2008 Arid West Regional Supplement (Version 2)* and the *Wetlands Delineation Manual* (Environmental Laboratory 1987). Wetlands and streams located outside of a project site and any associated generation tie line (for the Fumaria and Typha Solar Project sites) but that occurred within 200 feet of their boundaries and had the potential to have buffers extend into the project were included in a "study area." Wetlands and streams outside of the project site and within the study area were visually inspected but not formally delineated. Detailed descriptions of the field methods used in these studies are provided in Appendices G through K.

A Trimble Geo XT GPS unit was used by the field team to assist in identifying the project site boundaries and to record site spatial data. This device was capable of submeter accuracy.

The full extent of each project site was covered by the team of biologists. Photographs were collected and vegetation, soil, and hydrology characteristics were documented. The boundaries for wetlands located outside of the project site but within the study area were approximated using field observations and aerial imagery to determine the extent of on-site wetland buffers.

GIS software was used to analyze data and to produce the report figures. Per Washington Administrative Code (WAC) 463-60-333 and KCC Chapter 17A, wetlands were rated using Ecology's wetland rating criteria in the *Washington State Wetland Rating System for Eastern Washington, 2014 Update*. Kittitas

County's definition of a wetland is based on RCW 36.70A.030. Per KCC 17A.04.020, the resulting wetland ratings were used to determine the Kittitas County–prescribed range of wetland buffers for each wetland.

A detailed analysis of wetland functions was not conducted; however, a brief description of wetland functions is provided as part of the general description for each wetland.

2.20.4 Archaeological Surveys (April 4–17, 2012)

Archaeological fieldwork was conducted on each of the five proposed Columbia Solar Project sites from April 4 to 17, 2017, by a team of 11 SWCA archaeologists. The parcels were surveyed with pedestrian transects spaced at approximately 20-meter intervals. The survey was supplemented by about 900 shovel probes (SPs) measuring between 35 and 40 cm in diameter (Appendices G–K). The SPs were excavated in arbitrary 20-cm levels, and the sediments from each level were passed through a ¼-inch mesh screen. Shovel probes were terminated at 100 cm, when native alluvial cobbles or gravels were encountered, or when other obstructions prevented further excavation. If a probe was positive for the present of cultural material, a minimum of two 20-cm negative levels were excavated beyond the lowest positive level, unless an obstruction or depth of 100 cm was reached first. Any cultural material identified during the pedestrian survey and SP survey was recorded and photographed. Subsurface artifacts were bagged in plastic bags, labeled, and reburied where they were found.

The findings of each SP were recorded on standard shovel/auger probe forms that included information about soil color, texture, composition, and observed cultural materials. A Trimble handheld GPS unit was used to collect the Universal Transverse Mercator (UTM) coordinates of shovel probes. Digital photographs were taken of each project area and a sample of the excavated SPs, and information about the photographs was recorded on a standard photograph log. SP photographs included cardinal direction overview photographs and at least one photograph of the soil stratigraphy. Project field records and files are on file at SWCA's office in Seattle.

Information about any identified archaeological sites or isolates was recorded on State of Washington Archaeological Site Inventory Forms, which were entered into the Washington State Department of Archaeology and Historical Preservation's Washington Information System for Architectural and Archaeological Records Data (WISAARD) database.

For the generation tie lines for the Fumaria and Typha Solar Project sites, SWCA also conducted a pedestrian survey, but no shovel probing, for portions of the generation tie line ROW associated with each solar facility. The generation tie line pedestrian survey was conducted by four SWCA archaeologists on April 17, 2017. Within the generation tie line ROW, SWCA did not survey any private property outside of the ROW of public roads, except where landownership was the same as the project site and landowner permission had therefore been given. In addition, though TUUSSO is considering two alternative generation tie line alignments for the Fumaria Solar Project (ROWs A and B), only the one located on the north side of Clarke Road (ROW A) was surveyed for the present inventory, and the area around the substation at the terminus of the transmission line also was not surveyed. Photographs were taken from the center of the generation tie line ROW in cardinal directions, and toward any places of interest within the generation tie line ROW.

2.20.5 Built Environment Surveys (April 5–6, 2017)

A SWCA architectural historian conducted site visits on April 5 and 6, 2017, to conduct a field survey of built environment resources over 50 years old. These resources included buildings such as houses, barns, and sheds, and structures such as bridges and irrigation ditches. Resources were photographed and described on field forms, these data were then entered into the WISAARD database, and an inventory form was generated for each resource (Appendices G–K).

2.21 Potential for Future Activities at Site 463-60-295

The application shall describe the potential for any future additions, expansions, or further activities which might be undertaken by the applicant on or contiguous to the proposed site.

TUUSSO does not plan for any further additions, expansions, or further activities upon or contiguous to the sites used for the Columbia Solar Projects.

2.22 Analysis of Alternatives 463-60-296

The application shall include an analysis of alternatives for site, route, and other major elements of the proposal.

Within Washington State, Kittitas County represents a unique overlap of: 1) available land parcels large enough to support a utility-scale solar project; 2) high solar insolation; and 3) PSE's service territory (one of the only utilities in Washington with tariffs that support utility-scale solar production). In early 2016, TUUSSO identified Kittitas County as the best area for utility-scale solar development in Washington State.

As part of the initial conceptual development and siting of the five Columbia Solar Projects, TUUSSO applied solar facility siting criteria to identify potential sites in Kittitas County. These criteria included the following:

- High solar insolation
- Available land of sufficient size for the solar facility
- Proximity to PSEs distribution lines and/or substations
- Proximity to existing roads
- Cost-effective land value
- Land currently zoned for utility-scale solar development in accordance with Kittitas County's permitting requirements
- Agricultural, or otherwise previously disturbed land
- Land that is sufficiently flat for efficient solar installation with minimal grading

TUUSSO identified more than 100 sites in Kittitas County based on these criteria, and approached the landowners for these sites. Sites were then dropped based on one of the following screens: 1) landowner not interested in a lease or sale of the property; 2) distribution lines near the project site were not owned by PSE; 3) landowner's lease rates were not economical for solar development; 4) distribution lines near the site were electrically connected to other lines upon which TUUSSO or another solar developer was already proposing a project (only one utility-scale solar project could be connected to each distribution line, and only two utility-scale solar projects could be connected to each PSE substation); or 5) idiosyncratic site risks made the site too risky (e.g., high risk of flooding, protected flora or fauna on site, etc.).

In the process of culling through more than 100 sites, TUUSSO identified the proposed five Columbia Solar Project sites as the best opportunities for solar development in Kittitas County.

2.23 Pertinent Federal, State, and Local Requirements 463-60-297 (Compliance Evaluation)

(1) Each application shall include a list of all applicable federal, state, and local statutes, ordinances, rules, permits, and required use authorizations (i.e., leases, easements, rights of way, or similar authorizations) that would apply to the project if it were not under council jurisdiction. For each federal, state, or local requirement, the applicant shall describe how the project would comply or fail to comply. If the proposed project does not comply with a specific requirement, the applicant shall discuss why such compliance should be excused.

(2) Inadvertent failure by the applicant to discover and list a pertinent requirement shall not invalidate the application, but may delay the council's processing of the application.

Table 2.23-1 lists the pertinent federal, state, and local permits and related requirements pursuant to WAC 463-42-685 that would apply to construction and operation of the five Columbia Solar Projects. The table lists the permits or requirements, identifies the permitting agency, and cites the authorizing statute or regulation. The table also identifies the sections in the ASC relating to each permit or requirement.

Table 2.23-1. Pertinent Federal, State and Local Codes, Ordinances, Statutes, Rules, Regulations, and Permits

Permit or Requirement	Agency Code, Ordinance, Statute, Rule, Regulation, or Permit	Application Section
Federal		
Threatened or Endangered Species	U.S. Fish and Wildlife Service Endangered Species Act of 1973 (16 USC, Section 1531, et seq.) and implementing regulations. Designates and provides for protection of threatened and endangered plants and animals and their critical habitat.	Sections 3.4.2 and 3.4.4
Migratory Birds	U.S. Fish and Wildlife Service Migratory Bird Treaty Act (16 USC 703-711)	Sections 3.4.1, 3.4.5, 3.4.6.1
Bald Eagles	U.S. Fish and Wildlife Service Bald and Golden Eagle Protection Act (16 CFR 668-668c) Eagle permit regulations (50 CFR 22)	Sections 3.4.2 and 3.4.4
Waters of the United States	U.S. Army Corps of Engineers, Seattle District Clean Water Act of 1972 (Waters of the U.S. 1986/1988 regulatory definition in 40 CFR 230.3) Joint Aquatic Resource Permit Application (JARPA) for Section 404 fill in Waters of the U.S.	Sections 3.3.1, 3.3.2, 3.5.1, 3.5.2, 3.5.3, 3.5.4; Appendix J-3
State		

Permit or Requirement	**Agency** **Code, Ordinance, Statute, Rule, Regulation, or Permit**	**Application Section**
Electrical Construction Permit	Washington Department of Labor and Industries WAC 296-746A, Washington Department of Labor and Industries Safety Standards – Installing Electrical Wires and Equipment – Administration Rules.	
Noise Control	Washington Department of Ecology RCW 70.107, Noise Control; WAC 173-58, Sound Level Measurement Procedures WAC 173-60, Maximum Environmental Noise Levels; WAC 463-62-030, Noise Standards	Sections 4.1.4, 4.1.6, 4.1.7
Water Quality Storm Water Discharge: Construction Activities	Washington Department of Ecology RCW 90.48, Water Pollution Control Act, establishes general stormwater permits for the Washington Department of Ecology National Pollutant Discharge Elimination System Permit Program WAC 173-201A, Washington Department of Ecology Water Quality Standards for Surface Waters of the State of Washington, which regulates water quality of surface waters Federal statute(s) and regulations implemented by the above state statute(s) and regulations include: Federal Clean Water Act, 42 USC 1251; 15 CFR 923-930 KCC 12.70	Sections 2.3.3, 2.10, 2.11, 3.3.4, 3.3.5, 3.3.6, 3.3.7, 3.3.8; Appendices G-3, H-3, I-3, J-3, K-3
Shorelines of the State	Washington Department of Ecology WAC 173-18, Shoreline Management Act, Streams and Rivers Constituting Shorelines of the State (Note EFSEC energy facility exemption from Shoreline Act permitting requirements, RCW 90.58.140[9]). WAC 173-22, Adoption of Designations of Shorelands and Wetlands Associated with Shorelines of the State JARPA and shoreline conditional use permit (CUP) for fill in wetlands associated with Shorelines of the State	Sections 3.3.1, 3.3.2, 3.5.1, 3.5.2, 3.5.3, 3.5.4; Appendix J-3

Permit or Requirement	Agency Code, Ordinance, Statute, Rule, Regulation, or Permit	Application Section
Fish and Wildlife	Washington Department of Fish and Wildlife WAC 220-610, defines State species status and protections WAC 232-12, Washington Department of Fish and Wildlife Permanent Regulations, provides information on classification of wildlife species, including “Priority Habitats and Species” RCW 77, Hydraulic Code for in-water work	Section 3.4
State Environmental Policy Act (SEPA)	RCW 43.21C, Washington Environmental Policy Act WAC 197-11, Washington Department of Ecology SEPA Rules, which establishes uniform requirements for compliance with SEPA KCC 15.04	A SEPA Environmental Checklist is attached as Appendix A. Also, this entire Application for Site Certification describes the affected environment, potential construction and operational impacts, and mitigation measures.
Archaeology and Historic Preservation	Washington State Department of Archaeology and Historic Preservation RCW 27.53, Archaeological Sites and Resources	Sections 4.2.10 and 4.10.11
County		
Comprehensive Plan	Kittitas County Comprehensive Plan, 2000–2020	Sections 4.2.1 and 4.2.2
Zoning Ordinance, including Critical Areas Ordinance	KCC 17, including 17A	Sections 2.1.1, 2.18.2, 3.1.1, 3.1.2, 3.1.3, 3.1.10, 3.1.11, 3.3.1, 3.3.2, 3.3.3, 3.3.9, 3.3.10, 3.5.1, 3.5.2, 3.5.3, 3.5.4, 3.5.5; Appendices G-1, H-1, I-1, J-1, K-1
Access Permit	KCC 12.05	Appendices G-3, H-3, I-3, J-3, K-3
Grading Permit (if necessary)	KCC 14.05	Section 2.15.3

2.23.1 Pertinent Federal Statutes, Regulations, Rules, and Permits

2.23.1.1 Threatened or Endangered Species

The Endangered Species Act (ESA) of 1973 (16 United States Code [USC] 1531, et seq.) and implementing regulations designates and provides for protection of threatened and endangered plants and animals and their critical habitat. It requires a determination of whether a protected species is present in the area affected by a project. Section 7 of the ESA requires that federal agencies consult with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for their determination in authorizing a project that may affect listed species or designated critical habitats that may be found in the vicinity of a project. In cases where a project does not require the approval, funding, or conduct of a federal agency, Section 10 of the ESA provides a parallel process whereby non-federal entities may consult with the USFWS or NMFS and acquire a take statement for incidental adverse effects or take of listed species by the project.

Statement of Compliance

TUUSSO has carried out studies and field surveys for the Columbia Solar Projects. Bald eagles (*Haliaeetus leucocephalus*), a Federal Species of Concern, are present near the Fumaria and Penstemon Solar Project sites, and are likely present throughout the project-scale analysis areas. If nests are present in the project vicinity, they have the potential to be affected by noise and visual disturbances during construction. No bald eagle nests have been identified near the solar project sites; if nests are identified near the sites, construction outside of the critical use period (January 1–May 31) is recommended. If construction near active bald eagle nests might occur during the critical use period, local USFWS biologists would be consulted.

There are no threatened, endangered, proposed, or candidate species, or designated critical habitat, present at the project sites. Because the Columbia Solar Projects do not have a federal nexus and also would not affect any federally-listed threatened or endangered species, ESA Section 7 and Section 10 consultation were not conducted for the proposed projects.

2.23.1.2 Migratory Bird Species

The U.S. Fish and Wildlife Service administers and enforces the Migratory Bird Treaty Act (MBTA) (16 USC 703-711). The MBTA prohibits the taking, killing, or possession of migratory birds, except as allowed by the Secretary of the Interior. The list of migratory birds is found in 50 CFR 10, and permit regulations are found in 50 CFR 21.

Statement of Compliance

To ensure compliance with MBTA, vegetation clearing for the Columbia Solar Projects would ideally be undertaken from August 1 through the end of February. If construction or vegetation clearing is required between March 1 and August 1, nest surveys would be required in the proposed areas of disturbance. If active migratory bird nests are encountered during the surveys, land-disturbing construction activities should be avoided while the birds are allowed to fledge. An appropriate species avoidance buffer, as determined in conjunction with WDFW and local agencies, would apply to all active nests for migratory bird species. Implementing these measures would result in the Columbia Solar Projects being in compliance with the MBTA.

2.23.1.3 Bald Eagles

The federal Bald and Golden Eagle Protection Act (BGEPA) (16 CFR 668-668c) prohibits the taking, possession, purchase, sale, barter, transport, export, or import of any bald or golden eagle or any part, nest, or egg of a bald or golden eagle, except for certain scientific, exhibition, and religious purposes. Eagle permit regulations are found in 50 CFR 22.

Statement of Compliance

The Columbia Solar Project project-scale analysis areas have the potential to provide nesting habitat to bald and golden eagles. All raptor species are protected under the MBTA, and bald and golden eagles are additionally protected under the BGEPA. If active raptor nests occur within 0.25 mile of the solar project construction activities, noise and construction activities could disturb nesting and fledgling raptors, potentially causing nest abandonment. Based on WDFW guidance (Appendix C), a nest survey within

0.25 mile of construction activities would be conducted within the same year that construction is scheduled, to determine whether nests could be occupied during construction. The nesting seasons vary by species, as shown in Section 3.4.6.1. WDFW's 0.25-mile buffer is inclusive of the distance recommended by the National Bald Eagle Management Guidelines (USFWS 2007), which specifies a 660-foot (0.125-mile) buffer from active eagle nests. If active raptor nests are observed, then TUUSSO would coordinate with WDFW to determine approaches to minimize disturbance to the nesting raptors. Buffer distances and timing restrictions would collaboratively be developed by WDFW and TUUSSO, dependent upon the sound levels produced by the construction equipment and the sensitivity of the nesting raptors. Implementing these measures would result in the Columbia Solar Projects being in compliance with the BGEPA.

2.23.1.4 Waters of the United States

The Clean Water Act of 1972 establishes the basic structure for regulating discharges of pollutants into the waters of the United States, which are defined in subsequent regulations in 1986 and 1988 (40 CFR 230.3), and regulating quality standards for surface waters. The fill or excavation of waters of the United States, which includes associated wetlands, is regulated by the USACE.

Statement of Compliance

The Columbia Solar Projects would avoid all impacts to waters of the United States through avoidance measures in the project design, except for the Typha Solar Project site. A minor wetland fill is currently proposed on the Typha Solar Project site at the southern site entrance where an existing access road that has been compromised by a crushed or blocked culvert would be improved to allow for safe site access. A Joint Aquatic Resource Permit Application (JARPA) would be submitted to the Seattle District USACE and Ecology to meet both federal and state regulations. The wetland fill activities during construction and operation of the Typha Solar Project site would be in compliance with CWA regulations.

2.23.2 Pertinent State Statutes, Regulations, Rules, and Permits

2.23.2.1 Electrical Construction Permit

The Washington Department of Labor and Industries permits, inspects, and enforces regulations regarding electrical installations pursuant to WAC 296-746A, Washington Department of Labor and Industries Safety Standards – Installing Electrical Wires and Equipment – Administration Rules.

Statement of Compliance

The Washington Department of Labor and Industries would administer and enforce all electrical permitting, inspecting, design, and enforcement regulations regarding electrical installations either directly or pursuant to a contract with EFSEC. The Columbia Solar Projects would be designed and constructed in conformance with WAC 296-746A.

2.23.2.2 Noise Control

Ecology has the authority regarding noise standards and control pursuant to RCW 70.107, Noise Control; WAC 173-58, Sound Level Measurement Procedures; and WAC 173-60, Maximum Environmental Noise Levels.

Statement of Compliance

The Columbia Solar Projects would be designed, constructed and operated to meet the Ecology's noise regulations and standards.

2.23.2.3 Water Quality Storm Water Discharge: Construction Activities and Operation

The Columbia Solar Projects would require a Stormwater General Permit for construction activities because construction of the facilities would disturb more than 5 acres of land. EFSEC has jurisdiction regarding the NPDES Permit for the Columbia Solar Projects pursuant to WAC 463-38. Ecology would have had jurisdiction in the absence of EFSEC. The applicable statutes and regulations are as follows:

- RCW 90.48, Water Pollution Control Act;
- WAC 173-226, Waste Water General Permit Program establishes general stormwater permits for the Washington Department of Ecology National Pollutant Discharge Elimination System Permit Program (NPDES); and
- WAC 173-201A Washington Department of Ecology Water Quality Standards for Surface Waters of the State of Washington, which regulates water quality of surface waters.

Federal statute(s) and regulations implemented by the above state statute(s) and regulations include: 42 USC 1251, Federal Clean Water Act; and 15 Code of Federal Regulations [CFR] 923-930. A NPDES Permit would be required for construction activities and may be required for operation.

Statement of Compliance

TUUSSO would obtain the necessary NPDES Permit(s) from EFSEC pursuant to WAC 463-39 that would conform and be in compliance with all the requirements set forth above. An NPDES Permit for stormwater would be obtained, and its associated SWPPP(s) would be implemented, for construction of the Columbia Solar Projects. The above measures also meet the Kittitas County Storm Water Management Plan guidelines (KCC 12.70).

2.23.2.4 Shorelines of the State

EFSEC jurisdictional energy facilities (including those opting in to EFSEC) are exempt from the requirements of the Shoreline Management Act (RCW 90.58.140[9]). KCC 17B.07.0030(l) provides that "any project with a certification from the governor pursuant to RCW Chapter 80.50" is exempt from shoreline permit requirements. The Typha Solar Project site would nevertheless be consistent with all of the policies specified in RCW 90.58.020 and the Kittitas County SMP, but is subject to EFSEC jurisdiction and authorization. A Shoreline CUP application and JARPA meeting state regulations are included in Appendix J-3.

In non-EFSEC settings, Ecology, pursuant to the Shoreline Management Act (WAC 173-18), regulates waters designated as Shorelines of the State and wetlands associated with them as defined in WAC 173-22. Any impacts that would occur in designated Shorelines of the State would need to be addressed in a JARPA that would be submitted to Ecology. In addition, if the project is considered a "substantial development" by the definition stated in RCW 90.58.030(3)(e), then a substantial development permit (SDP) would be required for any work that impacts designated Shorelines of the State and would be submitted to Ecology in conjunction with the JARPA. In addition, a shoreline conditional use permit (CUP) would be required for utility generation facilities in areas with a Shoreline Environment Designation (SED) of Rural Conservancy, based on the Kittitas County Shoreline Master Program (SMP). Under WAC 173-27-150, SDPs and CUPs cannot be approved unless they are consistent with policies and procedures of the Shoreline Management Act, Ecology rules, and the local master program.

Statement of Compliance

Designated Shorelines of the State are not located near any of the Columbia Solar Projects, except for the Typha Solar Project site. The nearest Shoreline of the State is located along the Yakima River within 200 feet of the eastern site boundary for the Typha Solar Project site. The western edge of the Yakima River ordinary high water mark (OHWM) is between 35 feet and 200 feet from the eastern edge of the site boundary. All portions of the site within 200 feet of the OHWM of the Yakima River, and within the National Wetland Inventory (NWI)-mapped emergent wetland that extends into the southern portion of the site, have a SED of Rural Conservancy. This SED area partially overlaps wetlands TW01 and TW02, which would be avoided through project design, as well as areas delineated as uplands that would be within the Typha Solar Project site.

The Typha Solar Project would overlap areas within the Shoreline of the State jurisdiction in two areas. The nearest project impact occurring within 200 feet of the Yakima River shoreline would overlap this shoreline area by only 0.19 acre and would consist of fence installations located at least 144 feet from the OHWM of the Yakima River and solar arrays located at least 154 feet from the OHWM of the Yakima River. The second area of overlap would be located at an existing access road crossing of wetland TW03, an associated wetland of the Yakima River that would be considered within Shoreline of the State jurisdiction, where access road improvements would result in approximately 0.01 acre of wetland fill. The Kittitas County SMP designates an area that overlaps approximately 6.61 acres of the proposed project area as part of the Shoreline of the State based on NWI mapping; however, SWCA performed a professional wetland delineation throughout the entire site and found that wetlands associated with the Yakima River shoreline only occur in areas delineated as wetlands TW01, TW02, and TW03. Refer to Figure 2.23-1 for exact locations. Both wetlands TW01 and TW02 would be avoided through project design, and impacts to wetland TW03 would be limited to only 0.01 acre for the proposed access road improvement required for site access. In addition, the vegetation adjacent to the Yakima River would not be altered, and all of the areas of the project within 200 feet of the Yakima River shoreline would be planted with low-growing native plant species. Therefore, the proposed project would have minimal adverse effects on the shoreline of the Yakima River and would preserve the natural character of the shoreline. In addition, any adverse effects associated with the proposed project would be minimal and would not substantially affect the ecology and resources of the Yakima River shoreline (meets RCW 90.58.020[2–4]).

The proposed Typha Solar Project would add less than 3% impervious surfaces to the property, including less than 10 square feet (based on approximately 16 solar array footings of 6- by 8-inch cross-section) for solar array footings and less than 700 square feet for the access road fill within wetland TW03 in areas within Shoreline of the State jurisdiction. These areas and the overall project would not result in a substantial increase in runoff. No shoreline protection work is proposed nor would be necessary to stabilize the shoreline for project purposes (meets Kittitas County SMP 6.19.A.1). The location of the proposed Typha Solar Project is on private land located west of a segment of the Yakima River that is not visible from properties immediately to the west of the site. The solar arrays on the proposed site would not exceed 8 feet in height and would not block any views of the Yakima River from adjoining properties. In addition, the associated generation tie line would be predominately located along existing power lines and would not substantially alter the current views nearby (meets Kittitas County SMP 6.19.A.2).

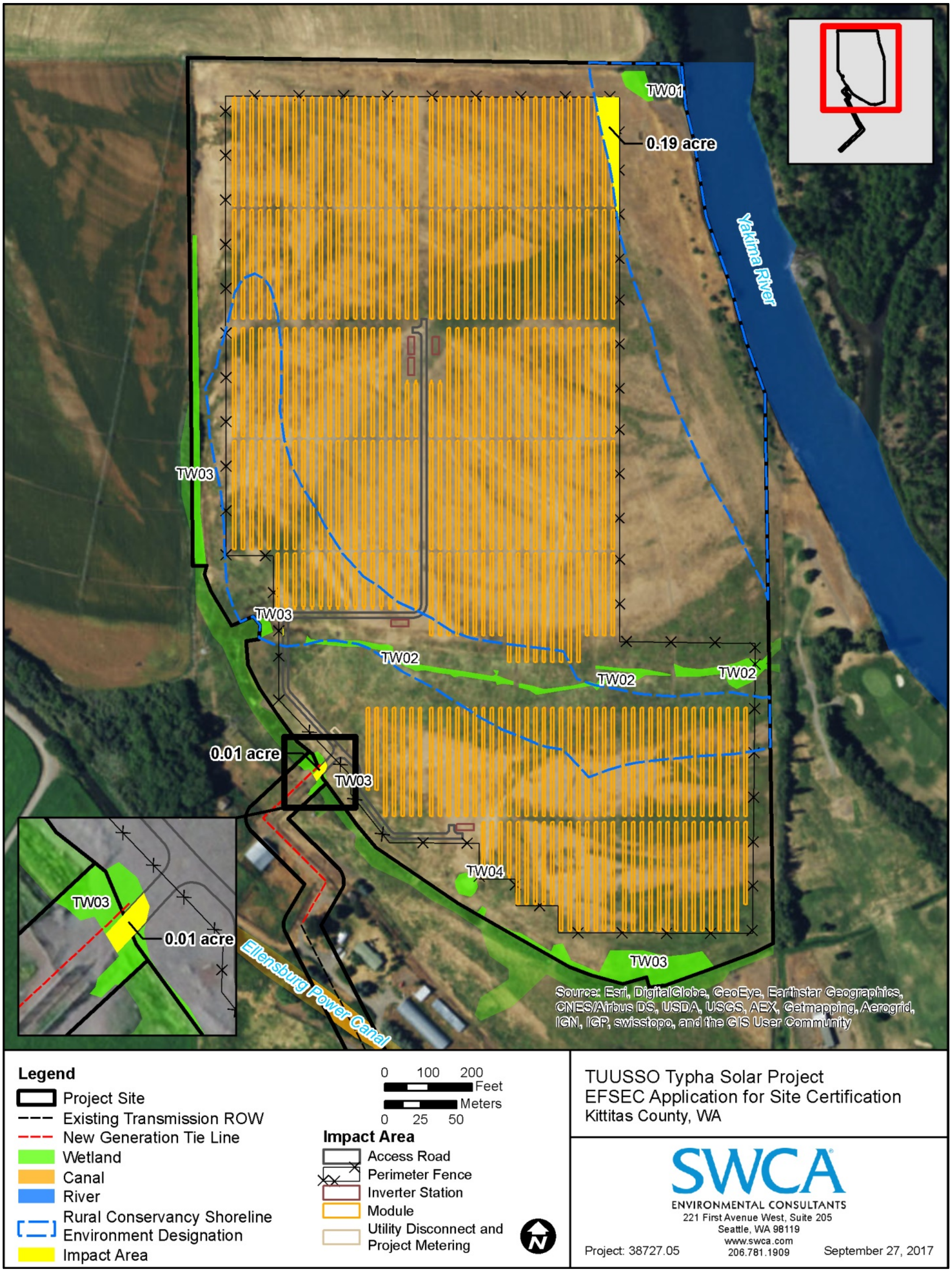


Figure 2.23-1. Shoreline of the State encroachment areas for the Typha Solar Project.

Solar generation facilities are an allowed conditional use on lands zoned Commercial Agriculture. As described in Section 1.16 of the ASC, the Typha Solar Project would be consistent with the Kittitas County Comprehensive Plan. The proposed project would limit grading activities as much as possible, utilizing existing site contours with limited ground disturbance. The project would operate under a maximum 41-year lease with the current landowner, after which the site may return to its current agricultural land use. In addition, the generation tie line would be located predominantly along existing power lines and would not affect any existing land uses along its route (meets Kittitas County SMP 6.19.A.3). The proposed Typha Solar Project is located on private land that currently does not allow public access to the Yakima River shoreline. Therefore, public access to the shoreline of the Yakima River and public recreational opportunities would not be affected by the proposed project (meets RCW 90.58.020[5–6]).

Finally, based on the project design and impacts described above, the proposed Typha Solar Project would not destroy or obstruct scenic views of the Yakima River shoreline because of the private location of the property and topography of the surrounding landscape. In addition, the project would meet the no-net-loss standards of the Kittitas County SMP because the small areas of impact are either below the threshold for mitigation, in the case of the 0.01 acre of wetland fill, or would have a negligible impact with an improvement in vegetation quality, in the case of the 0.19 acre at least 144 feet from the OHWM of the Yakima River. Therefore, the proposed project meets the Kittitas County SMP 6.19.B.12 requirement.

The Typha Solar Project would be a conditionally permitted use for areas within the SED of Rural Conservation under the Kittitas County SMP. The wetland fill activities during construction of the Typha Solar Project site would be in compliance with regulations under the Shoreline Management Act (WAC 173-18) and the Kittitas County SMP.

2.23.2.5 Fish and Wildlife

The WDFW, pursuant to WAC 232-12, provides information on the classification of wildlife species. Additionally the WDFW, pursuant to WAC 232-12, designates certain Priority Habitats and Species. The State of Washington regulates fish and wildlife with RCW 77 and WAC 220. State and protected species regulations are defined in WAC 220-610, which includes provisions for endangered, threatened, and sensitive wildlife species, ESA-listed fish, and bald eagle protection rules. Fish and aquatic habitats are protected under RCW 77.55, commonly referred to as the Hydraulic Code. Any environmental impacts that could occur in waters of the state below the OHWM would need to be addressed in a Hydraulic Project Approval process.

Statement of Compliance

TUUSSO would comply with the substantive requirements of the WDFW regarding the appropriate minimization and mitigation of impacts to Priority Habitats and Species. Sections 3.4.3, 3.4.4, and 3.4.5 evaluate the potential for construction and operation impacts on habitats, fish, and wildlife. No significant impacts would occur from the proposed Columbia Solar Projects, therefore these projects would comply with State habitat, fish, and wildlife guidelines.

2.23.2.6 State Environmental Policy Act (SEPA)

A Development Permit would have been required from Kittitas County, which would have made it the lead agency for SEPA, absent EFSEC jurisdiction. The applicable statutes and regulations are as follows: RCW 43.21C, Washington Environmental Policy Act; and WAC 197-11, Washington Department of Ecology SEPA Rules, which establishes uniform requirements for compliance with SEPA and Kittitas County SEPA regulations set out in KCC 15.04.

Statement of Compliance

A SEPA Environmental Checklist has been prepared meeting the above statutes and regulations, and is attached as Appendix A to this application. A SEPA Determination would be issued by EFSEC that would comply with the statutes and regulations set out above. The substantive requirements set out in KCC 15.04 are the same and would be used by EFSEC in its SEPA process.

2.23.2.7 Archaeological Sites

The Washington State Department of Archaeology and Historic Preservation (DAHP) regulates and protects the cultural and historic resources on private and public lands in the State of Washington. The applicable statute is as follows: RCW 27.53, Archaeological Sites and Resources.

Statement of Compliance

The Columbia Solar Projects would comply with RCW 27.53. TUUSSO has researched state and federal registries along with all archaeological and historical files and maps located at DAHP in Olympia. TUUSSO conducted a comprehensive pedestrian field survey of the project area. This archaeological survey project covered the entire areas within the Columbia Solar Projects where ground-disturbing activities are proposed. Thirteen isolates, one historic debris scatter, and two small lithic scatter sites were identified, and SWCA recommends these resources are not eligible for listing on the NRHP. These sites would be avoided during construction and operation of the Columbia Solar Projects. A qualified archaeologist would monitor all ground-disturbing activities during the construction process. The Yakama Nation has been consulted during the planning process, beginning in March of 2017. The Yakama Nation would be notified prior to commencement of construction and would be invited to have representatives present during all ground-disturbing activities. It is anticipated that a stipulation would be made with the Yakama Nation establishing procedures to be followed in the event of any finds during construction.

2.23.3 Pertinent Local Ordinances and Permits

2.23.3.1 Comprehensive Plan, Zoning Ordinances, Critical Areas

The five Columbia Solar Projects and two associated generation tie lines are located in unincorporated portions of Kittitas County and are consistent and compliant with the Kittitas County Code, including KCC 17, Zoning, or the December 2016 Kittitas County Comprehensive Plan.

Since Kittitas County is a full-planning Growth Management Act county, the Kittitas County Code, including its zoning code, must be consistent with the county’s comprehensive plan. As a result, compliance with the Kittitas County Code also serves as compliance with the comprehensive plan.

Under the Kittitas County Code, each of the Columbia Solar Projects is a “major alternative energy facility” because each is a solar farm that is not a “minor alternative energy facility” (see KCC 17.61.010[9, 11]). As major alternative energy facilities, the solar projects can be authorized as conditional uses in the A-20 and Commercial Agriculture zones (see KCC 17.61.020). In designating solar PV generation facilities as permitted conditional uses, Kittitas County has made the legislative decision (based on its comprehensive plan policies) that these solar projects are allowable within the A-20 and Commercial Agricultural zones, subject to site-specific review and conditions to address potential *localized impacts* to the agricultural land uses in the vicinity. The Camas, Penstemon, and Typha Solar Projects would be located on land zoned as Commercial Agriculture. The Fumaria and Urtica Solar Projects would be located on land zoned as Rural Working – Agriculture 20. As a result, the Columbia Solar Projects are consistent and compliant with siting and zoning pursuant to the Kittitas County Code and Comprehensive Plan.[2]

The Columbia Solar Projects can be authorized as conditional uses in A-20 and Commercial Agriculture zones because the solar projects meet the Kittitas County Code review criteria for conditional uses. In accordance with RCW 80.50.110, and WAC 463-60-117 and 463-28, EFSEC can permit and authorize a conditional use, with appropriate consideration accorded to the following county code requirements:

Kittitas County Code Title 17.61.020, Permitted and Conditional Uses

A) **The proposed use is essential or desirable to the public convenience and not detrimental or injurious to the public health, peace, or safety or the character of the surrounding neighborhood** (KCC 17.60A.015[1]).

The Columbia Solar Projects are essential or desirable to the public convenience because the projects would help the state meet Washington's Renewable Portfolio Standard mandates for 9% of Washington's electricity to be generated from renewable sources by 2016, increasing to 15% by 2020. The solar projects would also provide clean, locally produced power that would be delivered directly to the PSE electricity grid. The Columbia Solar Projects would deliver their 25 MW of output to the PSE electric grid through its existing electrical distribution transmission line system.

Washington has a policy to increase the use of renewable energy facilities through focusing on local sources such as solar (RCW 82.16.110 and 82.16.110). The legislature also found it in the public interest to encourage private investment in renewable energy resources, to stimulate the state's economic growth and to enhance the continued diversification of energy resources used in the state (RCW 80.60.005). The Columbia Solar Projects meet this policy because they would be funded by private money, with an estimated total cost of $40 to $50 million, which should stimulate economic growth and would diversify energy resources further through additional solar facilities.

Finally, the Columbia Solar Projects would not be detrimental or injurious to the public health, peace, safety, or character of the surrounding neighborhood. As discussed in this application, the solar projects would have minimal impacts to the environment and available agricultural land. The Columbia Solar Projects would be the largest individual and collective solar projects in Washington and would fortify Kittitas County's electric grid with clean, local power. Each of the five Columbia Solar Projects would generate an estimated 11,500 MWh of electricity in the first full year of project operation, for a total of 57,500 MWh.

B) **The proposed use at the proposed locations will not be unreasonably detrimental to the economic welfare of the county, and that it will not create excessive public cost for facilities and services by finding that**

   a. **The proposed use will be adequately serviced by existing facilities such as highways, roads, police and fire protection, irrigation and drainage structures, refuse disposal, water and sewers, and schools; or**

[2] On July 18, 2017, the Kittitas County Board of Commissioners extended until January 9, 2018, a moratorium on accepting applications for major alternative energy facilities in the form of solar farms. Ordinance 2017-004 (July 18, 2017). The moratorium temporarily precludes accepting applications but does not preclude approving facilities. In addition, it does not alter the Kittitas County Comprehensive Plan or Kittitas County Code which allow (via CUP) solar facilities on Commercial Agriculture and Agriculture-20 zoned lands. Therefore, the moratorium does not alter findings that the Columbia Solar Projects are consistent and compliant with the Comprehensive Plan and Kittitas County Code.

b. **The applicant shall provide such facilities; or**

c. **The proposed use will be of sufficient benefit to offset additional public costs or economic detriment** (KCC 17.60A.015[2]).

The Columbia Solar Projects would not be unreasonably detrimental to the economic welfare of Kittitas County or create excessive public cost. The solar projects would not have a detrimental impact on the county's economic welfare but rather a positive impact. During peak construction, the solar projects would employ up to 100 workers per day, hired locally when possible, and should increase local spending. The projects would also provide an estimated $4,880,000 in property tax revenues for Kittitas County over the approximate 30-year project life, as well as consistent revenue to the landowners through lease payments. The electricity generated by the five Columbia Solar Projects would likely be absorbed into PSE's service area in Ellensburg and Kittitas County. Capital investments for each of the five projects is estimated to be $8 to $10 million, for a total investment of $40 to $50 million. In addition to generating a source of renewable electricity, the solar projects would create additional economic benefits through direct capital investments in the local and regional economy.

In addition, as described in Sections 4.3 and 4.4, existing services would adequately serve the Columbia Solar Projects, with no anticipated significant impacts to police, fire, school, irrigation, refuse, water or septic systems, or health care services. Any additional facilities required by the solar projects would be provided by TUUSSO. These facilities may include appropriate access improvements coordinated with the Kittitas County Department of Public Works and the Washington State Department of Transportation, and additional fire response and safety training for the local fire departments. Finally, the solar projects should generate a positive tax-related impact for the area that could help expand services.

C) **The proposed use complies with relevant development standards and criteria for approval set forth in this title or other applicable provisions of Kittitas County Code** (KCC 17.60A.015[3]).

TUUSSO and the Columbia Solar Projects would comply with all relevant development standards and criteria in the Kittitas County Code, including low impact construction and operation, and BMPs, as well as:

KCC Title 8 Health, Welfare, and Sanitation,
KCC Title 9 Public Peace, Safety and Morals
KCC Title 10 Vehicles and Traffic
KCC Title 12 Roads and Bridges
KCC Title 13 Water and Sewers
KCC Title 14 Buildings and Construction
KCC Title 15 Environmental Policy
KCC Title 17 Zoning
KCC Title 17A Critical Areas
KCC Title 20 Fire and Life Safety

TUUSSO is dedicated to using BMPs during all phases of development, construction, and operation/maintenance of the Columbia Solar Projects. The five solar projects would comply with any and all relevant development standards required by the Kittitas County Code.

D) The proposed use will mitigate material impacts of the development, whether environmental or otherwise (KCC 17.60A.015[4]).

As discussed in the SEPA Environmental Checklist and this ASC's Section 1.10 and Chapter 3, the Columbia Solar Projects would mitigate potential impacts through mitigation plans and other measures. TUUSSO is committed to developing well-sited, well-constructed solar projects. TUUSSO employed a rigorous site selection process to first avoid and then to mitigate, to the greatest extent feasible, potential negative natural and built environmental impacts, while partnering with landowners and local residents to generate positive community impacts and economic development in Kittitas County.

The development process for the five Columbia Solar Projects began in early 2016 when TUUSSO originally identified more than 100 potential solar project sites in Kittitas County. TUUSSO has been systematically collecting and evaluating information for each of those sites, to identify those that best avoid having impacts and then subsequently those with the least potential impacts, while also achieving successful financing and operations. TUUSSO would continue to work to mitigate potential impacts. TUUSSO is committed to developing well-sited solar projects that avoid sensitive habitats and engaging agencies early and often, as shown in Section 1.12, with discussions and correspondence with the EFSEC, Ecology, WDFW, DAHP, the Yakama Nation, and various representatives of Kittitas County.

E) The proposed use will ensure compatibility with existing neighboring land uses (KCC 17.60A.015[5]).

The five proposed Columbia Solar Projects would be compatible with the existing neighboring land uses as they would create very limited visual and auditory impacts and generate almost no traffic during operations, as discussed in Chapters 3 and 4. The solar projects are an allowed use, considered to be compatible with the Kittitas County Comprehensive Plan, and an accepted rural land use. Solar PV facilities are, therefore, compatible with the rural nature of Kittitas County.

F) The proposed use is consistent with the intent and character of the zoning district in which it is located (KCC 17.60A.015[6]).

Kittitas County Code allows major alternative energy facilities as conditional uses in the A-20 and Commercial Agriculture zones. A major alternative energy facility can be a solar farm that is not a minor alternative energy facility (KCC 17.61.010[9]). As a result, the Columbia Solar Projects would be major alternative energy facilities that can be allowed as conditional uses in A-20 and Commercial Agriculture zones. The solar projects are consistent with the intent and character of the zoning districts, as they are expressly allowed and satisfy the Growth Management Act's intent that the county allow a range of land uses in rural areas, discouraging residential sprawl, to meet local economic needs.

The zoning for the five Columbia Solar Project sites is as follows:

- Camas Solar Project Site: the site would be located on land zoned as Commercial Agriculture.
- Fumaria Solar Project Site: the site would be located on land zoned as Rural Working – Agriculture 20.
- Penstemon Solar Project Site: the site would be located on land zoned as Commercial Agriculture.
- Typha Solar Project Site: the site would be located on land zoned as Commercial Agriculture.
- Urtica Solar Project Site: the site would be located on land zoned as Rural Working – Agriculture 20.

G) For conditional uses outside of Urban Growth Areas the use:

1. Is consistent with the intent, goals, policies, and objectives of the Kittitas County Comprehensive Plan, including the policies of Chapter 8, Rural and Resource Lands;

Kittitas County has established goals, policies, and objectives (GPOs) to provide its intent toward county-wide land use planning. The county created these GPOs in response to identified needs within the county and to guide legislative actions in adopting zoning. Tables 2.23-2 and 2.23-3 provide an overview of the GPOs related to the lands where the Columbia Solar Projects would be located, and are intended to direct the county in the adoption of specific zoning ordinances:

Table 2.23-2. Kittitas County Comprehensive Plan GPO General Policy Statements

GPO Number	General Policy Statements
2.15	The development of resource based industries and processing should be encouraged in all areas of Kittitas County. When such uses are located in rural and resource lands, criteria shall be developed to ensure the protection of these lands to ensure compatibility with rural character. Consider adding a definition for “resource based industry” to the definitions in Title 17, Zoning.
6.18	Decisions made regarding utility facilities should be consistent with and complementary to regional demand and resources and should reinforce an interconnected regional distribution network.
6.36	Develop a study area encompassing the entire county to establish criteria and design standards for the siting of solar farms.
8.1	Rural lands are characterized by a lower level of services; mixed residential, agricultural and open space uses; broad visual landscapes and parcels of varying sizes, a variety of housing types and small unincorporated communities.
8.3	The County shall promote the retention of its overall character by establishing zoning classifications that preserve rural character identified to Kittitas County.
8.4	Development in rural areas is subject to agricultural and forestry activities that may take place as a right on adjacent properties.
8.8	A certain level of mixed uses in rural areas and rural service centers is acceptable and may include limited commercial, service, and rural industrial uses
8.11	Policies will reflect a “right to farm” in agricultural lands.
8.13	Encourage development activities and establish development standards which enhance or result in the preservation of rural lands.
8.14C	Development shall be located distances from streams, rivers, lakes, wetlands, critical areas determined necessary and as outlined within existing Shorelines Management Program, the Critical Areas Ordinance and other adopted resource ordinances in order to protect ground and surface waters.
8.15	Uses common in rural areas of Kittitas County enhancing rural character, such as agriculture uses in Lower Kittitas and rural residential uses and recreation uses in Upper Kittitas shall be protected from activities which encumber them.
8.17	Land use development within the Rural area that is not compatible with Kittitas County rural character or agricultural activities as defined in RCW 90.58.065(2)(a) will not be allowed.
8.44	Growth and development in Rural lands will be planned to minimize impacts upon adjacent natural resource lands.
8.129	Encourage development projects whose outcome will be the significant conservation of farmlands.

GPO Number	General Policy Statements
8.16	Give preference to land uses in Rural designated areas that are related to agriculture, rural residential development, tourism, outdoor recreation, and other open space activities.
8.21	Kittitas County will provide criteria within its zoning code to determine what uses will be permitted within rural zone classifications in order to preserve rural character.

Table 2.23-2 Kittitas County Comprehensive Plan GPO Zoning Implementation Statements

GPO Number	General Policy Statements
6.7	Decisions made by Kittitas County regarding utility facilities will be made in a manner consistent with and complementary to regional demands and resources.
6.9	Process permits and approvals for all utility facilities in a fair and timely manner, and in accordance with development regulations that ensure predictability and project concurrency.
6.10	Community input should be solicited prior to county approval of utility facilities, which may significantly impact the surrounding community.
6.23	Kittitas County reserves the right to review all applications for utilities placed within or through the County for consistency with local policies, laws, custom and culture.
8.5	In order to protect and preserve Resource Lands, non-resource development and activities on adjacent Rural lands shall require preservation of adjacent vegetation, existing landforms (e.g. ravines) or use of other methods that provide functional separation from the resource land use.
8.9	Protecting and preserving resource lands shall be given priority. Proposed development allowed and adjacent to resource lands shall be conditioned to protect resource lands from negative impacts from that development.
8.21B	Functional separation and setbacks found necessary for the protection of water resources, rural character and/or visual compatibility with surrounding rural areas shall be required where development is proposed. The first sentence of this policy shall not apply to agricultural activities as defined in RCW 90.58.065(2(a). When required by the county shoreline master program or critical area regulations, buffers shall be provided.

The above GPOs are directed at the legislative effort to adopt zoning codes that implement the intent and policy direction of Kittitas County and these GPOs; therefore, they have little to no direct application to the Columbia Solar Projects. Given this, while the zoning code references the comprehensive plan, the plan itself is not a regulatory mandate, does not include regulatory criteria capable of reliable and predictable implementation, and is not directly applicable or enforceable as such.

However, the Columbia Solar Projects are consistent with the above listed GPOs from the Kittitas County Comprehensive Plan, including policies in Chapters 2 (Land Use), 6 (Utilities), and 8 (Rural and Resource Lands). The solar projects implement the intent under the Growth Management Act for land uses that are compatible with agricultural uses, provide economic opportunity to rural area residents and landowners, minimize and mitigate impacts to rural and resource lands, and recognize the emphasis the GPOs place on the character and use of these lands. The solar projects are consistent particularly with GPO 6.36, which focuses on developing and studying the county for siting solar farms, showing an intent to address solar facilities as allowed uses.

2. Preserves "rural character" as defined in the Growth Management Act (RCW 36.70A.030[15]);

The Columbia Solar Projects preserve the area's rural character, as defined in the Growth Management Act, by being compatible with the county's rural patterns of land use and development. The solar projects maintain natural areas, open space, and the visual landscape. The low-lying panels used in the projects are quiet, unobtrusive structures with very few moving parts and minimal maintenance requirements that would not significantly impact viewsheds or alter the county's rural character during operations. The panels would have native vegetation planted under them and would be surrounded by native habitat. The solar projects would also be compatible with current rural uses of the land. The projects would not impact traditional rural lifestyles, rural-based economies, or opportunities to live and work in rural areas. Local farming practices can (and TUUSSO anticipates would) continue on the properties adjacent to the projects, particularly where the projects would operate on portions of larger parcels. The solar projects would not in any way interfere with existing surrounding agricultural practices and would not force or compel any conversions to non-agricultural land uses.

The Columbia Solar Projects would also not cause inappropriate conversion of undeveloped land into sprawling, low-density residential development. The projects would be temporary and provide an opportunity for diversified farming income that disincentivizes sprawling, low-density development. Finally, as discussed below, the solar projects would not require the extension of urban governmental services.

The Columbia Solar Projects would also maintain the rural character of the wildlife habitat and protection of natural surface water and groundwater flows, recharge, and discharge. The projects would also be compatible with local wildlife. TUUSSO would continue to work with WDFW to manage existing wildlife habitat. In addition, the solar projects would maintain current patterns of surface water and groundwater flow and recharge and discharge areas, as well as surface water and groundwater uses. The projects are anticipated to have no stormwater discharges and would use water under existing water allocations or water that is trucked in.

3. Requires only rural government services; and

The Columbia Solar Projects would require only rural government services, such as police and fire services. The projects would have on-site fire prevention and protection measures. In addition, with minor improvements, the surrounding roads and infrastructure would be sufficient to serve the projects' construction and operation. As mitigated, the solar projects would not increase the need for police, fire, school, irrigation, refuse, water or septic systems, or health care services. As mitigated, there should be no costs or detriments to offset.

4. Does not compromise the long term viability of designated resource lands (KCC 17.60A.015[7]).

The Columbia Solar Projects would not compromise the long-term viability of the surrounding agricultural land. The solar projects would temporarily remove approximately 232 acres of land from its current agricultural use or fallow status. Throughout the solar projects' life, they would not compromise agricultural and rural use on the surrounding land. Moreover, after the removal of all solar equipment after the lease terms, the land would be returned to its original state and can be returned to agricultural production.

Kittitas County Code Title 17A, Critical Areas

The Columbia Solar Projects would meet applicable requirements of KCC 17A, Critical Areas Ordinance (CAO), as indicated below.

The KCC CAO applies to lands within unincorporated Kittitas County, including both Washington state-owned lands and privately owned lands. The Columbia Solar Projects would follow the general guidance of the Kittitas County critical areas policy document, coupled with the more specific provisions of the critical areas development ordinance, pursuant to the requirements of RCW 36.70A (Ord. 94-22 [part], 1994).

TUUSSO has adhered to all requirements outlined in the critical areas checklist and required information (KCC 17A.03.035) for project activities subject to this ordinance, which are outlined in the critical areas reports for each solar project site in Appendices G to K. The critical area reports and this application include the following information, meeting the required KCC CAO checklist (KCC 2017):

- Legal descriptions of the land, and assessor's parcel numbers.
- As defined herein, the location of the following, if applicable:
  - wetlands;
  - erosion hazard areas;
  - floodplains and floodways;
  - riparian habitats;
  - geologically hazardous areas;
  - landslide hazard areas;
  - mine hazard areas;
  - seismic hazard areas; and
  - streams and rivers.
- Any voluntary methods or activities anticipated by TUUSSO pertaining to critical areas, including incentives being offered by the local or state government.
- Duplicate plans drawn to scale showing the nature, location, dimensions, and elevations of the areas in question, including existing or proposed structures, estimated amounts of fill materials, drainage facilities, significant natural features, and the location of the above items, if applicable.
- The requirement for delineating the location of possible critical areas would be waived if field investigations by county staff indicate the following:
  - sufficient information exists for staff to estimate the boundaries of any critical areas without a delineation by the applicant; or
  - no structures and uses, except for exempt activities, are proposed to be located within any possible critical area.
- Subject to field investigations by county staff, or other reliable and relevant information, the information submitted by the applicant shall be presumed valid for all purposes under this chapter (Ord. 94-22 [part], 1994).

The Columbia Solar Projects would comply with all Kittitas County critical areas ordinances.

2.23.3.2 Access Permit

Under KCC 12.05, an access permit is required for any activity within Kittitas ROWs and for driveways or access roads that connect to county ROWs.

Statement of Compliance

TUUSSO has prepared access permits for each of the Columbia Solar Project sites and would be in compliance with this requirement.

2.23.3.3 Grading Permit

Under KCC 14.05, grading or filling on a site involving more than 100 cubic yards requires a grading permit from Kittitas County.

Statement of Compliance

Grading on the Columbia Solar Project sites would be minimized to the extent possible and be focused in access road and transformer locations. The Columbia Solar Projects would be permitted through EFSEC and would likely not require a grading permit through Kittitas County. If a grading permit is required, then TUUSSO would coordinate with the county to prepare and submit a grading permit for each project site, as necessary.

2.24 References – Chapter 2

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station. Available at: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

Kittitas County. 2016. Kittitas County Comprehensive Plan, December 2016. Adopted by Ordinance No. 2016-023. Available at: https://www.co.kittitas.wa.us/uploads/documents/cds/comp-plan/2016/2016%201206%20Comp%20Plan%20per%20Kittitas%20Co%20Ord%202016-023.pdf.

Kittitas County Code (KCC). 2017. Kittitas County, Washington, Ordinances and Resolutions. Available at: http://co.kittitas.wa.us/boc/countycode/. Accessed March 13, 2017.

U.S. Bureau of Reclamation (Reclamation). 2012. *Yakima River Basin Integrated Water Resource Management Plan, Final Programmatic Environmental Impact Statement*. March 2012. U.S. Bureau of Reclamation, Pacific Northwest Region. Available at: https://www.usbr.gov/pn/programs/yrbwep/reports/FPEIS/fpeis.pdf.

U.S. Environmental Protection Agency (EPA). 2017. MyWATERS Data Mapper Google Earth kmz file. Available at: https://www.epa.gov/waterdata/viewing-waters-data-using-google-earth. Accessed March 7, 2017.

Washington State Department of Ecology (Ecology). 2017. Wells GIS Data. Available at: http://www.ecy.wa.gov/services/gis/data/data.htm#w. Accessed March 7, 2017.

3 NATURAL ENVIRONMENT AFFECTED ENVIRONMENT AND IMPACTS

3.1 Earth 463-60-302

(1) The applicant shall provide detailed descriptions of the existing environment, project impacts, and mitigation measures for the following:

(a) Geology. The application shall include the results of a comprehensive geologic survey showing conditions at the site, the nature of foundation materials, and potential seismic activities.

3.1.1 Affected Environment for Geology

3.1.1.1 General County

Kittitas Valley is at the eastern margin of the Yakima River Valley in a structural basin between the Cascade Mountains and the Columbia Plateau (Alt and Hyndman 1995; McKee 1972). In April 2017 TUUSSO Energy, LLC (TUUSSO), conducted a comprehensive geologic survey showing conditions at the Columbia Solar Project sites, the nature of foundation materials, and potential seismic activities. The reports summarizing this study are included in Appendices G through K (Swiftwater Environmental & Geotechnical [Swiftwater] 2017a, 2017b, 2017c, 2017d, 2017e). Two test borings were drilled at each project site to a maximum depth of 16.5 feet below existing grade. The boring locations were selected to attempt to be representative of each project site. A general description of soils and groundwater conditions is included below in Sections 3.1.4 and 3.3.11, respectively.

According to Waitt (1979), the Columbia Solar Project sites and surrounding area are underlain by Qs (Quaternary Alluvium, Sidestream Facies) soil which is characterized as downstream aggradation deposits with their source being upstream glacial moraines located in the west and northwest areas of the Kittitas Valley. These deposits consist primarily of basaltic gravels and sands with varying amounts of silt and clay minerals. The gravel varies from fine to coarse. These undifferentiated sandy gravel deposits are overlain by varying thicknesses of topsoil, weathered sandy gravel horizons, and loessal (wind) deposits that comprise silty sand and sandy silt units observed from the surface down to the relatively un-weathered, partially cemented gravel. The gravel deposits consistently displayed some level of cementation that is most likely caused by breakdown of the basaltic rock to silt and clay minerals and then subsequent relithification under normal loading. The soils observed in the borings at the sites were consistent with this mapping.

In the second borings at each project site, Swiftwater encountered a fine-grained, reddish brown to tan silty clay to clayey silt unit underlying the sandy gravel deposits. Swiftwater contacted Dr. Nick Zentner, Professor of Geological Sciences at Central Washington University about this unit. Dr. Zentner indicated that this layer is probably an alluvial deposit that develops in slow-water areas and ox-bows proximate to streams and to the Yakima River. He stated that these deposits are horizontally discontinuous and are found throughout the valley. The deposit on each project site is thus likely limited in lateral extent, especially given that it was not encountered in the first borings at any of the sites.

3.1.1.2 Solar Project Sites

Camas Solar Project Site

Surface geology in the Camas Solar Project site vicinity consists of Holocene river and creek alluvium and windblown loess of the Palouse Formation overlying Pleistocene Thorp Gravels. Recent alluvium deposited by Naneum and Wilson Creeks covers most of the project area, except the northeast corner where an older alluvial terrace of the ancestral Yakima River is present.

Fumaria Solar Project Site

The Fumaria Solar Project site is within the Kittitas Valley on the east side of the river on a Pliocene epoch gravel deposit called the Thorp Gravels.

Fumaria Solar Project Generation Tie Line

The Fumaria Solar Project generation tie line crosses several adjacent landforms, including ridges of Pleistocene epoch alpine glacial sediment of the Kittitas Drift (Swauk Prairie and Indian John subdrifts) and the Lakedale Drift (Bullfrog subdrift). Quaternary creek alluvium is mapped in the swales between the glacial ridges and at the point of intersection of the generation tie line with the existing grid (Baker et al. 1991).

Penstemon Solar Project Site

Surface geology in the Penstemon Solar Project site vicinity consists of Holocene creek alluvium and wind-blown loess of the Palouse Formation overlying Pleistocene Thorp Gravels. Alluvium deposited by Coleman Creek covers most of the project site.

Typha Solar Project Site

Surface geology in the Typha Solar Project site vicinity consists of Holocene river alluvium and wind-blown loess overlying older Pleistocene gravels. Recent alluvium deposited by the Yakima River and its major local tributary Robinson Creek covers most of the project site, and Thorp Highway South follows an older alluvial terrace southwest of the project.

Urtica Solar Project Site

Surface geology in the Urtica Solar Project site vicinity consists of Pleistocene-aged wind-blown loess and ash on top of Holocene-aged, water-lain alluvium, both overlying older glacial and pre-glacial gravels (Baker et al. 1991). Quaternary terraced sediments that include glacial sediment, older alluvium, and uplifted, partially lithified coastal marine and estuarine deposits form the substrate of the project site. Flows of the Middle Miocene Grande Ronde Basalt make up the hills just south of the project site and younger alluvium is in the valley floor to the north.

3.1.2 Impacts to Geology

3.1.2.1 General County

Detailed plans and specifications for the Columbia Solar Projects were not available prior to completion of the geologic survey, nor was a grading plan. However, based on Swiftwater's review of similar projects, they believed that very little grading would be required to construct the solar panel racks (Swiftwater 2017). Standard H-beam penetration for this type of installation is 6 to 8 feet below grade, and based on their survey, Swiftwater determined that from a geotechnical standpoint construction of the proposed solar projects would be feasible provided that strong enough vertical H-beam supports are installed. Once the loading for the piles has been determined, final bearing capacities and embedment lengths would be computed. The density of the soil matrix combined with the weight of the hammer might possibly damage the pile, leading to less than satisfactory bearing capacity values. In this case, it would be prudent to complete several test borings to determine whether the piles could be placed without damage. The purpose of this testing is two-fold: 1) it is necessary to determine that the piles can be driven into the bearing soils to the required embedment depth without damaging the pile and 2) it is required to load test the resulting piles to determine that adequate bearing capacity is being developed.

Wind Loading

The Kittitas Valley, particularly the Ellensburg area, is known for year-round windy conditions. This analysis assumed that solar panels that would be used for the Columbia Solar Projects would be 8 feet long by 4 feet wide, i.e., 32-square-foot panels. Ultimately, the panels would be 6.5 feet long by 3.5 feet wide, i.e., approximately 23-square-foot panels. The wind pressure loads in Table 3.1-1 were calculated using maximum wind speeds on vertically-oriented panels (Swiftwater 2017a).

Table 3.1-1. Estimated Wind Pressure Loads on Solar Panels Calculated Using Maximum Wind Speeds

Site-specific Wind Speed Value	Wind Speed (miles per hour)	Wind Pressure (lbs)
American Society of Civil Engineers (ASCE) 7-93 Wind speed (fastest mile)	70	593
ASCE 7-05 Wind speed (3-second peak gust)	85	878
ASCE 7-10 100-year Mean Recurrence Interval	91	1006
ASCE 7-10 Risk Category II	110	1470

Because the panels' current design is smaller than the dimensions used in the analysis, and the panels typically would not be oriented vertically and could be shifted horizontally before or during a high-wind event, the pressure on the panels (and therefore the H-beams) is likely to be less than these estimates. As a result, potential impacts to geology would be permanent, but minimal.

Seismic Activities

No seismic activities are planned as part of the Columbia Solar Projects.

3.1.2.2 Solar Project Sites

Camas Solar Project Site

The zone of appropriate embedment depth for the H-beams on the Camas Solar Project site is about 3 to 4 feet below grade to 16 feet below grade (Swiftwater 2017a).

Fumaria Solar Project Site

From the surface, drilling was difficult in both of the Fumaria Solar Project borings, indicating that embedment soils were present from grade down to 16 feet (Swiftwater 2017b).

Penstemon Solar Project Site

In both of the Penstemon Solar Project borings, drilling became more difficult with depth, indicating increasing density, increasing cementation, or both. Embedment depths were present from 3 feet below grade (Swiftwater 2017c).

Typha Solar Project Site

In both of the Typha Solar Project borings, drilling was difficult beginning at about 1.5 to 2 feet below grade, indicating that adequate embedment soils were present from about 2 feet below grade (Swiftwater 2017d).

Urtica Solar Project Site

In both of the Urtica Solar Project borings, drilling was difficult beginning at about 3.5 to 4 feet below grade, indicating that adequate embedment soils were present from about 3 to 4 feet below grade (Swiftwater 2017e).

3.1.3 Mitigation Measures for Geology

Complete several test borings to determine if the piles can be placed without damage. The purpose of this testing is two-fold: 1) it is necessary to determine that the piles can be driven into the bearing soils to the required embedment depth without damaging the pile, and 2) it is required in order to load test the resulting piles to determine that adequate bearing capacity is being developed.

(b) Soils. The application shall describe all procedures to be utilized to minimize erosion and other adverse consequences during the removal of vegetation, excavation of borrow pits, foundations and trenches, disposal of surplus materials, and construction of earth fills. The location of such activities shall be described and the quantities of material shall be indicated.

3.1.4 Affected Environment for Soils

3.1.4.1 General County

Most soils in the vicinity of the Columbia Solar Project sites have a cemented zone at depth, commonly called caliche, and a blanket of loess and volcanic ash across the surface (Gentry 2010). In April 2017 TUUSSO conducted a comprehensive geologic survey showing conditions at the solar project sites. The reports summarizing this study are included in Appendices G through K (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). Two test borings were drilled at each project site to a maximum depth of 16.5 feet below existing grade. The boring locations were selected to be representative of each project site as possible. The soil profiles in all of the borings were very consistent and based on the depositional environment in available mapping and also on the locally flat topography, the soil profile across each site is likely similar to those observed in the boring profiles. The boring logs contain detailed descriptions of soils at each project site (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e).

3.1.4.2 Solar Project Sites

Camas Solar Project Site

Soils mapped on the Camas Solar Project site include Mitta ashy silt loam, Nosal ashy silt loam, and Opnish ashy loam that form on floodplains and alluvial fan landforms within alluvium mixed with volcanic ash (Gentry 2010). Hydrologic Soil Group D was used in the hydrologic modeling because Nosal ashy silt loam is classified as Group D for undrained areas (detailed in Section 3.3.5).

Boring C-1 was completed in the north-northwest quadrant of the Camas Solar Project site, immediately to the south and west of the barn and staging area and Boring C-2 was located in the southeast quadrant of the site west of Little Naneum Creek (Figure 3.1.-1) (Swiftwater 2017a).

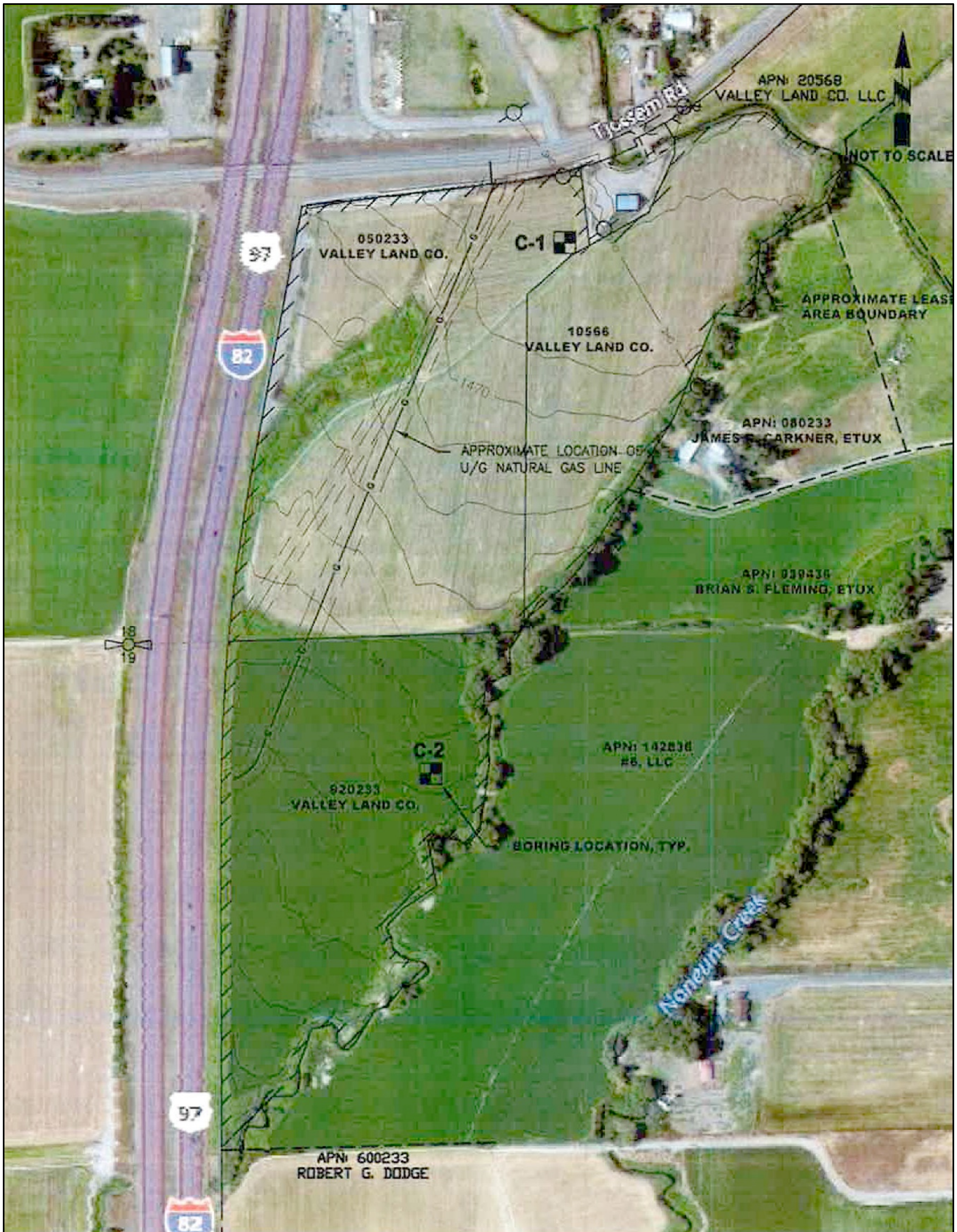


FIG. 2
CAMAS SITE
TEST BORING LOCATIONS

Swiftwater
Environmental & Geotechnical
Western Washington Division
165 NE Juniper Street, Suite 201A • Issaquah, WA 98027 • Phone: (425) 321-0787
Eastern Washington Division
407 Swiftwater Blvd., Suite A • Cle Elum, WA 98922 • Phone: (425) 321-0787

Figure 3.1-1. Boring locations at the Camas Solar Project site.

In Boring C-1, Swiftwater observed less than 6 inches of very dark brown highly organic sod underlain by a brown, moist medium dense topsoil-like loam soil with varying amounts of fine gravel. Swiftwater encountered this material to a depth of about 4 feet below grade. Drilling became very hard at about 4.5 to 5 feet below grade and the Standard Penetration Test (SPT) sample at 5.0 feet revealed a gray to dark gray, silty, sandy, partially cemented gravel with thin (<1-inch) fine sand seams that contained perched groundwater. N-values in this material was in excess of 40 and remained above that until termination of the hole. In Boring C-2, Swiftwater observed a soil profile that was nearly identical to that found in Boring C-1. A 6-inch-thick, wet sand seam was observed at 10.0 to 11.0 feet below grade. The entire soil profile of the site is moisture sensitive.

In both borings, Swiftwater observed that drilling grew difficult with depth beginning at about 3.5 to 4 feet below grade, indicating that adequate embedment soils are present from about 3 to 4 feet below grade down to the depth of the test borings.

Fumaria Solar Project Site

Soils mapped on the Fumaria Solar Project site include the Reeser-Reelow-Sketter complex, which form in alluvium and glacial drift with an influence of loess and volcanic ash on remnant alluvial fan landforms and typically extend to 1.8 feet below the surface. Hydrologic Soil Group D was used in the hydrologic modeling (detailed in Section 3.3.5).

Boring F-1 was completed in the north-northwestern quadrant of the Fumaria Solar Project site and Boring F-2 was located in the southeastern quadrant of the solar project site (Figure 3.1.-2) (Swiftwater 2017b). From the surface, drilling was difficult in both borings, indicating that embedment soils are present from the start of installation of the piles.

In Boring F-1, less than 6 inches to 1 to 1.5 feet of dark brown topsoil-like material was observed. It was a moist, very loose to loose, silty sand to sandy silt with varying amounts of gravel. Immediately underlying the very thin topsoil unit with a SPT (N-value) of 88, a dark gray to light gray, slightly moist to moist, very dense and partially cemented sandy gravel with varying amounts of silt was observed. N-values observed below 13 feet were about 28. This is on the high end of dense, but should not cause problems for pile installation because of the depth of the material.

In Boring F-2, a soil profile nearly identical to that found in F-1 was observed; the only differences being a thin (2- to 3-inch) unit of poorly developed topsoil and a slight reduction in density below 13 feet. Minor seepage was observed in Boring F-2 at 6.0 to 7.0 in a reddish sand seam. The entire soil profile of the site is moisture sensitive. Similar to F-1, there should not be any problems for pile installation because the dense material depth is below that of the planned pile installation depth.

Fumaria Solar Project Generation Tie Line

Soils mapped along the proposed Fumaria Solar Project generation tie line include Nanum, Manastash, Durtash, Metmill, and Brysill soils that form in alluvium mixed with ash on remnant alluvial fan and old terrace landforms. Soils mapped at the Reecer and Dry Creek crossings include Ackna, Brickmill, Manastash, Metmill, Nanum, Nosal, and Reeser soils that form in alluvium mixed with loess and ash on alluvial fan and terrace landforms, as well as soils of the Weirman-Kayak-Zillhah complex that form in alluvium on floodplains. The alluvial soils extend from 1.3 to 3.7 feet below the modern surface.

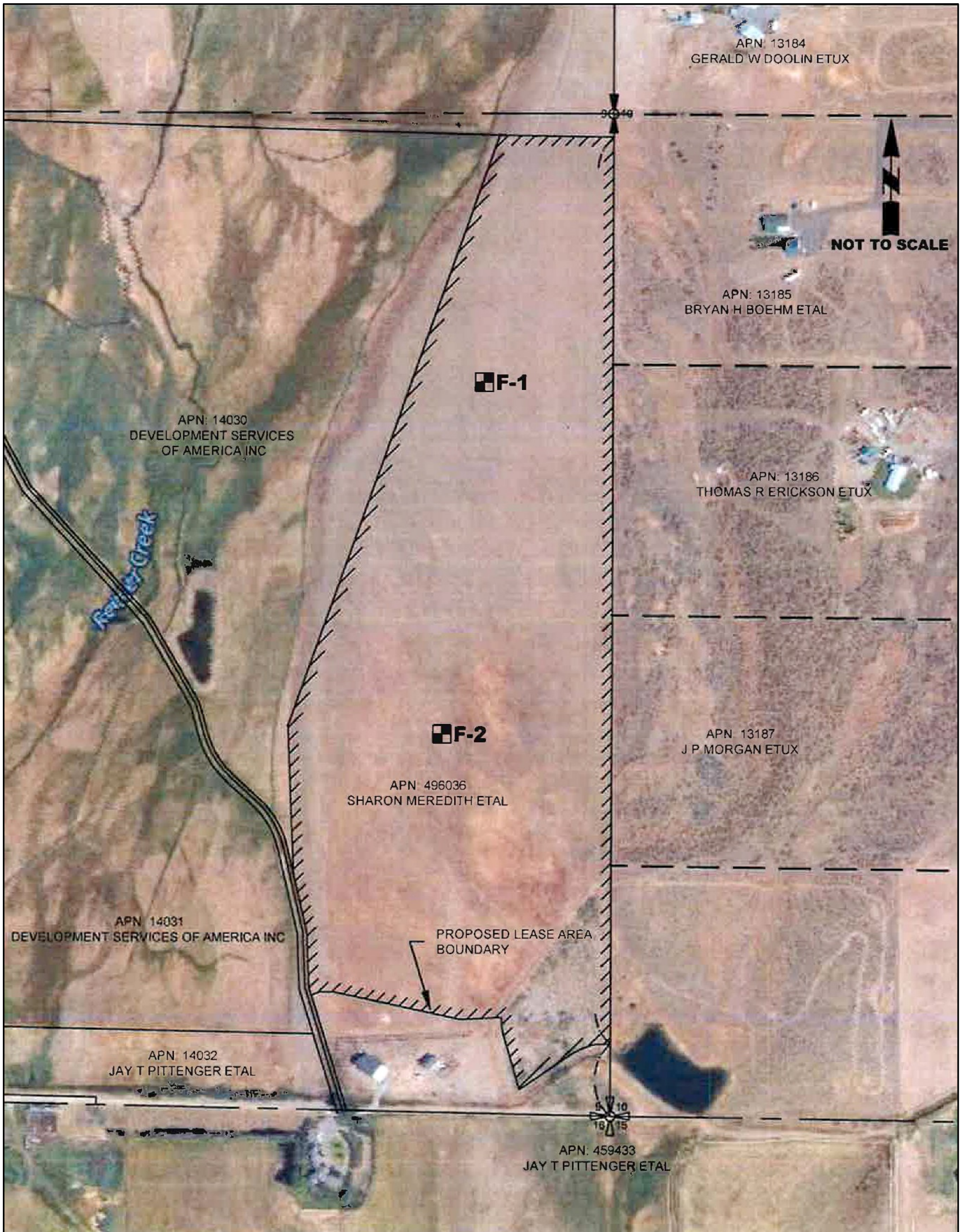


FIG. 2 *FUMARIA SITE* *TEST BORING LOCATIONS*	*Swiftwater* *Environmental & Geotechnical* **Western Washington Division** 165 NE Juniper Street, Suite 201A • Issaquah, WA 98027 • Phone: (425) 321-0787 **Eastern Washington Division** 407 Swiftwater Blvd., Suite A • Cle Elum, WA 98922 • Phone: (425) 321-0787

Figure 3.1-2. Boring locations at the Fumaria Solar Project site.

Penstemon Solar Project Site

Soils in the west third of the Penstemon Solar Project site is mapped as the Nack-Brickmill complex. Soil in the middle of project area is mapped as Mitta ashy silt loam. Soil in the east third of project area is mapped as Deedale clay loam. These soils form in alluvium mixed with volcanic ash on alluvial fan landforms and floodplain landforms (Gentry 2010). Hydrologic Soil Group D was used in the hydrologic modeling because some of these soils are either classified as Group D or are Group D when undrained (detailed in Section 3.3.5).

Boring P-1 was completed in the northwestern quadrant of the Penstemon Solar Project site and Boring P-2 was located in the southeastern quadrant of the site (Figure 3.1-3) (Swiftwater 2017c).

In Boring P-1, 1.5 feet of dark brown topsoil-like material consisting of a moist, very loose to loose silty sand to sandy silt with varying amounts of gravel was observed. Immediately underlying the topsoil unit a dark gray to light gray, slightly moist to moist, very dense and partially cemented sandy gravel with varying amounts of silt was observed. Below about 10 feet, thin (less than 6 inches) reddish-brown fine sand seams with minor amounts of perched groundwater were observed. This boring was terminated in the sandy gravel unit. The soil profile in P-1 was nearly identical to that found in P-2, the only difference being a reddish-brown, stiff to very stiff, silty clay to clayey silt unit below about 12.5 feet.

In both borings, drilling became more difficult with depth indicating increasing density, increasing cementation, or both. The upper topsoil unit is moisture sensitive.

Typha Solar Project Site

Soils mapped on the Typha Solar Project site include Nosal ashy silt loam, Weirman gravelly sandy loam, and soils of the Weirman-Kayak-Zillah complex that form in alluvium on flood plain landforms (Gentry 2010). Hydrologic Soil Group D was used in the hydrologic modeling because some of these soils are classified as Group D when undrained (detailed in Section 3.3.5).

Boring T-1 was completed in the south-central area of the Typha Solar Project site, and Boring T-2 was located in the northeast quadrant of the site, west of the Yakima River (Figure 3.1-4) (Swiftwater 2017d).

In Boring T-1, less than 6 inches of very dark brown, highly organic sod underlain by a brown, moist medium dense gravelly sand to sandy gravel with a trace to some silt and scattered fine organics (e.g., fine roots) was observed. Drilling was very hard below about 1.5 feet with a color change to gray. The surficial SPT N-value was 40. There was cementation in the sandy gravel to gravelly sand, and the same material was observed to the final depth of the boring. All N-values equaled or exceeded 50. At 6.5 feet below grade, there was a 6-inch silty sand seam with perched groundwater seepage. The seepage was not continuous.

A soil profile that was nearly identical to that found in T-1 was observed in Boring T-2, including the 6-inch silty sand seam with perched groundwater seepage. T-2 was terminated in the gray to dark gray silty sand to sandy silt unit. SPT N-values were consistent at 50.

In both borings, drilling was difficult beginning at about 1.5 to 2 feet below grade indicating that adequate embedment soils are present from about 2 feet below grade.

FIG. 2
PENSTEMON SITE
TEST BORING LOCATIONS

Swiftwater
Environmental & Geotechnical
Western Washington Division
165 NE Juniper Street, Suite 201A • Issaquah, WA 98027 • Phone: (425) 321-0787
Eastern Washington Division
407 Swiftwater Blvd., Suite A • Cle Elum, WA 98922 • Phone: (425) 321-0787

Figure 3.1-3. Boring locations at the Penstemon Solar Project site.

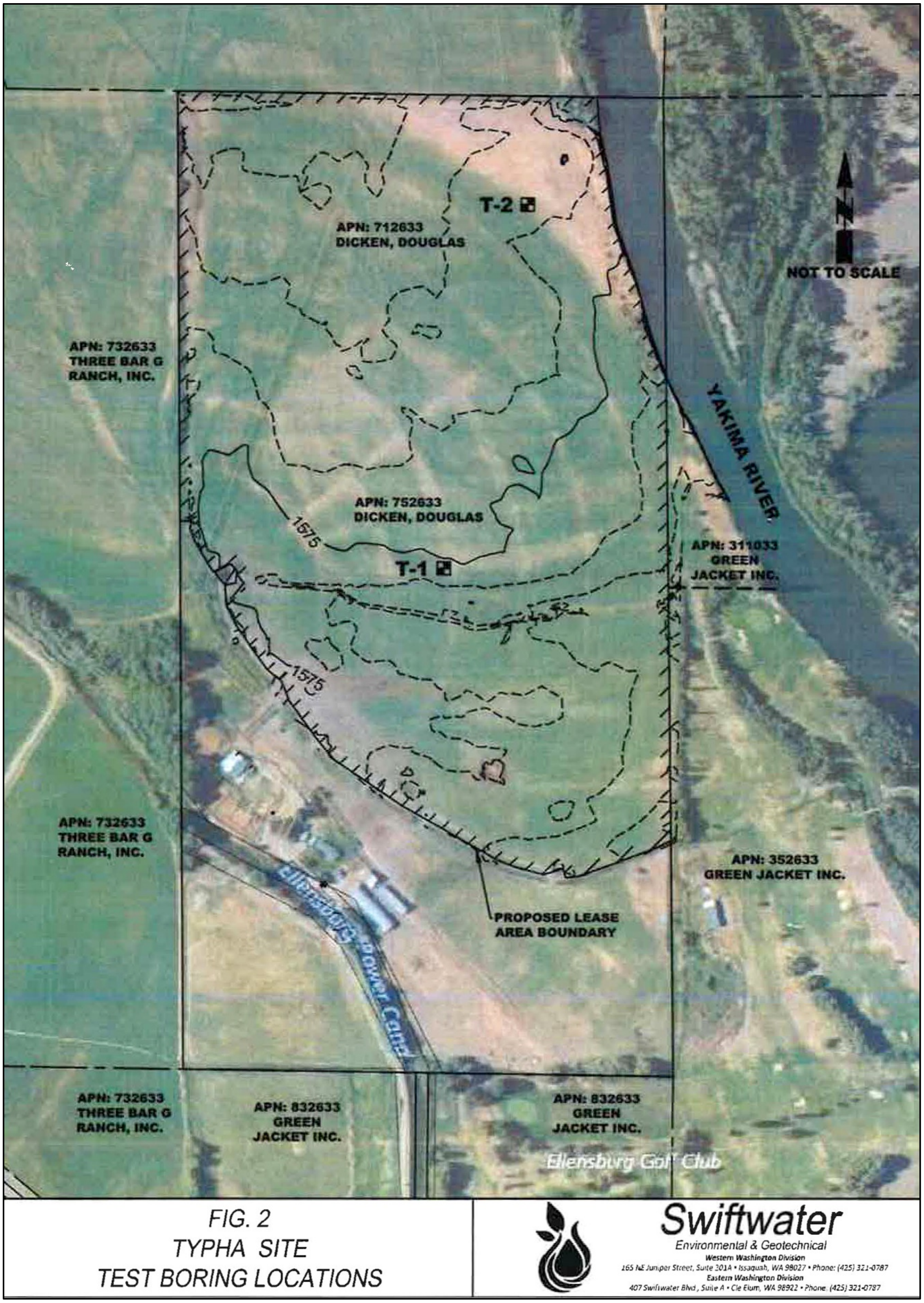


Figure 3.1-4. Boring locations at the Typha Solar Project site.

Urtica Solar Project Site

The Urtica Solar Project site is composed of Nanum ashy loam, Brickmill gravelly ashy loam, Ackna Ashy loam, and Brysill cobbly ashy loam (Natural Resources Conservation Service [NRCS] 2017a). Hydrologic Soil Group D was used in the hydrologic modeling because Nanum ashy loam is classified as Group D for undrained areas (detailed in Section 3.3.5)

Boring U-1 was completed in the northwest quadrant of the Urtica Solar Project site, northwest of the ponds and Boring U-2 was located in the south central quadrant of the site (Figure 3.1-5) (Swiftwater 2017e).

In each boring, there was a thin topsoil layer consisting of a brown silty fine sand with scattered organics that extended to a depth of about 1.5 to 4 feet below grade and consisted of a topsoil-like loamy material. This material would not be suitable for embedment or for lateral force. At about 4.5 to 5 feet below grade drilling became very hard and the SPT sample at 5 feet revealed a gray to dark gray silty sandy, partially cemented gravel. N-values in this material were in excess of 40 and remained there until termination of the hole. The soil profile in Boring U-2 was nearly identical to that found in U-1.

In both borings, drilling was difficult beginning at about 3.5 to 4 feet below grade indicating that adequate embedment soils are present from about 3 to 4 feet below grade.

3.1.5 Impacts to Soils

The following sections describe all procedures to be utilized to minimize erosion and other adverse consequences during the removal of vegetation, excavation of foundations and trenches (no borrow pits are planned), disposal of surplus materials, and construction of earth fills. The Columbia Solar Project would result in temporary minor impacts to soils. For each Columbia Solar Project site, the location of such activities is described in detail and shown in map figures in Appendix L.

3.1.5.1 Infiltration and Temporary Erosion and Sedimentation Control

TUUSSO would implement applicable stormwater guidelines and best management practices (BMPs) for eastern Washington to reduce or eliminate concentrated stormwater runoff and erosion on the Columbia Solar Projects. These BMPs would also help limit the introduction of pollutants/contamination into the arid-land and rangeland soils present at the solar project sites. Additional details regarding BMPs can be found in Section 3.1.6 and would be part of the SWPPP.

Construction of the Columbia Solar Project arrays could create a minor increase in the total and effective impervious area of each site that would be equivalent to the area of the solar panel footings and associated infrastructure. There would also be an increase in less pervious area because of the proposed gravel access roads on each solar project site.

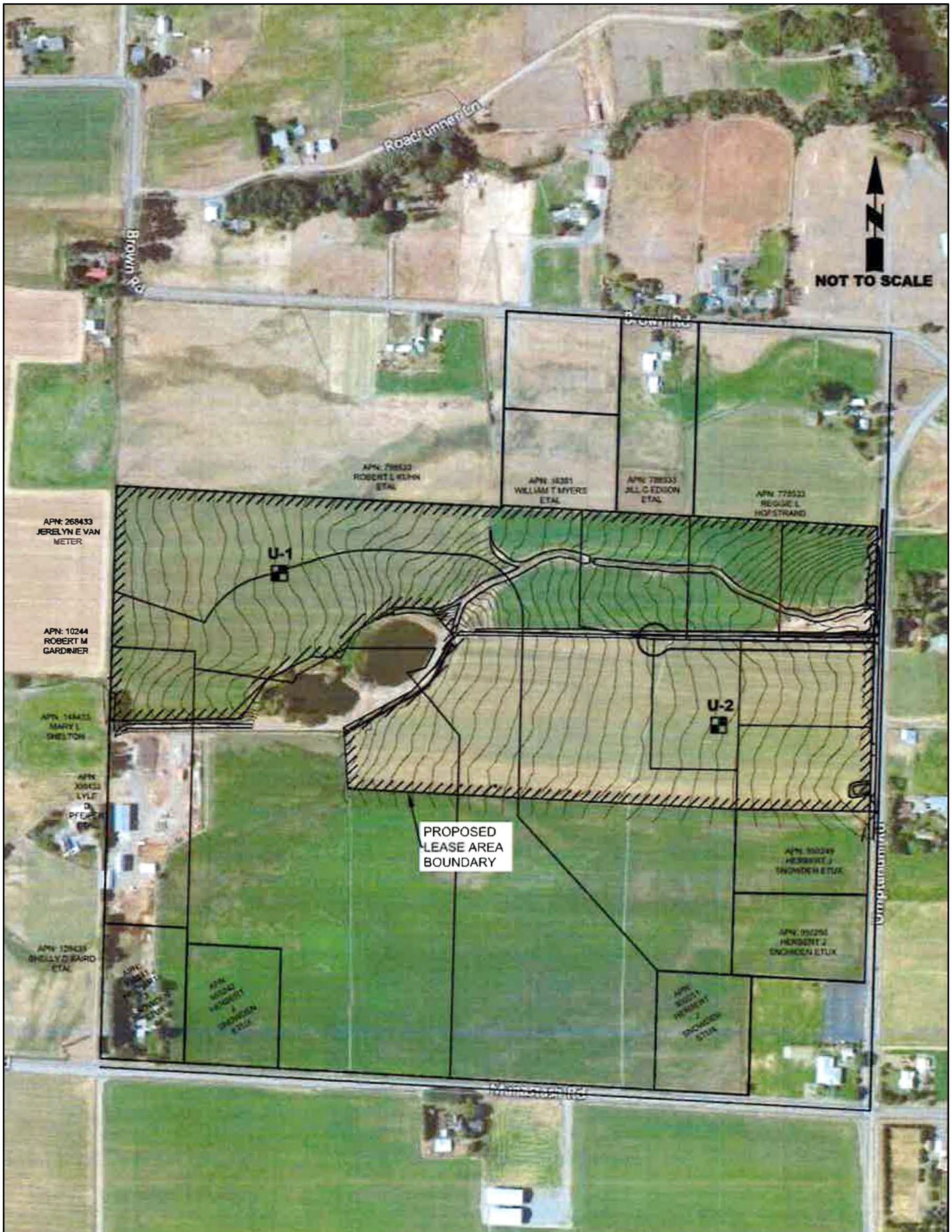


FIG. 2
URTICA SITE
TEST BORING LOCATIONS

Swiftwater
Environmental & Geotechnical
Western Washington Division
165 NE Juniper Street, Suite 201A • Issaquah, WA 98027 • Phone: (425) 321-0787
Eastern Washington Division
407 Swiftwater Blvd., Suite A • Cle Elum, WA 98922 • Phone: (425) 321-0787

Figure 3.1-5. Boring locations at the Urtica Solar Project site.

Based on the results of the geotechnical studies, infiltration into the upper, topsoil-like silty sand/sandy silt soils at the Columbia Solar Project sites is feasible and ongoing (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). The solar project sites have been cultivated using flood irrigation methods, and the irrigation water percolates into the soil and is stored above the underlying relatively impervious layer found throughout the valley. The soils are capable of allowing stormwater to infiltrate during an average year (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). The solar project sites are located in Climate Region 2 – Central Basin and receive an average of about 8 inches of precipitation per year, some of it in the form of snow. Given the relatively low precipitation in the area, combined with the natural permeability of the upper soil horizon, infiltration of normal stormwater amounts would occur, and normal levels of stormwater would not be concentrated to a significant extent on the solar project sites (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). As a result, there would be permanent minor impacts to soils.

3.1.5.2 Stripping

No well-developed sod or heavily organic topsoil layers were observed at the Columbia Solar Project sites because of ongoing cultivation, thus stripping should not be required (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). If a topsoil horizon is observed in areas where maintenance roads are proposed, the topsoil would be removed down to mineral soil and replaced with crushed rock or structural fill. Topsoil strippings could be stockpiled for use in non-structural areas, as desired, but would not be allowed to mix with soils that would be used for structural fill.

3.1.5.3 Native Soils and Imported Soils

At least the upper units of the soil profile at each Columbia Solar Project site, and for some sites the entire soil profile, are moisture-sensitive and those soils would be difficult to use as structural fill during the rainy winter and spring months. The underlying partially cemented sandy gravel soils would be less moisture sensitive, but natural variability of the fine-grained fraction (e.g., silts and clay minerals) might cause these soils to be moisture sensitive as well (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). However, if moisture content is near optimum, the soil could be used as compacted structural fill. Excavated site soils would be stockpiled and covered immediately if they are to be saved and used as structural fill. If the soils are above optimum moisture content, it may be possible to aerate them to reduce moisture content. This is possible during the warmer summer months, but it is difficult to achieve uniform moisture content. It may also be possible to use Portland cement as an admixture to reduce moisture content. If the site soils cannot be adequately compacted, it may be necessary to use imported soil for structural fill. Imported soil would be a well-graded granular mineral soil with fines content below 5% and should be at or slightly above the optimum moisture content. If construction of the Columbia Solar Projects is scheduled to occur during periods where precipitation is expected, a contingency would be built into the solar projects for imported soil/crushed rock base (CRB) or other imported structural fill.

3.1.5.4 Subgrade Preparation

Disturbed native soil would not be used in structural areas (e.g., maintenance road prism or inverter foundations). The fill would be compacted in accordance with the structural fill specifications to reach design grade. CRB can also be placed and compacted. If necessary, a local materials testing firm would sample soils to be used as structural fill, collect samples for Proctor testing, and provide compaction testing as structural fill is placed.

3.1.5.5 Structural Fill

Structural fill on the Columbia Solar Projects would be placed in thin lifts and compacted to design specifications, to support overlying structures with little or no post-construction movement. It is typically used under foundations, slabs, and roads; in utility trenches; behind retaining walls; and in constructed slopes. Compaction specifications may vary, especially in utility trenches under public or private roads, as specified by the local jurisdiction. Moisture content is critical to achieving adequate densification (compaction) and the upper units of all the Columbia Solar Project sites' soils is very moisture sensitive, i.e., a small change in moisture content can make them unusable as structural fill. If the soils are stockpiled and not covered, precipitation would make them difficult or impossible to use as structural fill (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e).

3.1.5.6 Foundations

The Columbia Solar Project inverter foundations would be supported on undisturbed, competent, native sandy gravel soils found below the upper topsoil-like horizon, on re-compacted native soils, structural fill, or CRB (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). Where loose or unsuitable soils are encountered at design subgrade, it would be necessary to re-compact the native soils to structural fill specifications, or to over-excavate down to competent native soils and then place structural fill or CRB up to design subgrade. The following parameters may be used for solar project design:

- Allowable soil bearing capacity: 1,500 pounds per square foot (psf)
- Passive earth pressure: 300 pound force per cubic foot (pcf) (equivalent fluid)
- Coefficient of friction: 0.35

A one-third increase in the allowable soil bearing capacity would be assumed for short-term wind and seismic loading conditions. The passive pressure and friction values above include a factor of safety of at least 1.5. With anticipated structural loads, total settlement of 1 inch and differential settlement of 0.5 inch would be anticipated. Most settlement would occur during construction, as dead loads are applied.

3.1.5.7 Seismic Design

The groundwater and native soil conditions (upper native silty sand soils and the underlying partially cemented sandy gravels) at the Columbia Solar Project sites have very low susceptibility to liquefaction (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). Liquefaction is a phenomenon wherein loose, saturated soils suddenly lose shear strength and begin to behave as a fluid. Liquefaction typically occurs under seismic loading conditions and if structures are supported on soils that liquefy, structural damage can occur.

3.1.5.8 Excavations/Slopes

Soils observed in the upper 1.5 to 2 feet of the test borings at all of the Columbia Solar Project sites would be classified as Occupational Safety and Health Administration/Washington Industrial Safety and Health Act (OSHA/WISHA) Type C. Temporary excavations like utility excavations and foundation excavations with heights in excess of 4 feet would be sloped to no steeper than 1.5H:1V. If seepage is observed in these excavations, they may need to be sloped at 2H:1V to prevent sloughing due to seepage pressure. The dense native sandy gravel soil observed below about 2 feet would be considered OSHA/WISHA Type B soils and would be laid back at 1H:1V.

3.1.5.9 Utility Support, Trenches, and Trench Backfill

Columbia Solar Project site soils would be suitable for support of solar panel infrastructure and utilities (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). In shallower trenches, particularly shallower than about 2 feet, it may be necessary to over-excavate loose or wet soil down to suitable, stable soils, and then replace it with compacted structural fill or CRB. Groundwater seepage may be encountered in trench walls, particularly if deeper than 2 to 3 feet. Seepage may cause caving of the trench walls and temporary shoring may be required. Dewatering measures may also be needed to control seepage.

Site soils may be suitable for use as backfill, provided the moisture content is optimal (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e), as determined in the laboratory. Trench backfill would be placed and compacted in accordance with the structural fill specifications (described above). CRB would be placed in 6- to 8-inch lifts and compacted with a plate compactor or other compaction device.

3.1.6 Mitigation Measures for Soils

The following soils mitigation measures would be used:

- Planned BMPs include those from stormwater management guidelines applicable to eastern Washington.
- If excavated site soils are to be used as structural fill, they would be protected from moisture while stockpiled.
- Stockpiled topsoil would not be mixed with structural fill, if it is planned for use in non-structural areas.
- Temporary excavations like utility excavations and foundation excavations with heights in excess of 4 feet would be sloped no steeper than 1.5H:1V. If seepage is observed in these excavations, they may need to be sloped at 2H:1V to prevent sloughing due to seepage pressure. Dewatering measures may also be needed to control seepage.
- Temporary construction ingress and egress would be completed prior to the start of ongoing construction traffic at the solar project sites. A temporary construction entrance would be constructed of 8 to 12 inches of quarry spalls. If the soils in the entrance locations are soft, a layer of geotextile fabric would be laid down as a barrier prior to placement of quarry spalls. The quarry spalls would provide a stable entrance/exit to the sites and would limit tracking of mud onto the existing public and private roads during and after wet weather. Infiltration and Temporary Erosion and Sedimentation Control (TESC) measures would consist of installation of silt fencing as needed around the site entrances, around the perimeter of the low side of the sites, and at discharge points where sediment-laden surface water might enter off-site drainage features. Because the solar project sites are flat and slope very gently to the south, silt fencing would probably not be necessary at the southern perimeters.

(c) Topography. The application shall include contour maps showing the original topography and any changes likely to occur as a result of energy facility construction and related activities. Contour maps showing proposed shoreline or channel changes shall also be furnished.

3.1.7 Affected Environment for Topography

The Columbia Solar Project sites are all relatively flat (see figures in Section 3.3.4.2).

3.1.7.1 Camas Solar Project Site

The Camas Solar Project site is sloped gently from north to south with an overall inclination of about 0.5%.

3.1.7.2 Fumaria Solar Project Site

The Fumaria Solar Project site is sloped gently north to south with an overall inclination of about 2%.

3.1.7.3 Fumaria Solar Project Generation Tie Line

The Fumaria Solar Project generation tie line would originate from the southwestern corner of the Fumaria Solar Project site and would connect to the existing Puget Sound Energy (PSE) distribution transmission lines (or the PSE substation) approximately 2.6 miles away to the southwest. The path is illustrated in Appendix L, and up to 0.9 mile of it would require new wooden poles or undergrounded conductor. The remaining length of the new generation tie line would be installed along existing electrical rights-of-way (ROWs).

3.1.7.4 Penstemon Solar Project Site

The Penstemon Solar Project site is flat with a very slight inclination from north to south.

3.1.7.5 Typha Solar Project Site

The Typha Solar Project site is irregularly shaped with the north and east site boundaries defined by the Yakima River. The site surface is irregular with an overall topography change of about 10 feet. This area appears to be ancient floodplain and old meanders and oxbows are visible across the project site.

3.1.7.6 Typha Solar Project Generation Tie Line

The generation tie line would originate from the southwestern corner of the Typha Solar Project site and share wooden poles with existing electric distribution lines that cross south along an existing access road, crossing the EP Canal three times, passing through the Ellensburg Golf and Country Club, to connect to the existing PSE distribution line along Thorp Highway South. The approximately 0.5-mile path is illustrated in Appendix L, and less than 0.1 mile would require new wooden poles and conductors. The remaining length of the new generation tie line would be installed along existing electrical ROWs.

3.1.7.7 Urtica Solar Project Site

The Urtica Solar Project site slopes gently from north to south.

3.1.8 Impacts to Topography

Minor topographical changes would occur as a result of Columbia Solar Project construction and operation activities; these include the proposed internal 12-foot access roads and inverter foundations (Appendix L). No other topographical changes are proposed. No changes would occur to shorelines or channels from the proposed solar project sites and their associated generation tie lines. As a result, potential impacts to topography would be permanent, but minimal.

(d) Unique physical features. The application shall list any unusual or unique geologic or physical features in the project area or areas potentially affected by the project.

3.1.9 Unique Physical Features

The Yakima River, located east of the Typha Solar Project site, is the only unusual or unique geologic or physical feature in the vicinity of the Columbia Solar Project sites and their associated generation tie lines. The river would not be affected by the proposed Typha Solar Project site because, at the closest, the project site boundary fence would be set back 146 feet from the river, and the solar panel arrays would be 158 feet from the river. As a result, there would be no potential impacts to unique physical features.

(e) Erosion/enlargement of land area (accretion). The application shall identify any potential for erosion, deposition, or change of any land surface, shoreline, beach, or submarine area due to construction activities, placement of permanent or temporary structures, or changes in drainage resulting from construction or placement of facilities associated with construction or operation of the proposed energy project.

3.1.10 Erosion/Enlargement of Land Area (Accretion)

As described in Section 3.1.7, the Columbia Solar Project sites are all relatively flat, and there is no potential for accretion impacts through erosion, deposition, or change of any land surface, shoreline, beach, or submarine area due to construction or operation of the proposed solar projects. Additional details regarding erosion control and drainage are included in Section 3.3.6.

(2) The application shall show that the proposed energy facility will comply with the state building code provisions for seismic hazards applicable at the proposed location.

3.1.11 Seismic Hazards

The Columbia Solar Project sites would be designed to seismic Site Class D in accordance with Table 20.3-1 of the American Society of Civil Engineers (ASCE) *Minimum Design Loads for Buildings and Other Structures* manual, as recognized by the 2015 International Building Code (Swiftwater 2017a). As a result, there would be minimal potential for seismic impacts to occur.

3.2 Air 463-60-312

The application shall provide detailed descriptions of the affected environment, project impacts, and mitigation measures for the following:

(1) Air quality. The application shall identify all pertinent air pollution control standards. The application shall contain adequate data showing air quality and meteorological conditions at the site. Meteorological data shall include, at least, adequate information about wind direction patterns, air stability, wind velocity patterns, precipitation, humidity, and temperature. The applicant shall describe the means to be utilized to assure compliance with applicable local, state, and federal air quality and emission standards.

3.2.1 Affected Environment for Air Quality

3.2.1.1 Local Climate

Localized meteorology can influence air pollutant mixing and dispersion. The climate of the Columbia Solar Projects area has both continental and marine characteristics. The climate is mild for its latitude due to the terrain, the Pacific Ocean, and semipermanent high and low pressure regions over the North Pacific Ocean. The proposed Columbia Solar Projects area is in the Ellensburg Valley, just east of the Cascade Range. As air descends along the eastern slopes of the mountains, it warms and dries, creating a nearly desert climate. The proposed solar project area experiences a mean annual maximum temperature around 60°F. In the warmest month, July, the average maximum temperature is in the mid-80s°F and minimum temperatures average around 54°F. January is the coolest month with a maximum temperature of 32°F and minimum temperatures average around 16°F. In the winter, the average snowfall ranges from 5 to 13 inches. Snow tends to remain on the ground for periods varying from a few days to two months between mid-December and the end of February (Western Regional Climate Center [WRCC] 2017a).

Annual precipitation averages around 9 inches. It is common for 4 to 6 weeks to pass during July and August without rainfall. Representative, historical data from Ellensburg Bowers Field National Weather Service Co-op Station 452508 is summarized in Table 3.2-1.

Table 3.2-1. Representative Meteorological Conditions in the Proposed Action Area

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (°F)	32.2	40.9	49.9	60.7	69.4	74.2	84.0	82.7	75.3	60.9	44.2	35.9	59.2
Average Min. Temperature (°F)	15.8	22.5	27.7	34.3	42.6	48.6	54.2	53.2	45.4	36.1	26.6	21.9	35.8
Average Total Precipitation (inches)	1.31	0.85	0.84	0.52	0.72	0.70	0.20	0.28	0.48	0.78	1.26	1.19	9.12
Average Total Snowfall (inches)	13.0	6.2	2.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	5.5	8.2	35.2

Note: Historical weather data for Ellensburg Bowers Field, Washington, National Weather Service Co-op Station 452508 (46.96917, -120.54) from 5/4/1940 to 6/7/2016. Annual averages are presented for minimum and maximum temperatures and annual totals for precipitation and snowfall.
max. = maximum
min. = minimum
Source: WRCC (2017b).

Wind conditions near the proposed solar project area can be characterized by Remote Automated Weather Stations (RAWS), which collect data used in numerous applications, including: fire weather, climatology, resource management, flood warning, noxious weed control, all-risk management, and air quality management (National Interagency Fire Center 2003). The RAWS closest to the proposed solar project sites is in Peoh Point, Washington. During the period from July 1, 2000, to July 5, 2017, the prevailing winds most frequently blew from the southwest (approximately 26% of the time). The average wind speed for the period was approximately 5.8 miles per hour (2.6 meters per second) (WRCC 2017c).

3.2.1.2 National Ambient Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has promulgated primary and secondary National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), two size categories of particulate matter (PM_{10} and $PM_{2.5}$), ozone (O_3), sulfur dioxide (SO_2), and lead. The primary standards are concentration levels of pollutants in ambient air, averaged over a specific time interval, designed to protect public health with an adequate margin of safety. The secondary standards are concentration levels judged necessary to protect public welfare and other resources from known or anticipated adverse effects of air pollution. Although states may promulgate more stringent ambient standards, the State of Washington has adopted standards identical to the federal levels (see Washington Administrative Code (WAC) 173-476, Ambient Air Quality Standards).

Table 3.2-2 presents the NAAQS for six “criteria” pollutants, including both primary standards (pertaining to human health) and secondary standards (pertaining to human welfare, such as visibility, socioeconomics, and effects on flora and fauna). Lead is not measured, as it generally does not pose a problem since the removal of lead from gasoline.

Table 3.2-2. National Ambient Air Quality Standards

Pollutant	Averaging Period	Primary	Secondary
Nitrogen Dioxide (NO_2)	1-hour	100 ppb	–
	Annual	53 ppb	53 ppb
Sulfur Dioxide (SO_2)	1-hour	75 ppb	–
	3-hour	–	0.5 ppm
	24-hour*	0.14 ppm	–
	Annual*	0.02 ppm	–
Carbon Monoxide (CO)	1-hour	35 ppm	–
	8-hour	9 ppm	–
Ozone (O_3)	8-hour	0.07 ppm	0.07 ppm
Lead (Pb)	3-month Average	0.15 μg/m^3	0.15 μg/m^3
Particulates			
• $PM_{2.5}$	24-hour	35 μg/m^3	35 μg/m^3
	Annual	12 μg/m^3	15 μg/m^3
• PM_{10}	24-hour	150 μg/m^3	150 μg/m^3

*State standard only. SO_2 24-hour and Annual NAAQS were revoked in 2010.
Note: μg/m^3 = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion.
Source: EPA (2017a), WAC 173-476-900.

3.2.1.3 General Conformity

The General Conformity Rule was established under the Clean Air Act (CAA) Section 176(c)(4) and serves to ensure that federal actions do not inhibit state's attainment plans for areas designated as non-attainment or maintenance. The term conformity (as it pertains to the rule), means "conformity to a SIP's [State Implementation Plan's] purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards." The rule effectively applies to all federal actions that take place in areas designated as non-attainment or maintenance, except for actions covered under the transportation conformity rule, actions with associated emissions below specified de minimis levels, and other actions that are exempt or presumed to conform (EPA 2010).

De minimis levels for criteria pollutants are established under the General Conformity Rule. De minimis levels are based on the severity of an area's air quality problem and establish a threshold for determining if a general conformity determination must be performed. Activities below this threshold level are assumed to have no significant impact on air quality. De minimis levels for hazardous air pollutants (HAPs) and greenhouse gases (GHGs) are not yet defined.

Because the five proposed Columbia Solar Project sites would be located within an attainment area, the General Conformity Rule does not apply.

3.2.2 Impacts to Air Quality

The five proposed Columbia Solar Projects would only have minimal dust and vehicular air emissions during construction, and no air emissions during operation. In addition, no air permit authorizations are anticipated to be required for the proposed solar projects.

(2) Odor. The application shall describe for the area affected all odors caused by construction or operation of the facility, and shall describe how these are to be minimized or eliminated.

3.2.3 Affected Environment for Odor

Kittitas County consists substantially of rural agricultural, native rural lands, and forests. Thus, typical sources of odors include crops and associated operating agricultural machinery, cattle and other farm animals, and various species of trees and native shrubs and grasses.

3.2.4 Impacts to Odor

3.2.4.1 Construction Impacts

Typical odor nuisances include hydrogen sulfide, ammonia, chlorine, and other sulfide-related emissions. No significant sources of these pollutants would be used during construction of the five Columbia Solar Projects. An additional potential source of project-related odor is diesel engine emissions. The five proposed solar projects may generate odors from the construction equipment exhaust. Any odors from construction would be periodic and temporary in nature, since construction equipment would not be located in any one area for longer than 3 months.

3.2.4.2 Operation Impacts

Operation and maintenance activities for the five proposed Columbia Solar Projects would not cause detectable odors. Vehicles used for occasional maintenance might generate exhaust odors in the immediate vicinity, but this would be temporary and would not affect a substantial number of people.

(3) Climate. The application shall describe the extent to which facility operations may cause visible plumes, fogging, misting, icing, or impairment of visibility, and changes in ambient levels caused by all emitted pollutants.

3.2.5 Affected Environment for Climate

Emission inventories are useful in comparing emission source categories to determine which industries or practices are contributing to the general level of pollution in an area. Emission inventories provide an overview of the types of pollution sources in an area, as well as the amount of pollution being emitted on an annual basis by said sources. For the purposes of this assessment, the most recent National Emissions Inventory conducted in 2014 was used. The emission inventory data is summarized in Table 3.2-3.

Table 3.2-3. Emissions Inventory in Tons per Year for Kittitas County, Washington

Source	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	HAPs
Agriculture	0	0	208	42	0	0	0
Biogenics [1]	5,079	269	0	0	0	21,967	3,376
Dust	0	0	708	130	0	0	0
Fires	36,866	442	3,701	3,138	257	8,675	2,072
Fuel Combustion	909	61	122	120	8	153	28
Industrial Processes	0	0	106	13	0	3	0
Miscellaneous [2]	46	1	30	28	0	706	76
Mobile	13,852	3,811	162	125	12	1,434	419
Waste Disposal	688	32	139	121	7	54	16
Total	**57,441**	**4,616**	**5,176**	**3,717**	**285**	**32,993**	**5,988**

Note: Due to an incomplete data set, GHG emissions are not presented. Totals may not sum exactly due to rounding.
VOC = Volatile Organic Compound, HAPs = Hazardous Air Pollutants, NO_X = Nitrogen oxides, including nitrogen dioxide (NO_2).
1. Biogenic emissions are those emissions derived from natural processes (such as vegetation and soil).
2. Miscellaneous categories include bulk gasoline terminals, commercial cooking, gas stations, miscellaneous non-industrial (not elsewhere classified), and solvent use.
Source: EPA (2014).

3.2.6 Impacts to Climate

3.2.6.1 Construction Impacts

As shown in Table 3.2-4, the most abundant pollutants produced during the construction phase of the Columbia Solar Projects, in total tons, are CO_2e, NO_X, CO, and PM_{10}. The greatest contributors to these pollutants are the operation of off-road construction equipment (CO_2e, NO_X, and CO) and on-road vehicles commuting and deliveries (PM_{10}).

Table 3.2-4. Construction-Related Emissions in Tons Resulting from the Proposed Solar Project (Per Project Site)

Source	CO	NO_X	SO_X [1]	PM_{10}	$PM_{2.5}$	VOCs	HAPs	CO_2e [2]
Off-Road Construction Equipment	3.42	5.53	0.01	0.25	0.23	0.76	0.08	744
Commuting/On-Road Equipment/Material Delivery	0.39	0.11	0.00	1.20	0.14	0.05	0.00	84
Fugitive Dust From Construction Operations	–	–	–	0.03	0.00	–	–	–
Total	**3.81**	**5.63**	**0.01**	**1.48**	**0.37**	**0.81**	**0.08**	**828**
Percent of Total Kittitas County Emissions	***0.01%***	***0.12%***	***< 0.01%***	***0.03%***	***0.01%***	***< 0.01%***	***< 0.01%***	***N/A*** [3]

Note: CO_2e = Carbon dioxide equivalent.
1. All oxides of sulfur (including SO_2). For purposes of comparison, SO_2 emissions reported in the county inventory are assumed to be equal to SO_X.
2. CO_2e emissions are reported in metric tons.
3. CO_2e emissions are not reported for all sources in the county inventory. Therefore, CO_2e emissions are not compared to the county inventory.

Each pollutant is at most 0.12% of Kittitas County's emissions inventory. These construction emissions would be temporary and transient in nature. Therefore, significant impacts to air resources are not likely to occur from the construction of the Columbia Solar Projects.

3.2.6.2 Operation Impacts

Climate concerns, similar to air quality concerns, would be very minimal once the five proposed Columbia Solar Projects are in operation. Operational-related emissions for the proposed solar projects would consist of a monthly maintenance inspections by workers in a single pick-up truck. Thus, the operational emissions would be minimal. There would be no impacts on climate from the operation of the five proposed solar projects.

(4) Climate change. The application shall describe impacts caused by greenhouse gases emissions and the mitigation measures proposed.

3.2.7 Affected Environment for Climate Change

Gases that trap heat in the atmosphere are called GHGs. Adverse health effects and other impacts caused by elevated atmospheric concentrations of GHGs occur via climate change. Climate impacts are not attributable to any single action but are exacerbated by diverse individual sources of emissions that each make relatively small additions to GHG concentrations.

GHGs absorb heat and slow the rate at which energy escapes to space. Some GHGs are more effective at absorbing energy and stay in the atmosphere longer than others. Equivalent carbon dioxide (CO_2e) is the amount of carbon dioxide (CO_2) that would cause the same level of warming as a unit of one of the other GHGs. The principal GHGs that enter the atmosphere because of oil and gas exploration and production include CO_2, methane (CH_4), and nitrous oxide (N_2O) (EPA 2015). For example, 1 ton of CH_4 has a CO_2e of 25 tons; therefore, 25 tons of CO_2 would cause the same level of warming as 1 ton of CH_4. N_2O has a CO_2e value of 298 (40 Code of Federal Regulations [CFR] 98).

The 2013 Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report states that the atmospheric concentrations of well-mixed, long-lived GHGs, including CO_2, CH_4, and N_2O, have increased to levels unprecedented in at least the last 800,000 years. Further human influence has been detected in warming of the atmosphere and the ocean, changes in the global water cycle, reductions in snow and ice, global mean sea-level rise, and changes in some climate extremes. It is extremely likely (95%–100% probability) that human influence has been the dominant cause of the observed warming since the mid-twentieth century (IPCC 2013).

Global mean surface temperatures have already increased 1.5°F (from 1880 to 2012). Additional near-term warming is inevitable due to the thermal inertia of the oceans and ongoing GHG emissions. However, climate change would impact regions differently and warming would not be equally distributed. Both observations and computer model predictions indicate that increases in temperature are likely to be greater at higher latitudes, where the temperature increase may be more than double the global average. Models also predict increases in duration, intensity, and extent of extreme weather events. Warming of surface air temperature over land would very likely be greater than over oceans (IPCC 2013).

3.2.8 Impacts to Climate Change

The five proposed Columbia Solar Projects would produce energy with minimal air emissions due to construction and maintenance equipment exhaust. Because no fuel is burned, no air emissions are produced in the process of generating electricity from photovoltaic sources. Furthermore, this fossil fuel–less project means there are also no GHG emissions due to the extraction of fossil fuel. In addition, equipment (e.g., switches and reclosers) containing sulfur hexafluoride (SF_6) are not planned for the solar projects.

The “total fuel cycle” of the Columbia Solar Projects includes the emissions from manufacturing processes, transporting parts and equipment, construction, operation, and maintenance of the solar projects. According to the IPCC, the total fuel cycle CO_2e emissions of solar power are 90% less than the total fuel cycle CO_2e emissions of natural gas and 94% less than the total fuel cycle CO_2e emissions of coal per unit of electricity generated (IPCC 2014).

(5) Dust. The application shall describe for any area affected all dust sources created by construction or operation of the facility, and shall describe how these are to be minimized or eliminated.

3.2.9 Affected Environment for Dust

Typical existing sources of dust in the Columbia Solar Project areas include agricultural activities (e.g., from plowing, planting, and harvesting fields) and from travel along gravel and dirt roads. Current emissions of particulate matter for Kittitas County are shown in Table 3.2-3.

3.2.10 Impacts to Dust

Dust generated by excavation and grading on the five Columbia Solar Projects would be short term. Dust from access roads would be controlled by applying gravel or watering, as necessary.

Once operational, the only source of dust emissions from the five Columbia Solar Projects would be due to occasional maintenance vehicle traffic on the access roads.

3.3 Water 463-60-322

(1) The application shall provide detailed descriptions of the affected natural water environment, project impacts and proposed mitigation measures, and shall demonstrate that facility construction and/or operational discharges will be compatible with and meet state water quality standards.

3.3.1 Affected Environment for Water Resources

3.3.1.1 General County

Streams identified within the five Columbia Solar Project sites were classified according to the WAC water typing system (WAC 222-16-030). Criteria for this typing system are described in Table 3.3-1. The streams were categorized based on the stream reaches within each of the five solar project sites; reaches downstream of the solar project sites may be rated higher.

Table 3.3-1. Summary of the WAC Water Typing System

Stream Type	Definition[1]
S	All waters, within their bankfull width, as inventoried as "shorelines of the state" under RCW 90.58 and the rules promulgated pursuant to RCW 90.58 including periodically inundated areas of their associated wetlands.
F	All segments of natural waters that are not Type S waters, and that contain fish or fish habitat, including: 1) waters diverted for domestic use by more than 10 residential or camping units or by a public accommodation facility; 2) waters diverted for use by a federal, state, or Tribal fish hatchery from the point of diversion for 1,500 feet or the entire tributary if the tributary is highly significant for protection of downstream water quality; 3) waters that are within a federal, state, local, or private campground having more than 10 camping units; or 4) riverine ponds, wall-based channels, and other channel features that are used by fish for off-channel habitat.
Np	All segments of natural waters within the bankfull width of defined channels that are perennial non–fish habitat streams. Perennial streams are flowing waters that do not go dry any time of a year of normal rainfall and include the intermittent dry portions of the perennial channel below the uppermost point of perennial flow.
Ns	All segments of natural waters within the bankfull width of the defined channels that are not Type S, F, or Np waters. These are seasonal, non–fish habitat streams in which surface flow is not present for at least some portion of a year of normal rainfall and the stream is not located downstream from any stream reach that is a Type Np water. Ns waters must be physically connected by an above-ground channel system to Type S, F, or Np waters.

1. Definitions are summarized from WAC 222-16-030.

Each of the five Columbia Solar Project sites was investigated for the presence of non-wetland waters and used a global positioning system (GPS) device capable of submeter accuracy to delineate the ordinary high water marks (OHWMs) of streams per the definitions in WAC 173-22-030 (Figures 3.3-1 to 3.3-15). The OHWMs of streams and rivers outside of each of the five project sites, but that occur within 200 feet of the project site boundary, were approximated using field observations and aerial imagery to determine the extent of potential on-site stream buffers. Water features delineated within and adjacent to each of the solar project sites included rivers, streams, canals, and ditches.

A total of one river, the Yakima River (Typha Solar Project site); five streams, including Little Naneum Creek (Camas Solar Project site), Reecer Creek (Fumaria Solar Project generation tie line), an unnamed stream (Fumaria Solar Project generation tie line), Coleman Creek (Penstemon Solar Project site), and McCarl Creek (Urtica Solar Project site); four canals, including Bull Ditch (Camas Solar Project site), the Cascade Irrigation District Canal (Fumaria Solar Project generation tie line), Town Ditch (Fumaria Solar Project generation tie line), and the Ellensburg Power (EP) Canal (Typha Solar Project generation tie line); one pond (Urtica Solar Project site); and various ditches were delineated throughout all of the five project sites.

Table 3.3-2 summarizes the water type, average width, and size within each of the five Columbia Solar Project sites. Most delineated waters would fall under the jurisdiction of the U.S. Army Corps of Engineers (USACE), Washington State Department of Ecology (Ecology), and Kittitas County. Some ditches and canals may not be considered jurisdictional based on their connectivity to jurisdictional features; however, this is determined on a case-by-case basis and can only be determined by the applicable regulatory agency. Detailed descriptions of each water feature within the solar project sites are provided in the Critical Areas Wetland and Waters Delineation Reports for each site (Appendices G–K), which also include a list of vegetation observed along each water feature and ground-level site photographs.

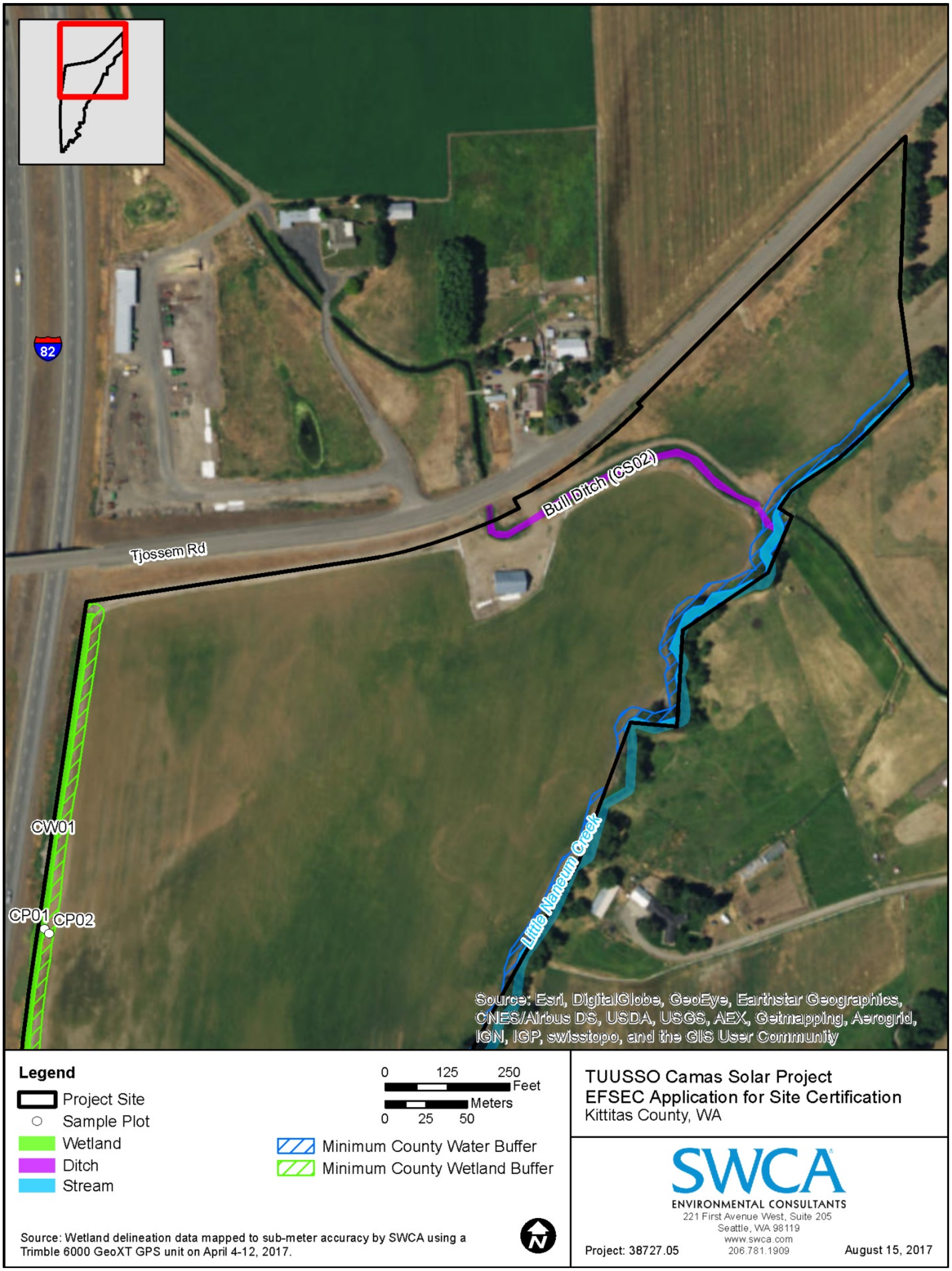


Figure 3.3-1. Camas Solar Project site map showing water resources, north portion.

Figure 3.3-2. Camas Solar Project site map showing water resources, south portion.

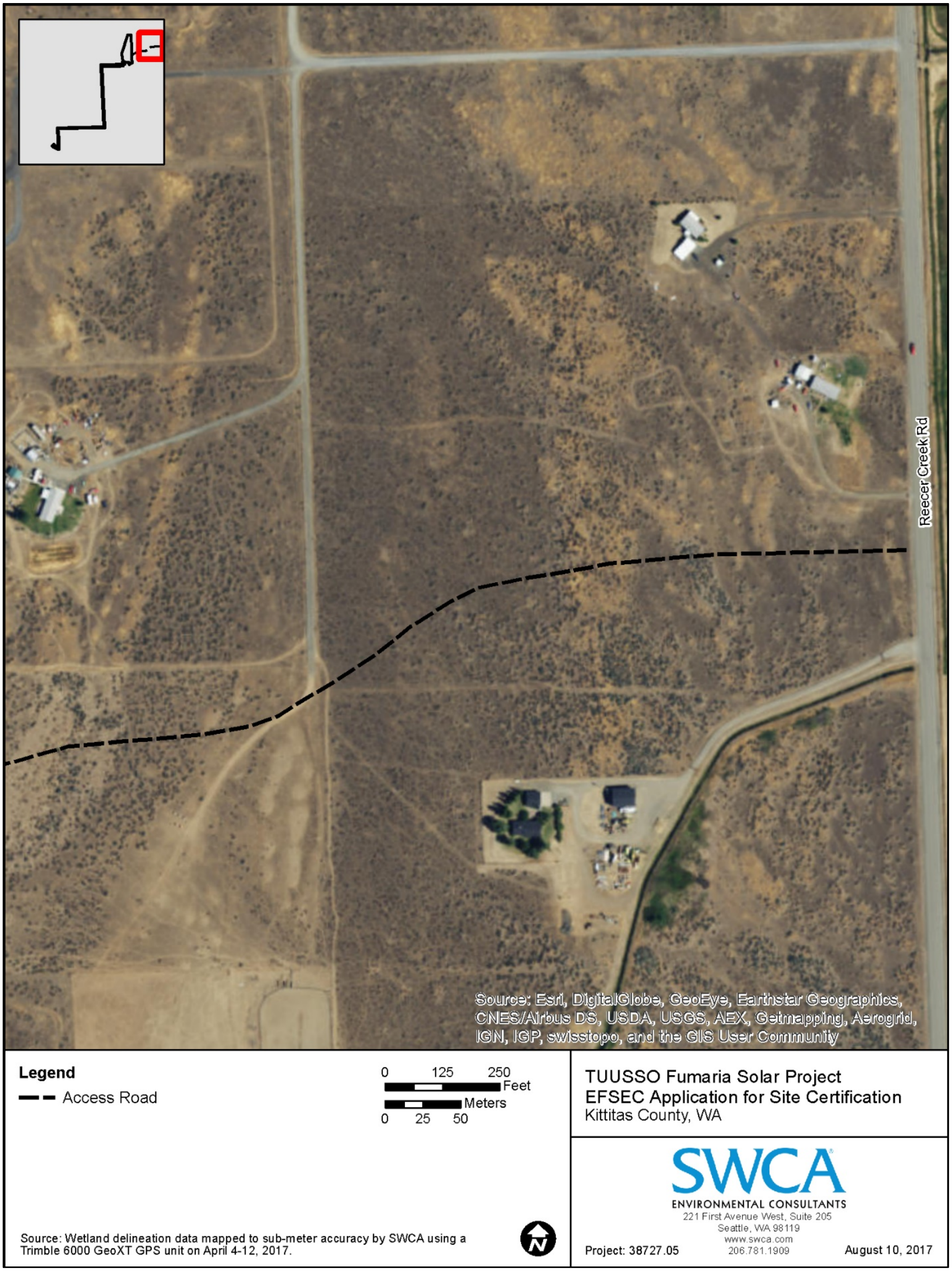


Figure 3.3-3. Fumaria Solar Project site map showing water resources, Map 1 of 8.

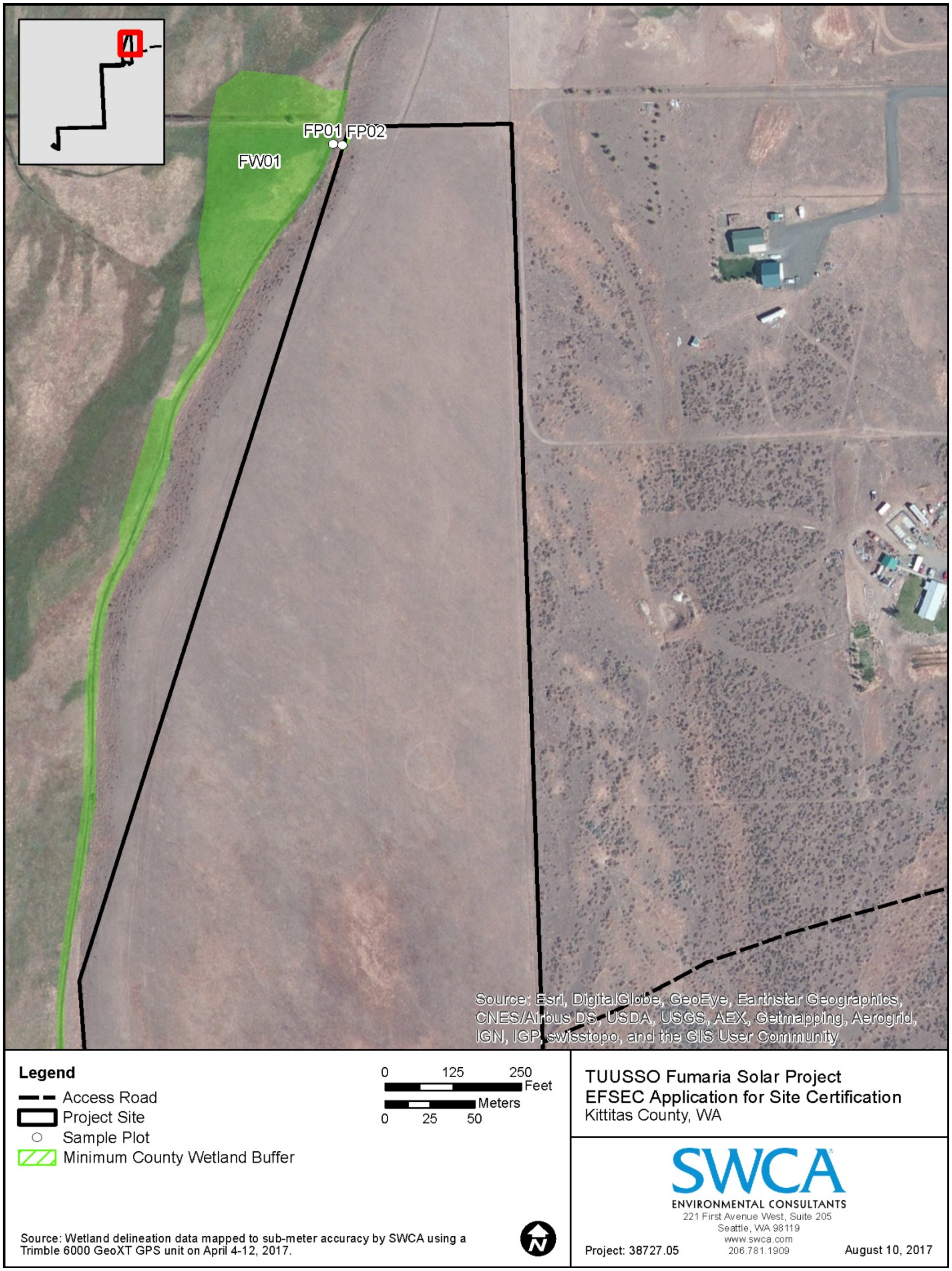


Figure 3.3-4. Fumaria Solar Project site map showing water resources, Map 2 of 8.

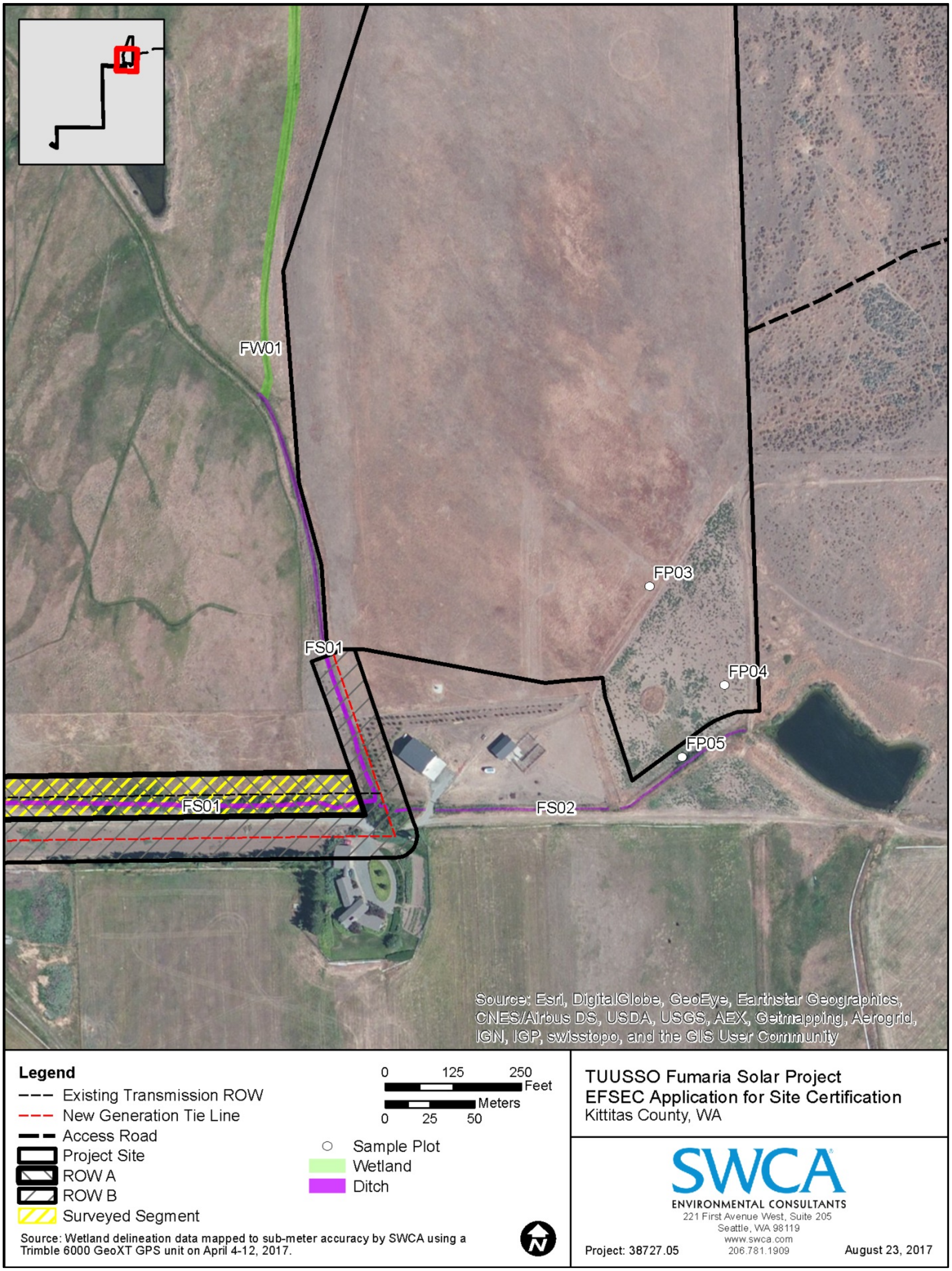


Figure 3.3-5. Fumaria Solar Project site map showing water resources, Map 3 of 8.

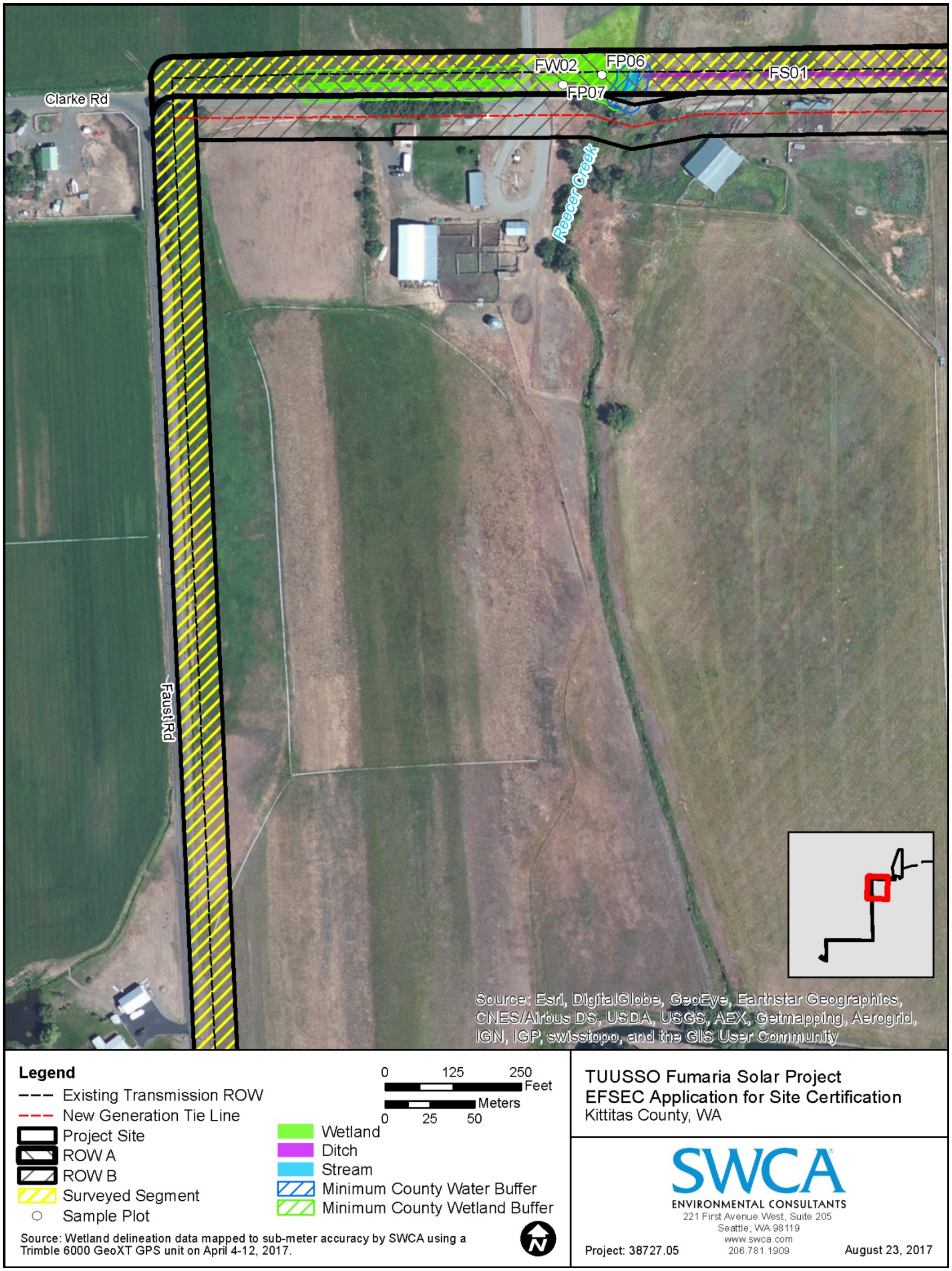


Figure 3.3-6. Fumaria Solar Project site map showing water resources, Map 4 of 8.

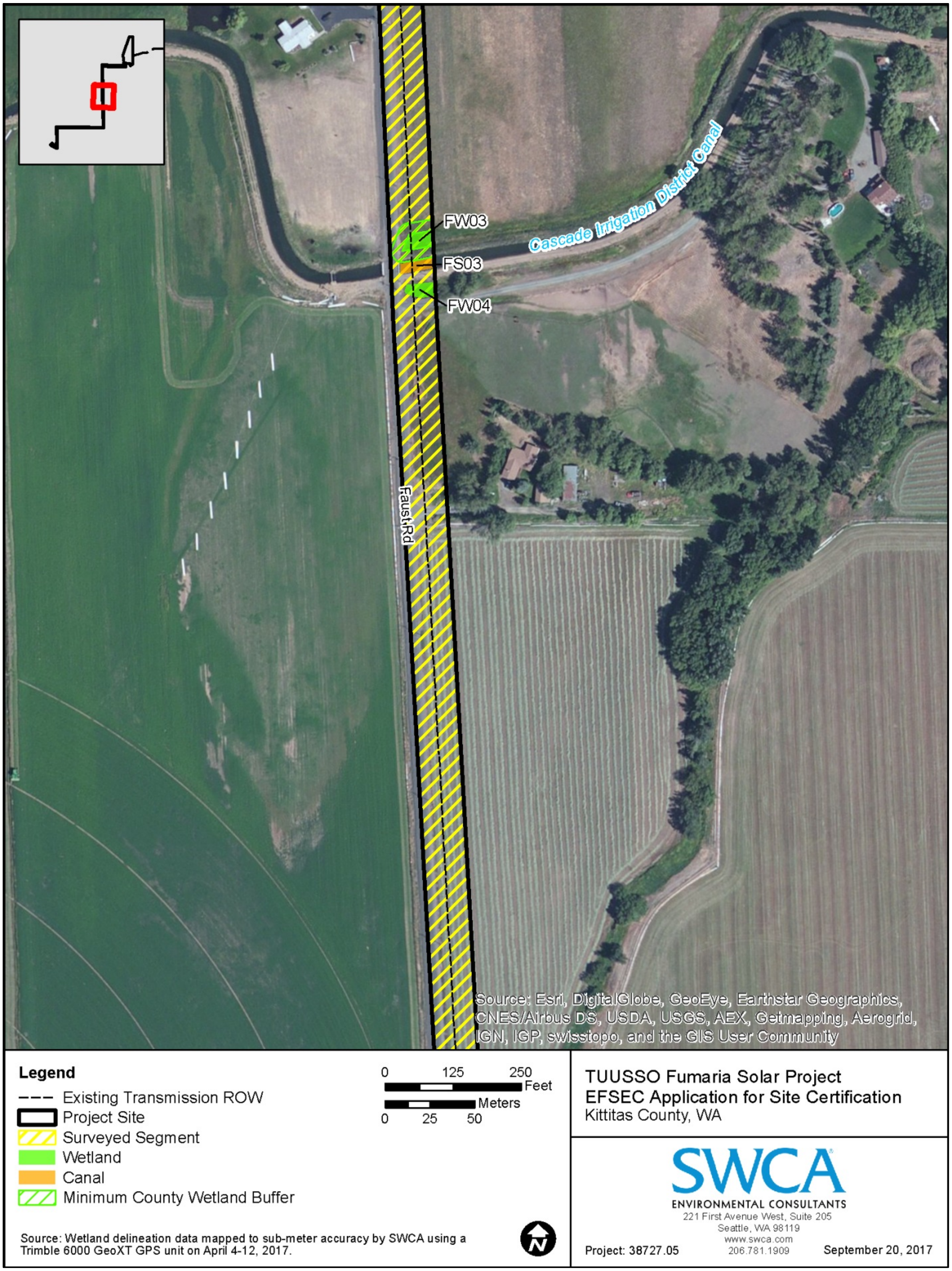


Figure 3.3-7. Fumaria Solar Project site map showing water resources, Map 5 of 8.

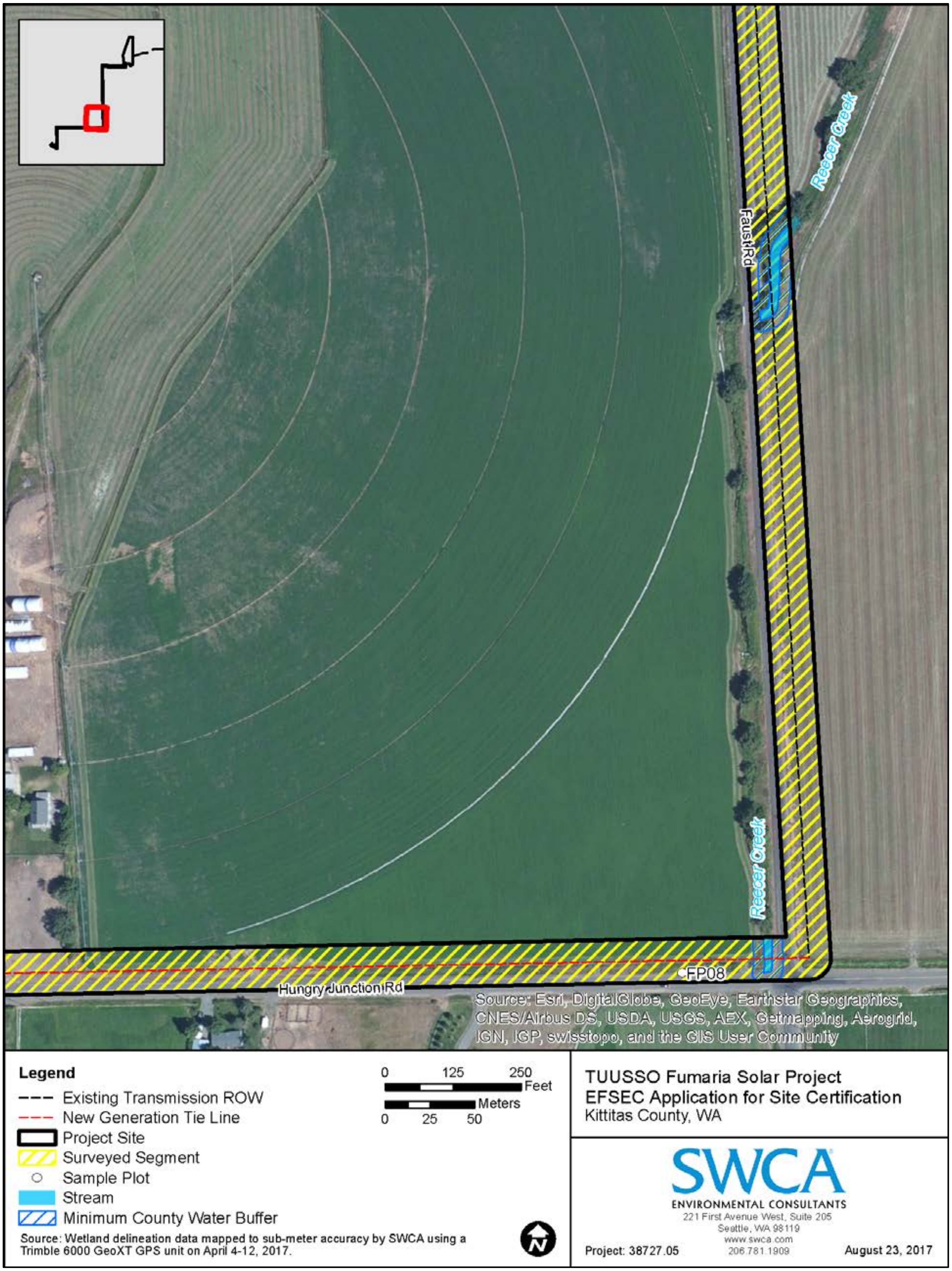


Figure 3.3-8. Fumaria Solar Project site map showing water resources, Map 6 of 8.

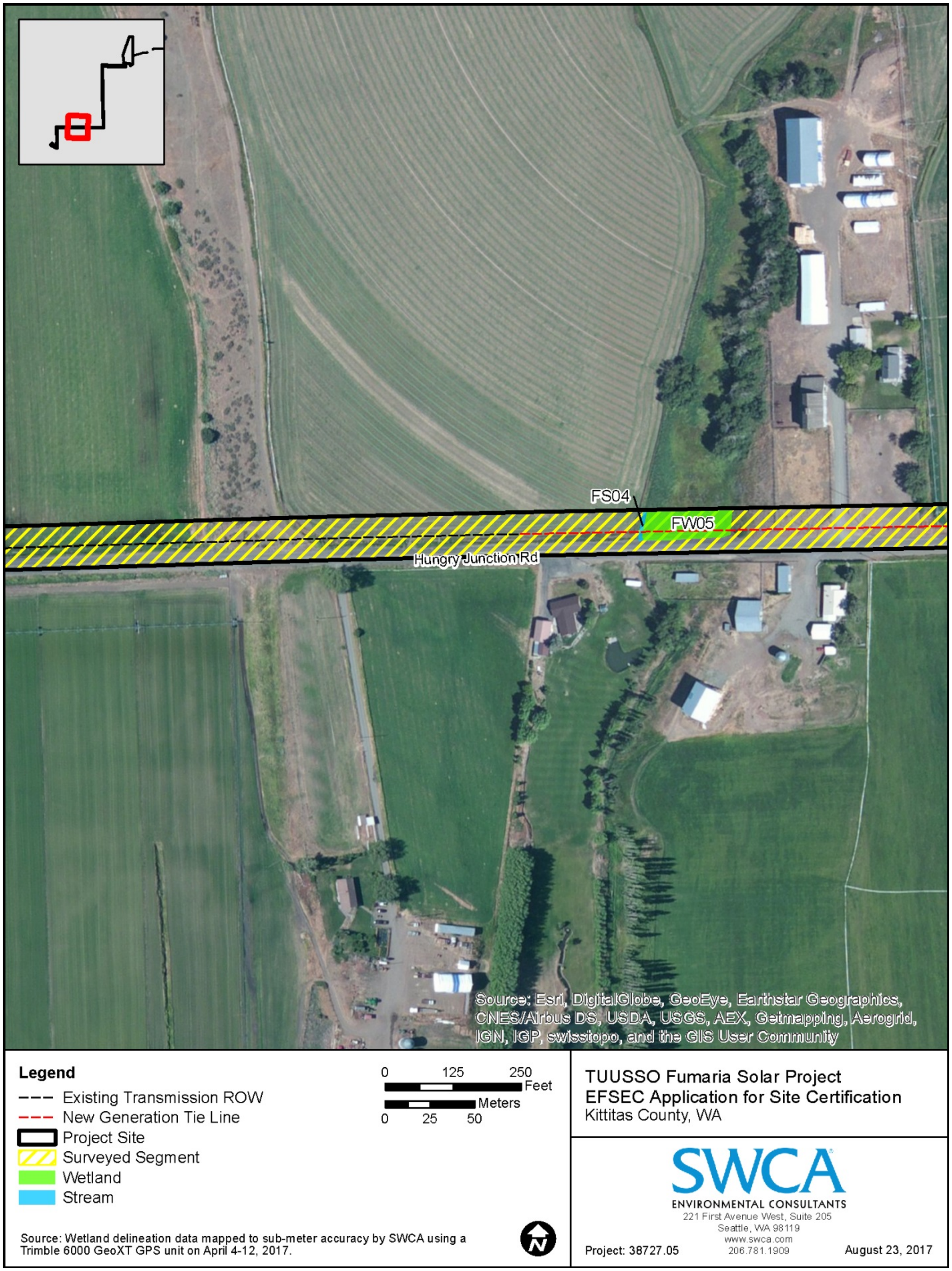


Figure 3.3-9. Fumaria Solar Project site map showing water resources, Map 7 of 8.

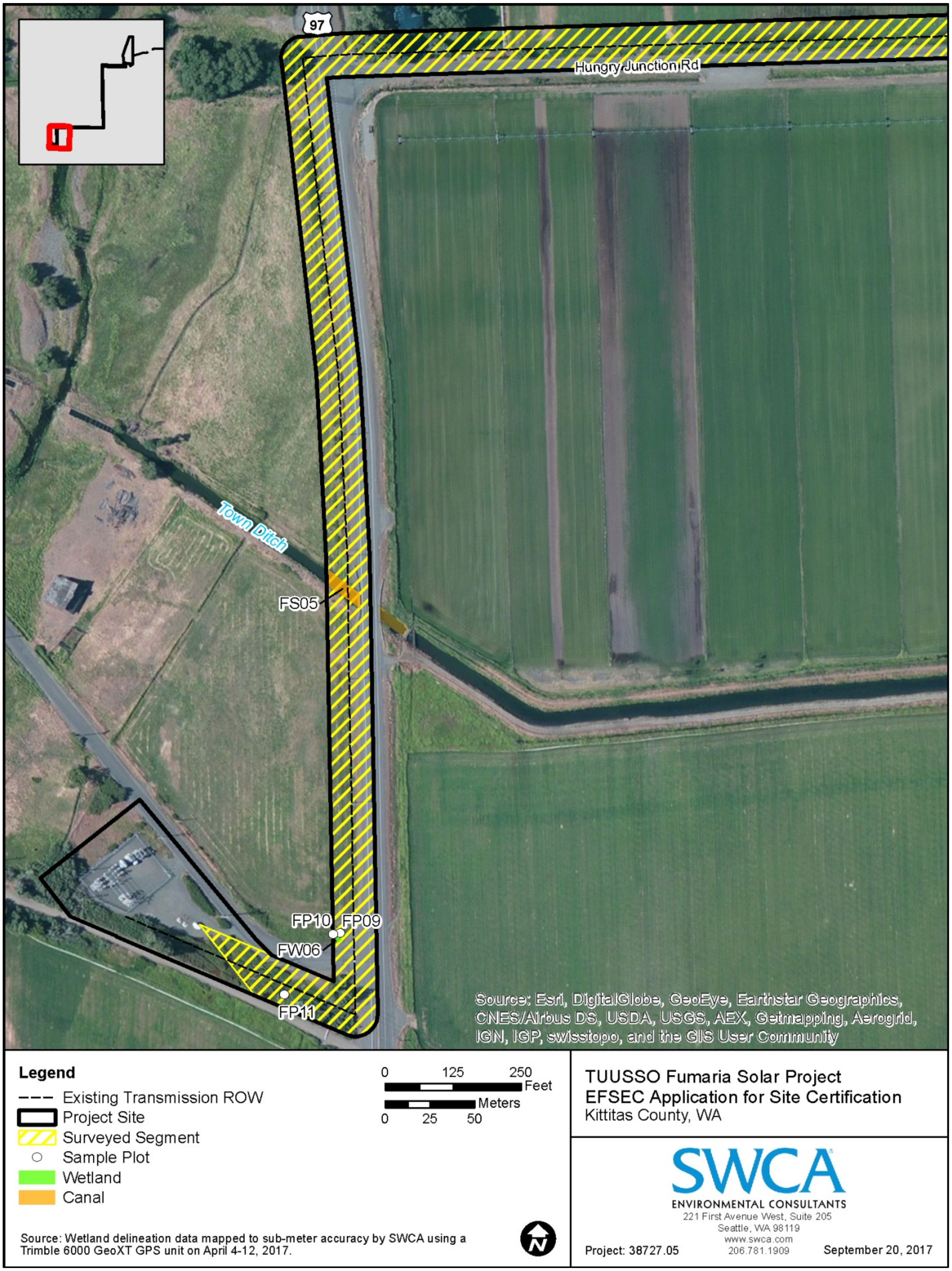


Figure 3.3-10. Fumaria Solar Project site map showing water resources, Map 8 of 8.

Figure 3.3-11. Penstemon Solar Project site map showing water resources.

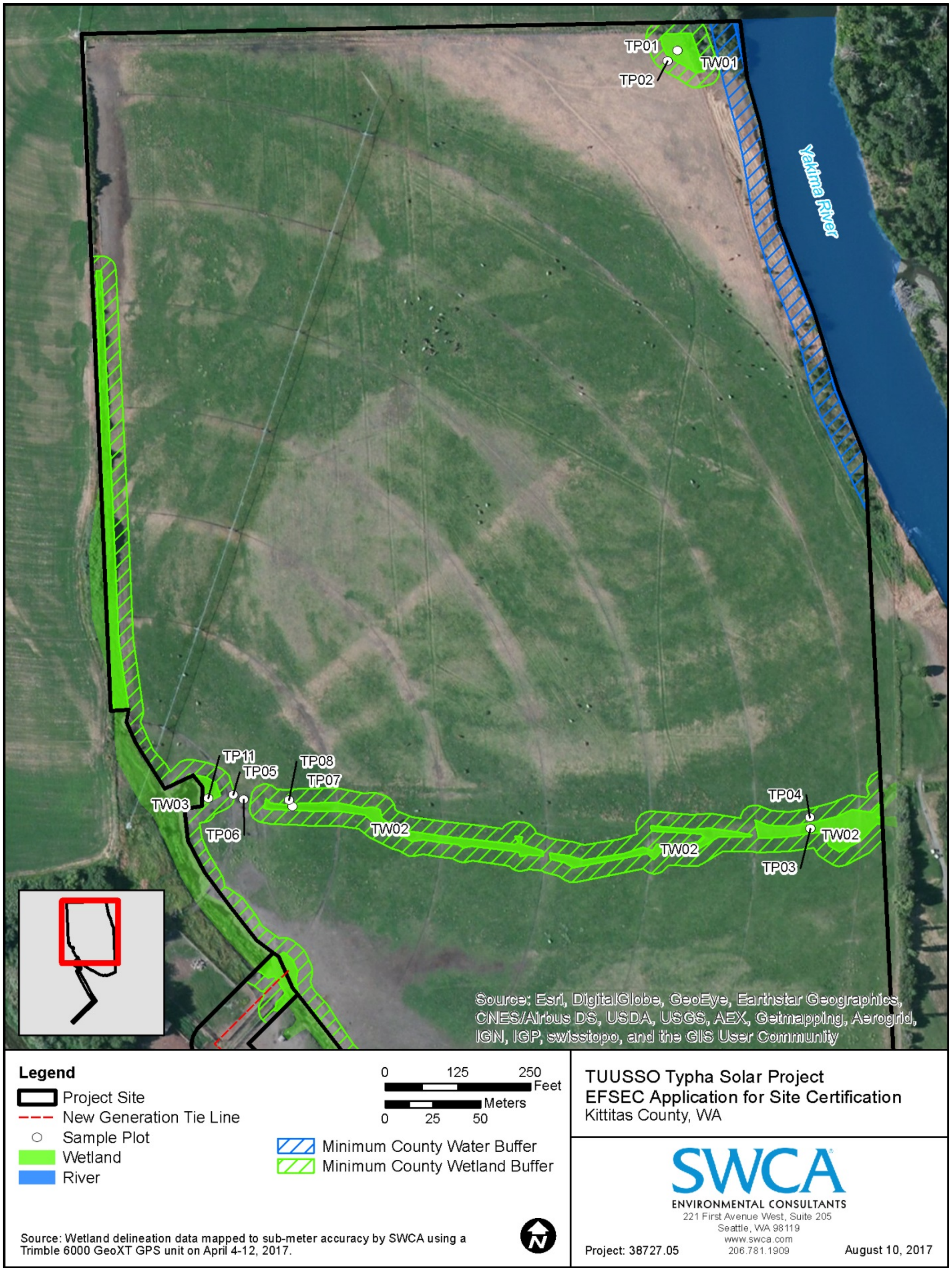


Figure 3.3-12. Typha Solar Project site map showing water resources, north portion.

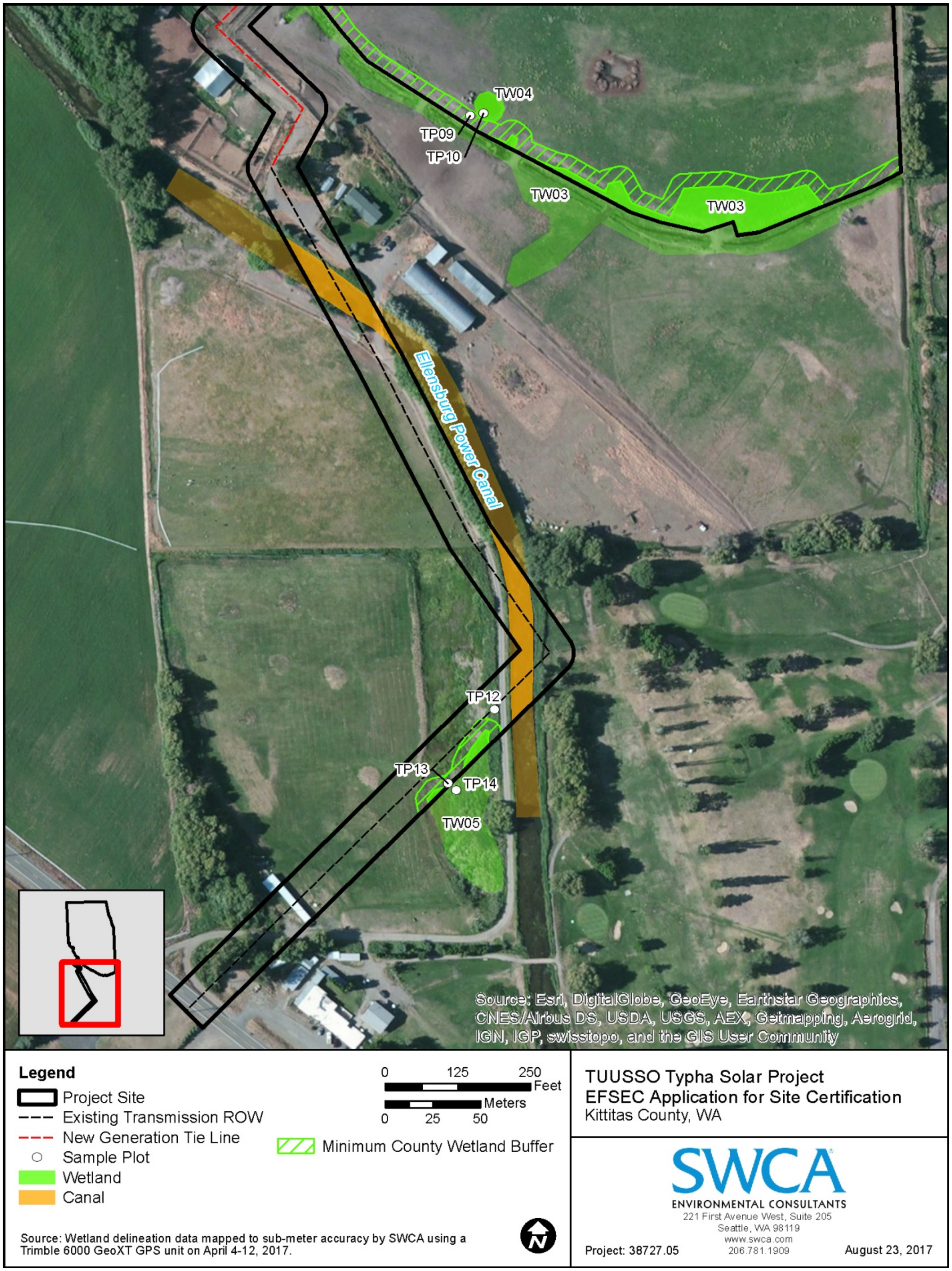


Figure 3.3-13. Typha Solar Project site map showing water resources, south portion.

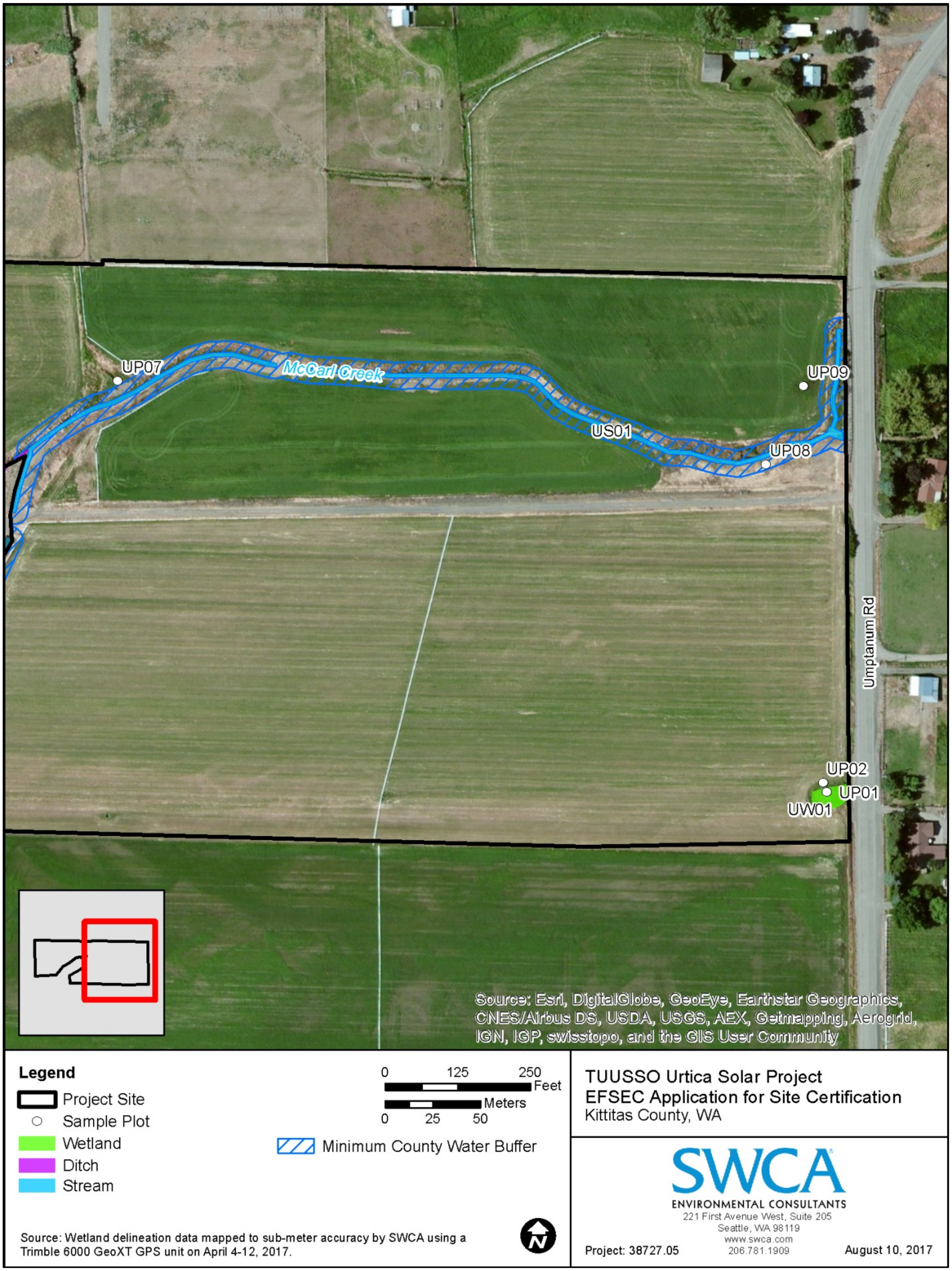


Figure 3.3-14. Urtica Solar Project site map showing water resources, east portion.

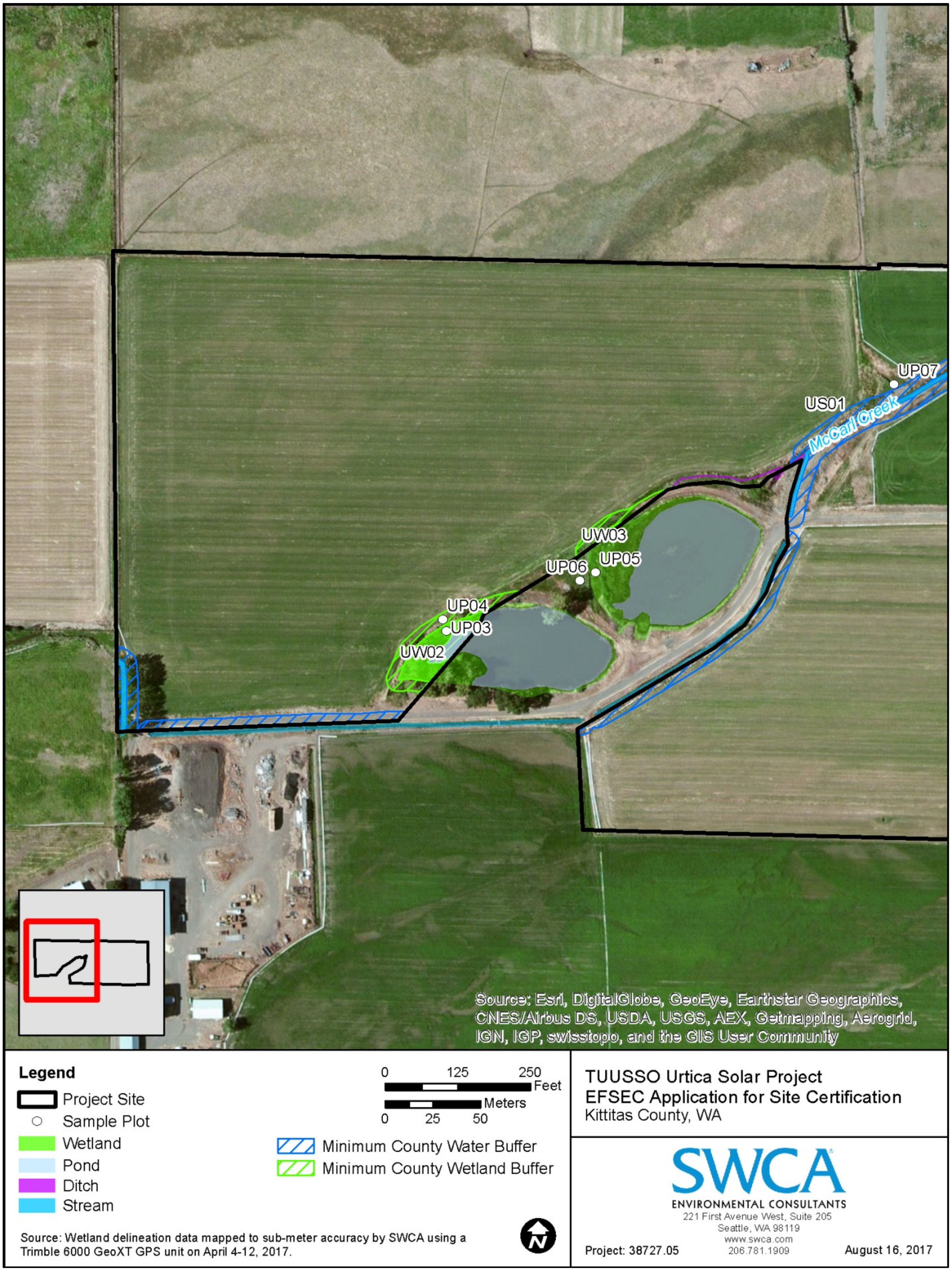


Figure 3.3-15. Urtica Solar Project site map showing water resources, west portion.

Table 3.3-2. Summary of Water Features within and near the Columbia Solar Project Sites

Stream Name	Tributary to	Stream Type[1]	USACE Jurisdiction[2]	Average Width in Project Site (feet)[3]	Approximate Length in Project Site (feet)[3]
Camas Solar Project Site					
Little Naneum Creek	Naneum Creek	F	RPW	19	2,050
Bull Ditch (CS02)	N/A	N/A	N/A	14	690
Fumaria Solar Project Site					
Ephemeral ditch (FS01)	Reecer Creek	N/A	N/A	8	710
Ephemeral ditch (FS02)	FS01	N/A	N/A	5	680
Fumaria Solar Project Generation Tie Line					
Reecer Creek	Yakima River	F	RPW	14	290
Ephemeral ditch (FS01)	Reecer Creek	N/A	N/A	8	1,087
Cascade Irrigation District Canal (FS03)	Yakima River	N/A	N/A	15	63
Unnamed stream (FS04)	Town Ditch	Ns	NRPW	6	57
Town Ditch (FS05)	Yakima River	N/A	N/A	16	74
Roadside ditches	Varies	N/A	N/A	3	1,920
Penstemon Solar Project Site					
Coleman Creek	Naneum Creek	F	RPW	19	1,005
Unnamed Ephemeral Ditch	Coleman Creek	N/A	NRPW	3	0
Typha Solar Project Site					
Yakima River	Columbia River	S	RPW	158	0
Typha Solar Project Generation Tie Line					
EP Canal (TS01)	Naneum Creek	F	RPW	19	2,050
Unnamed Ephemeral Ditch 1	Yakima River	N/A	RPW	45	540
Unnamed Ephemeral Ditch 2	EP Canal	N/A	NRPW	4	115
Urtica Solar Project Site					
McCarl Creek (US01)	Yakima River	F	RPW	7	2,108
UOW01 (western pond)	McCarl Creek	F	RPW	20	100
Unnamed Ephemeral Ditch	McCarl Creek	N/A	NRPW	3	269

1. S = shoreline of the state (WAC 222-16-030), F = fish-bearing stream (WAC 222-16-030), Ns = non-fish-bearing (WAC 222-16-030), N/A = not applicable, due to ditches and canals being excluded from the WAC typing system.

2. RPW = relatively permanent water, NRPW = non-relatively permanent water, N/A = not applicable, due to exclusion from jurisdiction.

3. Average widths and approximate lengths were determined based on SWCA survey data and field observations.

A summary of all non-wetland waters and their buffers documented within the Columbia Solar Project sites is provided in Table 3.3-3. Kittitas County Code (KCC) guidance (Chapter 17A.07.010) defines minimum protection buffers of 40 feet for Type S waters and 20 feet for Type F waters. KCC guidance does not define protection buffers for irrigation canals and ditches, because they do not qualify as streams. In addition, KCC guidance specifies that no protection buffer is needed for Type Ns waters.

Table 3.3-3. Water Typing and Minimum Buffer Distance Summary for each Columbia Solar Project Site

Water Features	Water Typing[1]	Kittitas County Minimum Buffer Distance (feet)[2]	Total Size of Water Feature Within the Project Site (acres)[3]
Camas Solar Project Site			
Little Naneum Creek	F	20	0.69
Bull Ditch (CS02)	N/A	None	0.22
Fumaria Solar Project Site			
Ephemeral ditch (FS01)	N/A	None	0.00
Ephemeral ditch (FS02)	N/A	None	0.00
Fumaria Solar Project Generation Tie Line			
Reecer Creek	F	20	0.12
Ephemeral ditch (FS01)	N/A	None	0.25
Ephemeral ditch (FS02)	N/A	None	0.01
Cascade Irrigation District Canal (FS03)	N/A	None	0.03
Unnamed stream (FS04)	Ns	None	0.01
Town Ditch (FS05)	N/A	None	0.04
Roadside ditches	N/A	None	0.18
Penstemon Solar Project Site			
Coleman Creek	F	20	0.47
Ditch	N/A	None	0.00
Typha Solar Project Site			
Yakima River	S	40	0.05
Typha Solar Project Generation Tie Line			
EP Canal (TS01)	N/A	None	0.44
Ditches	N/A	None	0.02
Urtica Solar Project Site			
McCarl Creek (US01)	F	20	0.27
UOW01 (western pond)	N/A	None	0.05
Ditch	N/A	None	0.02

1. F = fish-bearing water (WAC 22-16-030); N/A = not applicable, due to exclusion from water typing system.
2. Only minimum buffer distances are depicted on maps.
3. Does not include buffer areas.

3.3.1.2 Solar Project Sites

See Figures 3.3-1 through 3.3-15 for the locations of delineated water features throughout each of the five Columbia Solar Project sites. Detailed descriptions of each non-wetland water within the solar project sites are provided in the Critical Areas Wetland and Waters Delineation Reports for each site (Appendices G–K).

3.3.2 Impacts to Water Resources

3.3.2.1 General County

TUUSSO has made every effort to avoid impacts to water resources throughout all of the Columbia Solar Project sites, which would be achieved through avoidance measures in project design and utilization of BMPs. Table 3.3-4 shows the project impacts to each of the water resources delineated within each of the solar project sites.

Table 3.3-4. Proposed Water Resources Impact Summary for each Columbia Solar Project Site

Water Name	Total Size of Water Resources Within the Project (acres)[1]	Total Impacts to Water Resources Within the Project (acres)
Camas Solar Project Site		
Little Naneum Creek	0.69	0.00
Bull Ditch (CS02)	0.22	0.00
Fumaria Solar Project Site		
Ephemeral ditch (FS01)	0.00	0.00
Ephemeral ditch (FS02)	0.00	0.00
Fumaria Solar Project Generation Tie Line		
Reecer Creek	0.12	0.00[2]
Ephemeral ditch (FS01)	0.25	0.00
Ephemeral ditch (FS02)	0.01	0.00
Cascade Irrigation District Canal (FS03)	0.03	0.00
Unnamed stream (FS04)	0.01	0.00
Town Ditch (FS05)	0.04	0.00
Roadside ditches	0.18	0.00
Penstemon Solar Project Site		
Coleman Creek	0.47	0.00
Ditch	0.00	0.00
Typha Solar Project Site		
Yakima River	0.05	0.00
Typha Solar Project Generation Tie Line		
EP Canal (TS01)	0.44	0.00[2]
Ditches	0.02	0.00
Urtica Solar Project Site		
McCarl Creek (US01)	0.27	0.00
UOW01 (western pond)	0.05	0.00
Ditch	0.02	0.00

1. Does not include buffer areas.
2. TUUSSO plans to span this water resource, which would result in no impacts by the project.

In addition, the Columbia Solar Projects do not propose to discharge any water or contaminants into water resources on-site or downstream of the solar project sites, during or after construction. This would be achieved through avoidance measures in the project designs and through utilization of BMPs. No ditches or outfall pipes would be installed as part of the proposed projects. Therefore, all water in the solar project sites would either be absorbed on-site through infiltration or runoff through overland flow at very low velocities that are unlikely to cause excessive erosion.

Impacts to water resources at each solar project site and along each generation tie line are described below.

3.3.2.2 Solar Project Sites

Camas Solar Project Site

No impacts are proposed to any water resources within the Camas Solar Project site. The access road crossing of Bull Ditch depicted on the proposed site plan would utilize the existing road crossing and would not modify or impact this crossing of Bull Ditch. No impacts are proposed to Little Naneum Creek. Therefore, all impacts to water resources would be avoided through project design.

Fumaria Solar Project Site

No impacts are proposed to any water resources within the Fumaria Solar Project site. Internal access roads and site access would be located in upland areas or on existing access roads. All impacts to water resources would be avoided through project design.

For Western site access: Proposed site access would be from the west via Clarke Road and would cross Reecer Creek. The current road edge is eroding on the southern side of the road. TUUSSO would either install spanning structures to avoid impacts to the Reecer Creek crossing (such as using road plates and gravel) or improve and reinforce the current bridge infrastructure, which could result in minor impacts to Reecer Creek. If impacts to Reecer Creek are proposed, then TUUSSO would prepare and submit a Joint Aquatic Resource Permit Application (JARPA) for review by USACE and Ecology.

Fumaria Solar Project Generation Tie Line

No impacts are proposed to any water resources along the Fumaria Solar Project generation tie line. All water resources would be spanned by power poles, and existing roads adjacent to the proposed line would be utilized for installation of new lines or power poles. All impacts to water resources would be avoided through project design.

Penstemon Solar Project Site

No impacts are proposed to any water resources within the Penstemon Solar Project site. Internal access roads and site access would be located in upland areas or on existing access roads. All impacts to water resources would be avoided through project design.

Typha Solar Project Site

No impacts are proposed to any water resources within the Typha Solar Project site. Internal access roads would be located in upland areas or on existing access roads. For site access, existing roads would be utilized as much as possible; however, the existing bridge crossing of the Ellensburg Power Canal would need to be improved in one of three ways: 1) reinforce, improve, and/or replace existing bridge supports to accommodate the truck traffic to the project site; 2) completely remove and replace the existing bridge with a new bridge; or 3) install a temporary bridge over the existing bridge during the construction period to accommodate the truck traffic. Based on the current project design, all impacts to jurisdictional water resources would be avoided through project design. If TUUSSO alters the project design to where the EP Canal would be impacted, then TUUSSO would coordinate with EFSEC, USACE, Ecology, and Kittitas County to comply with all new permitting requirements.

Typha Solar Project Generation Tie Line

No impacts are proposed to any water resources along the Typha Solar Project generation tie line. All water resources would be spanned by power poles, and existing roads adjacent to the proposed line would be utilized for installation of new lines or power poles. All impacts to water resources would be avoided through project design.

Urtica Solar Project Site

No impacts are proposed to any water resources within the Urtica Solar Project site. Internal access roads and site access would be located in upland areas or on existing access roads. All impacts to water resources would be avoided through project design.

3.3.3 Mitigation Measures for Water Resources

3.3.3.1 General County

A total of one river, five streams, four canals, and various ditches were delineated throughout all of the five Columbia Solar Project sites and their associated generation tie lines. These waters were rated using the WAC water typing system (WAC 222-16-030), defined in Table 3.3-1, and minimum protection buffers were defined using KCC guidance (Chapter 17A.07.010). Of the delineated water resources, only five of them require protection buffers under KCC guidance: Little Naneum Creek (Camas Solar Project site), Reecer Creek (Fumaria Solar Project generation tie line), Coleman Creek (Penstemon Solar Project site), Yakima River (Typha Solar Project site), and McCarl Creek (Urtica Solar Project site). TUUSSO utilized avoidance measures during the project design to avoid, reduce, or eliminate impacts to water resources.

No water resources would be impacted by the proposed Columbia Solar Projects; however, minor encroachment into the minimum protection buffers would be unavoidable based on the current project designs and would occur over a total of less than 0.02 acre across all five of the solar project sites. Refer to Table 3.3-5 for the water type, minimum protection buffer distances, total area of buffers within the solar project sites, average distance from the edge of the minimum buffer to the nearest project disturbance, and total buffer area encroachment for water resources within each of the solar project sites.

Although avoidance and minimization measures were taken to the extent practicable to reduce impacts to waters and water protection buffers, further coordination and review by Ecology would be necessary to determine if further mitigation would be required for the proposed buffer encroachment.

See Figures 3.3-1 through 3.3-15 for the locations of delineated water resources and their buffers for each of the five Columbia Solar Project sites. See Appendix L for site plans for each of the Columbia Solar Project sites.

Table 3.3-5. Water Protection Buffers and Project Encroachment within Each Columbia Solar Project Site

Water Name	Water Type[1]	Kittitas County Minimum Buffer Distance (feet)[2]	Total Area of Buffer within Project (acres)	Average Distance from Buffer Edge to Project Disturbance (feet)	Total Buffer Encroachment (acres)
Camas Solar Project Site					
Little Naneum Creek	F	20	1.80	20	0
Fumaria Solar Project Generation Tie Line					
Reecer Creek	F	20	0.35	No power poles would be replaced within the water protection buffer	
Penstemon Solar Project Site					
Coleman Creek	F	20	0.68	36	<0.01
Typha Solar Project Site					
Yakima River	S	40	0.77	205	0
Urtica Solar Project Site					
McCarl Creek (US01)	F	20	2.06	0	0.02

1. S = shoreline of the state (WAC 222-16-030), F = fish-bearing stream (WAC 222-16-030); all other water resources were excluded from this table because no protection buffers were defined by KCC guidance for those features.
2. Minimum buffer distances are depicted on maps.

3.3.3.2 Solar Project Sites

Camas Solar Project Site

No impacts are proposed to the KCC-defined minimum protection buffer around Little Naneum Creek within the Camas Solar Project site. The nearest project impact area (the planned perimeter fence) would be 1 to 100 feet from the edge of the minimum protection buffer for Little Naneum Creek. No KCC-defined minimum protection buffer is defined for Bull Ditch because ditches and canals are excluded from the WAC water typing system. All impacts to water protection buffers would be avoided through project design.

Fumaria Solar Project Site

No KCC-defined protection buffers are defined for the two on-site ditches because ditches are excluded from the WAC water typing system. Therefore, no impacts are proposed to any KCC-defined minimum water protection buffers within the Fumaria Solar Project site. All impacts to water protection buffers would be avoided through project design.

Fumaria Solar Project Generation Tie Line

No impacts are proposed to the KCC-defined minimum protection buffers around Reecer Creek along the Fumaria Solar Project generation tie line. Power poles near Reecer Creek that are within its minimum protection buffer would not be replaced. No KCC-defined minimum water protection buffer is defined for unnamed stream FS04 because KCC guidance specifies that no protection buffer is needed for Type Ns water resources, and no KCC-defined minimum water protection buffers are defined for Cascade Irrigation District Canal, Town Ditch, and the ditches along the Fumaria Solar Project generation tie line because ditches and canals are excluded from the WAC water typing system. All impacts to water protection buffers would be avoided through project design.

If new power poles need to be installed, then TUUSSO would install them in upland areas outside of the KCC-defined minimum protection buffers for all water resources along the Fumaria Solar Project generation tie line.

Penstemon Solar Project Site

The Penstemon Solar Project would have very minor encroachment on the KCC-defined minimum protection buffer around Coleman Creek within the project site. The proposed perimeter fence would impact less than 0.01 acre (approximately 18 square feet) along the western edge of Coleman Creek's minimum protection buffer (Figure 3.3-16). Along the remainder of the buffer, the project impact area would be 0 to 82 feet from the edge of the minimum protection buffer for Coleman Creek, with an average distance of 36 feet from the edge of the minimum protection buffer. No KCC-defined minimum protection buffer is defined for the on-site ditch because ditches and canals are excluded from the WAC water typing system. Impacts to water protection buffers on the Penstemon Solar Project site would be negligible and would not require mitigation.

Typha Solar Project Site

No impacts are proposed to the KCC-defined minimum protection buffer around the Yakima River within the Typha Solar Project site. The nearest project impact area would be 104 to 335 feet from the edge of the minimum protection buffer for the Yakima River, with an average distance of 205 feet. All impacts to water protection buffers would be avoided through project design.

Typha Solar Project Generation Tie Line

No KCC-defined protection buffers are defined for the EP Canal and on-site ditches because ditches and canals are excluded from the WAC water typing system. Therefore, no impacts are proposed to any KCC-defined minimum water protection buffers along the Typha Solar Project generation tie line. All impacts to water protection buffers would be avoided through project design.

Urtica Solar Project Site

The Urtica Solar Project would impact the KCC-defined minimum protection buffer around McCarl Creek within the project site (Figure 3.3-17). Although 0.39 acre of the KCC-defined minimum protection buffer for McCarl Creek is within the proposed perimeter fencing depicted in Figure 3.3-17, no activities are planned within this area, other than adding the perimeter fencing. The perimeter fencing would have a negligible impact to vegetation and the water protection buffer's functionality would not be significantly altered. Therefore, fencing would only represent an impact along the fence posts, which would be at most 1 foot wide. The total water protection buffer encroachment would be less than 0.02 acre (743 square feet) within the Urtica Solar Project site. The existing road is not considered a part of the water protection buffer because it cannot act as a buffer for surrounding resources; therefore, its area was excluded from the buffer area calculation. Improvements to this road could extend outside of the existing road footprint; however, this is not proposed at this time. If plans are altered, then coordination with Kittitas County or Ecology would occur for the buffer impacts associated with that design change.

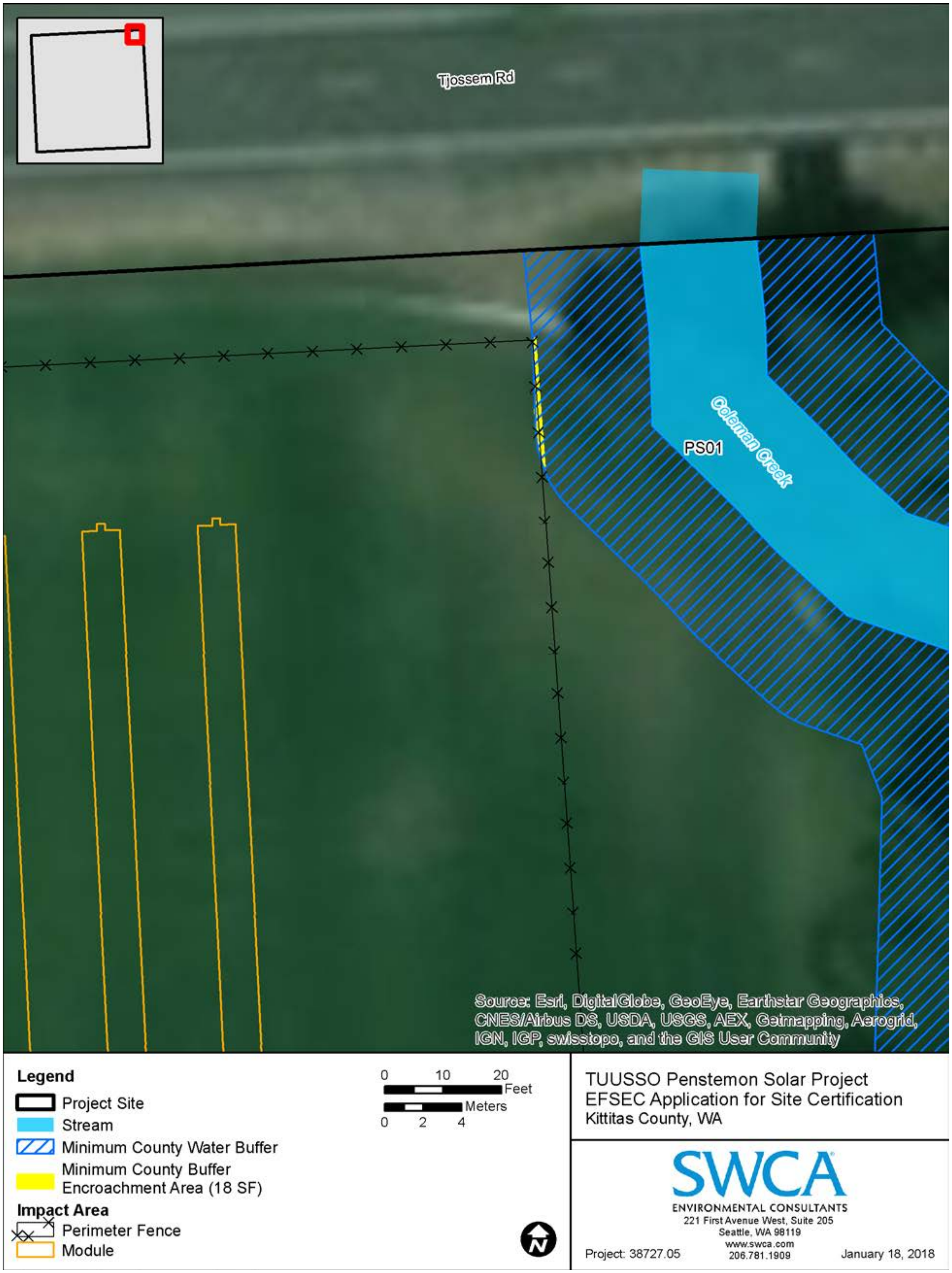


Figure 3.3-16. Penstemon Solar Project water buffer encroachment.

Figure 3.3-17. Urtica Solar Project wetland and water buffer encroachment.

(2) Surface water movement/quality/quantity. The application shall set forth all background water quality data pertinent to the site, and hydrographic study data and analysis of the receiving waters within one-half mile of any proposed discharge location with regard to: Bottom configuration; minimum, average, and maximum water depths and velocities; water temperature and salinity profiles; anticipated effluent distribution, dilution, and plume characteristics under all discharge conditions; and other relevant characteristics which could influence the impact of any wastes discharged thereto.

3.3.4 Affected Environment for Surface Water

3.3.4.1 General County

TUUSSO prepared drainage reports for the Columbia Solar Project sites (Encompass Engineering & Surveying [Encompass] 2017a, 2017b, 2017c, 2017d, 2017e). See also the Drainage Design and Current and Proposed Hydrology sections in Section 2.3.3.1. All of the sites are all relatively flat. All of the sites generally slope from north to south. There are no effluent discharges proposed at any of the sites; therefore, WAC 463-60-322(2) does not apply to this project.

3.3.4.2 Solar Project Sites

Camas Solar Project Site

The Camas Solar Project site is currently an open field used to make hay using flood irrigation methods. The overall topography of the site gently slopes to the south (Figure 3.3-18). The surface water that does not infiltrate flows to the south. The western edge of the site is bordered by an irrigation ditch (CW01) flowing to the south, while Little Naneum Creek flows southwest along the southeastern edge of the site. These surface waters meet at the southwest corner of the site before crossing under Interstate 82 (I-82) in existing irrigation infrastructure. Bull Ditch runs southeast through the northern portion of the site. These ditches are maintained by the landowner.

Drainage Basins

As shown in Figure 3.3-18, the Camas Solar Project site is made up of two drainage basins (Encompass 2017a). Drainage Basin 1 captures the majority of the site, and it includes everything that is south and west. Drainage Basin 2 is the small, northeast portion of the site that is separated from the rest of the site by Bull Ditch. All of the runoff is either infiltrated on-site or flows to the south/southwest. The existing drainage currently has a barn on it which results in 0.06 acre of impervious area on the site, while the remaining 51.15 acres are pervious.

Downstream Analysis

As noted above, all runoff from the Camas Solar Project site flows into Little Naneum Creek that leaves the site at the southwest corner of the site and flows under I-82. Little Naneum Creek and Bull Ditch are part of a larger irrigation network that serves the rural areas south of Ellensburg. The flow rates are controlled as needed. Little Naneum Creek flows south from the site for approximately 0.5 mile before discharging into Naneum Creek and then Wilson Creek. No issues have been brought up in relation to the existing irrigation infrastructure downstream of the project site.

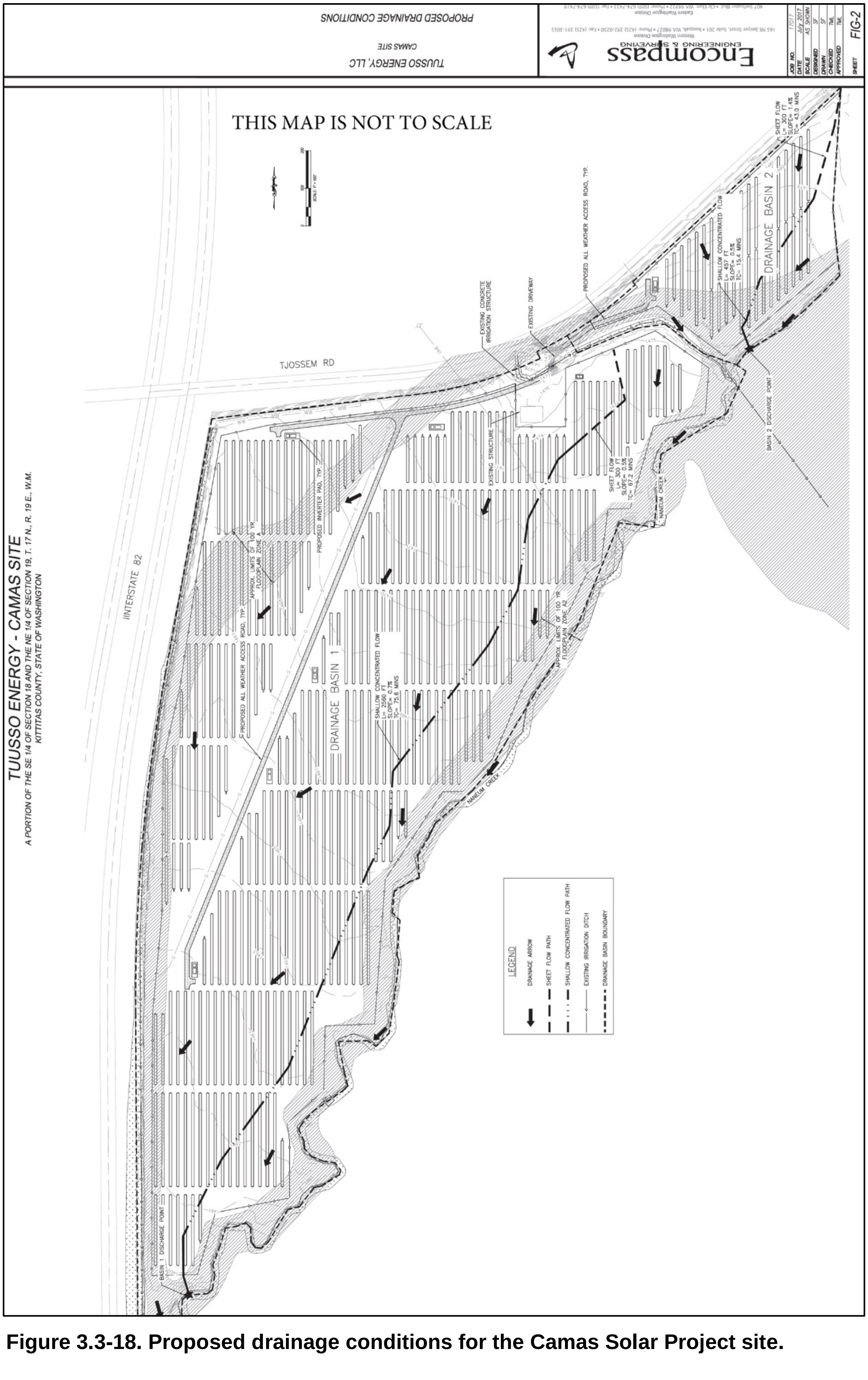


Figure 3.3-18. Proposed drainage conditions for the Camas Solar Project site.

Fumaria Solar Project Site

The overall topography of the Fumaria Solar Project site gently slopes to the south (Figure 3.3-19). The surface water that does not infiltrate flows to the south. Runoff to the west is captured by an existing irrigation ditch that flows south along the western border of the site (FS01). Runoff to the south is captured in the southern portion of the ditch where it discharges to an existing detention pond just off the southeast corner of the property.

Drainage Basins

As shown in Figure 3.3-19, since all runoff is either infiltrated on-site or captured in the existing irrigation pond, the Fumaria Solar Project site is a single drainage basin represented by two sub-basins: Basin 1A and Basin 1B (Encompass 2017b). Basin 1A makes up the majority of the site and flows generally to the south. Basin 1B makes up a small portion of the site that sheet flows off the site to the west. Runoff from Basins 1A and 1B meet in an existing irrigation ditch (FS01). The existing drainage basin contains no impervious surfaces, meaning the entire 35.24 acres is pervious.

Downstream Analysis

As noted above, all runoff from the Fumaria Solar Project site flows into the existing irrigation ditch at the southern end of the site. The ditch discharges into an existing irrigation pond immediately to the southeast of the project site. The ditch and pond are currently maintained by the landowner. The irrigation ditch, and ditches downstream of the project site, are part of a larger irrigation network that serves the rural areas north of Ellensburg. The pond outlets via a culvert to the south, where it then splits into two ditches, one to the south and one to the east. As these are irrigation facilities, the flow rates are controlled as needed. No issues have been brought up in relation to the existing irrigation infrastructure downstream of the project site.

Penstemon Solar Project Site

The overall topography of the Penstemon Solar Project site gently slopes to the south (Figure 3.3-20). The surface water that does not infiltrate flows to the south. This runoff is captured in an irrigation ditch along the southern property line. The ditch flows to the east and into Coleman Creek at the southeast corner of the site.

Drainage Basins

As shown in Figure 3.3-20, since all runoff is either infiltrated or captured in the existing irrigation ditch at the southern border of the Penstemon Solar Project site, the site is a single drainage basin (Encompass 2017c). The existing drainage basin contains no impervious surfaces, meaning the entire 39.38 acres is pervious.

Downstream Analysis

As noted above, all runoff from the Penstemon Solar Project site flows into the existing irrigation ditch at the southern end of the site. This ditch is currently maintained by the landowner. The irrigation ditch is part of a larger irrigation network that serves the rural areas south of Ellensburg, and the flow rates are controlled as needed. The ditch discharges into Coleman Creek, immediately to the southeast of the project site. Coleman Creek is well defined, with thick vegetation on its edges, and flows south along Moe Road for 0.5 mile. It then flows southeast, ultimately joining Wilson Creek, before discharging into the Yakima River. No issues have been brought up in relation to the existing irrigation infrastructure downstream of the solar project site.

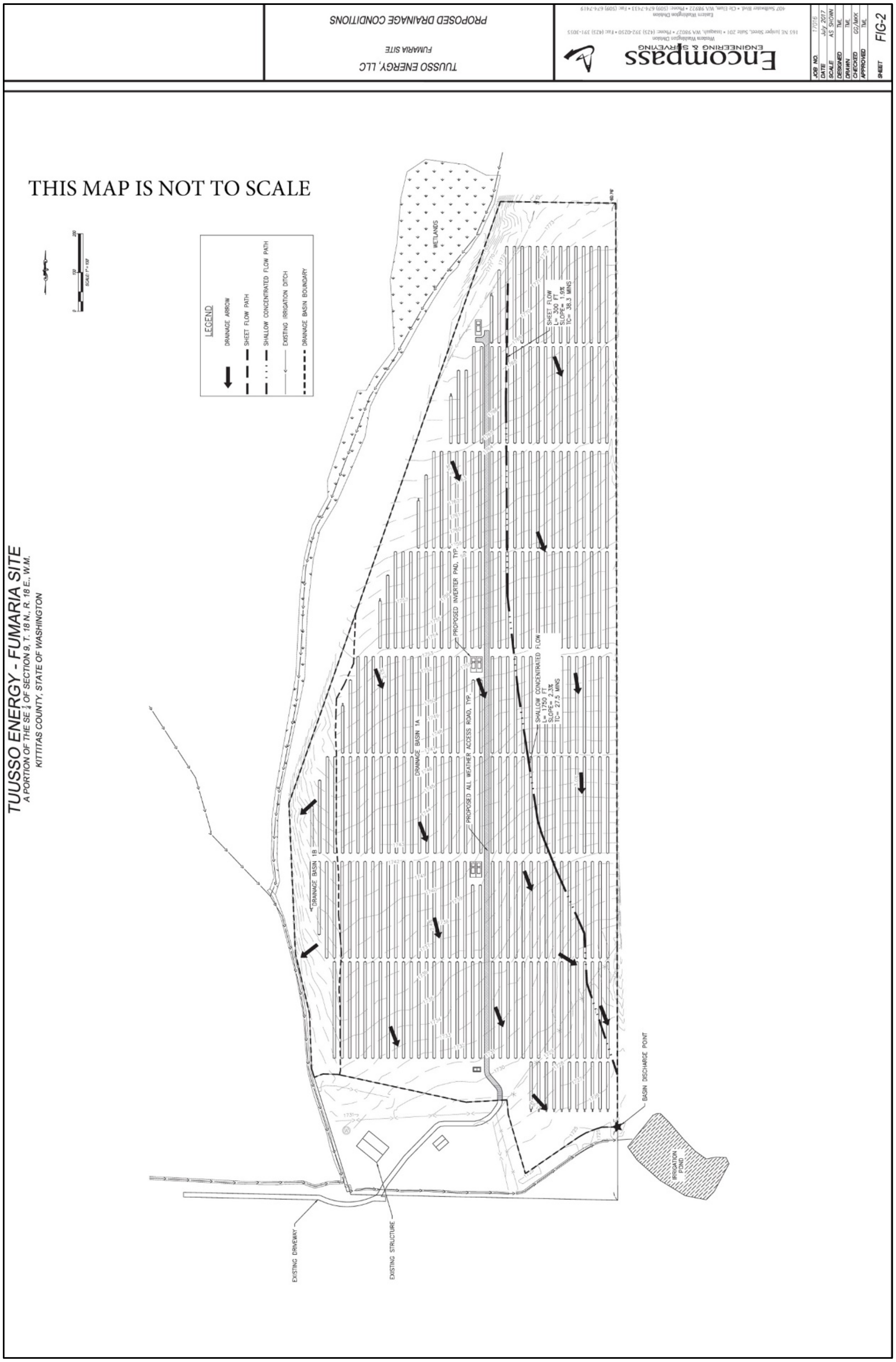


Figure 3.3-19. Proposed drainage conditions for the Fumaria Solar Project site.

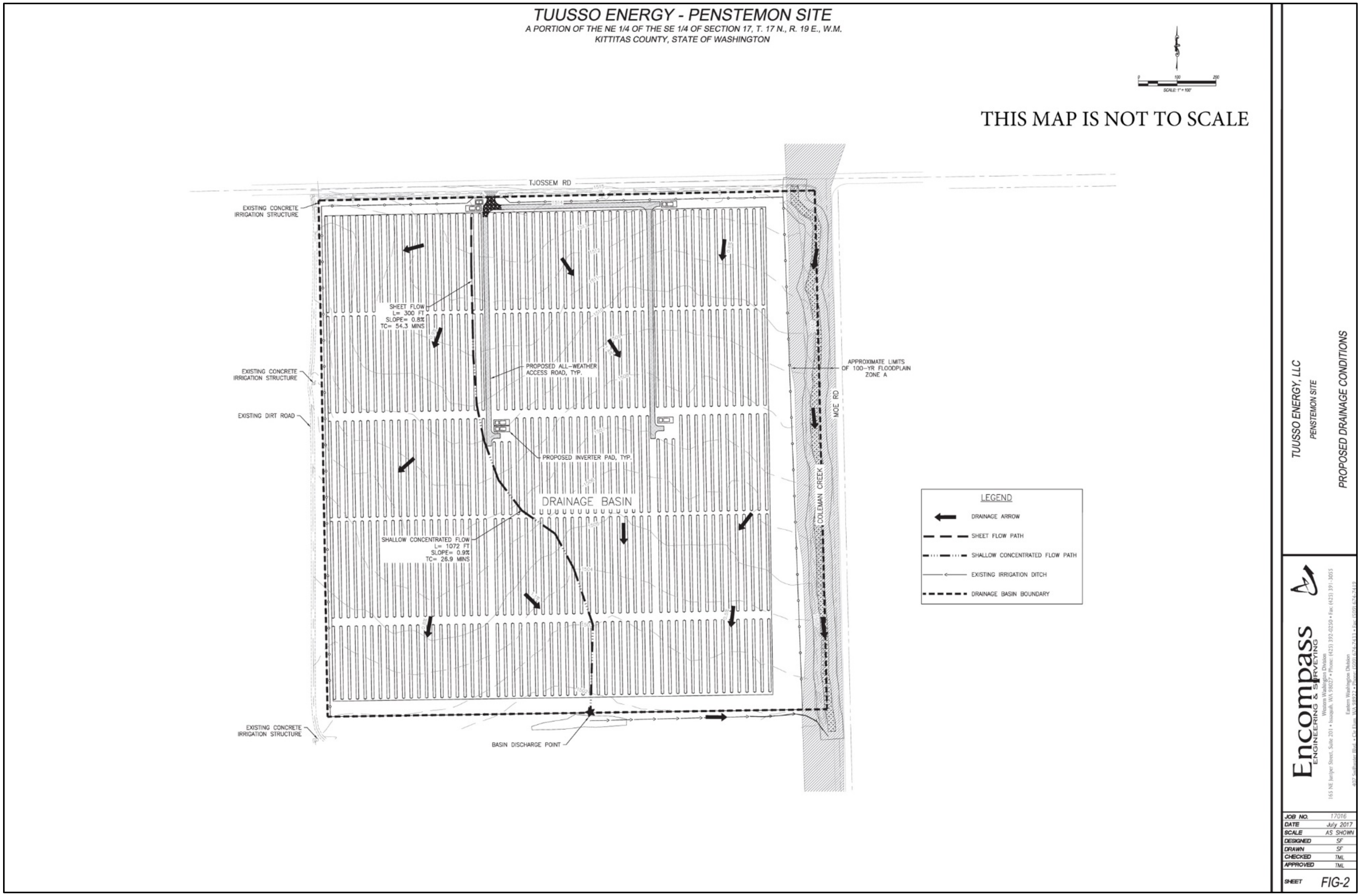


Figure 3.3-20. Proposed drainage conditions for the Penstemon Solar Project site.

Typha Solar Project Site

The overall topography of the Typha Solar Project site gently slopes to the south (Figure 3.3-21). The surface water that does not infiltrate flows to the south. There are two narrow wetlands that run west to east through the site and capture surface runoff and slowly discharge it to the east.

Drainage Basins

As shown in Figure 3.3-21, the Typha Solar Project site is made up of three drainage basins (Encompass 2017d). Drainage Basin 1 is made up of the northwest portion of the site. Drainage from this area flows south and into the northern wetland (TW01) on the site. Drainage Basin 2 is the largest drainage basin on the site and encompasses the northeast portion of the site. Drainage from Basin 2 flows south into the existing northern wetland (TW02), which then carries the flow to the east. Drainage from Basin 3 flows south into the wetland (TW03) which borders the southern portion of the site and is the more major wetland of the two on site. The runoff slowly flows to the east via the wetland. There are no impervious surfaces, meaning the entire 56.12 acres is pervious.

Downstream Analysis

The Typha Solar Project site drains into two wetlands (TW02 and TW03), both of which make their way to the east. The southern wetland becomes a more defined irrigation channel after leaving the site and continues to convey water to the east for approximately 0.75 mile before discharging into the Yakima River. This irrigation channel is currently maintained by the Kittitas Reclamation District (KRD). It is part of a larger irrigation network that serves the rural areas west of Ellensburg. As this channel is part of the irrigation facilities, the flow rate is controlled as needed. No issues have been brought up in relation to the existing irrigation infrastructure downstream of the project site.

Urtica Solar Project Site

The overall topography of the Urtica Solar Project site gently slopes to the east (Figure 3.3-22). The surface water that does not infiltrate flows to the east. Two ponds are located near the middle of the site and discharge into an existing irrigation ditch that runs west to east through the site.

Drainage Basins

As shown in Figure 3.3-22, the Urtica Solar Project site is made up of two drainage basins (Encompass 2017e). Drainage Basin 1 is the smaller of the two and encompasses the southern portion of the site. Drainage from this area flows east, to the southeast corner of the site, where it enters a culvert and crosses under Umptanum Road. Drainage Basin 2 is the larger drainage basin that encompasses the northern portion of the site. Drainage from Basin 2 flows into the existing irrigation pond and ditch (US01, McCarl Creek) that flows through the site to the east. There are no structures on the existing site, however there is an existing gravel road, which results in 0.33 acre of the site being impervious. The remaining 51.16 acres are pervious.

Downstream Analysis

The majority of the Urtica Solar Project site (Basin 2) drains to the east into the irrigation ponds and/or irrigation ditch (US01, McCarl Creek) that flows west to east through the site. The pond and ditch are currently maintained by the current landowner. The irrigation pond and ditch are part of a larger irrigation network that serves the rural areas southwest of Ellensburg. As this pond and ditch are irrigation facilities, the flow rates are controlled as needed. Both Basins drain into culverts that cross under Umptanum Road, and then continue on to the southeast as part of the larger existing irrigation network that serves the whole area. No issues have been brought up in relation to the existing irrigation infrastructure downstream of the project site.

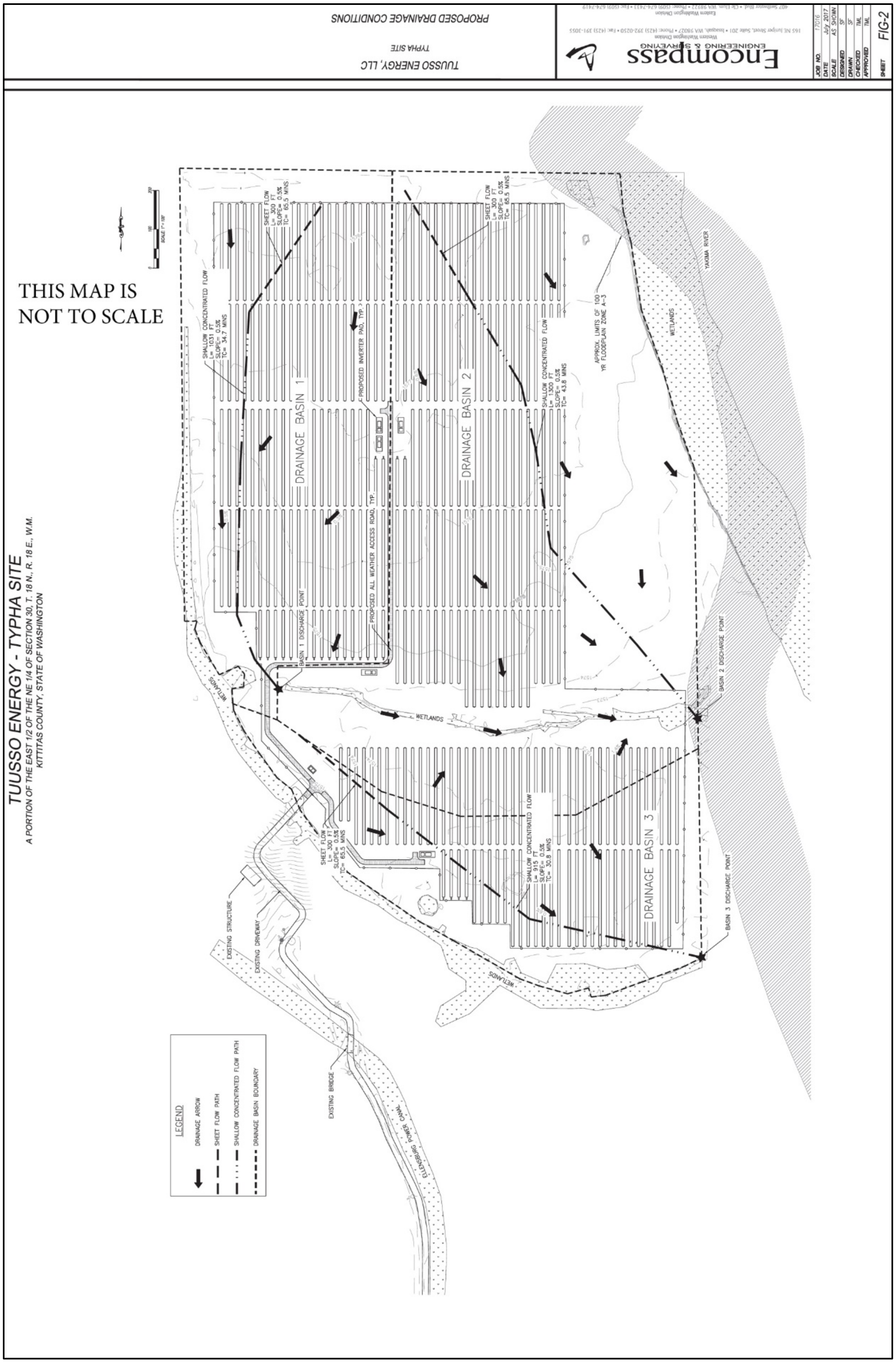


Figure 3.3-21. Proposed drainage conditions for the Typha Solar Project site.

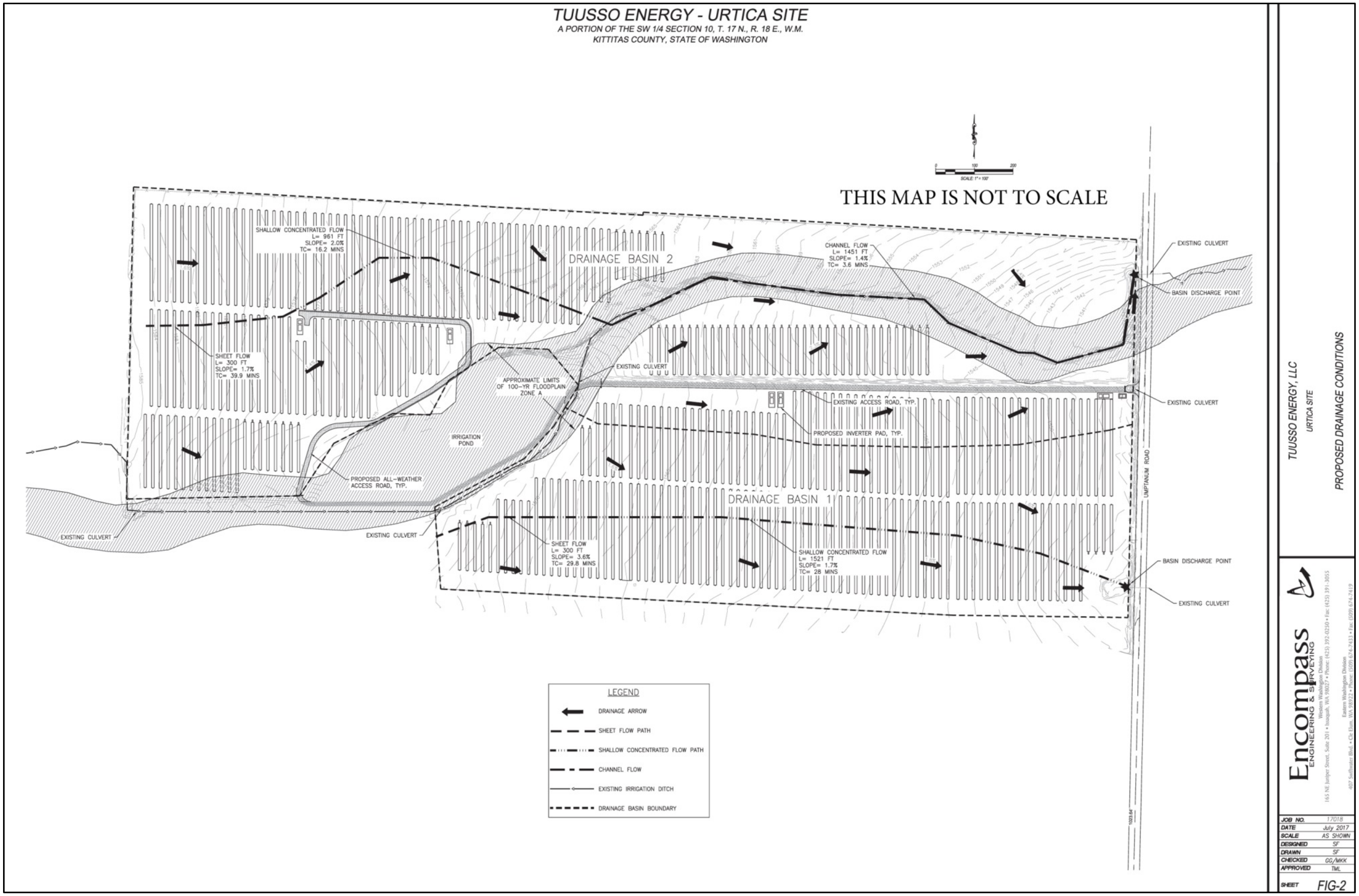


Figure 3.3-22. Proposed drainage conditions for the Urtica Solar Project site.

3.3.5 Impacts to Surface Water

3.3.5.1 General County

Minimal grading and ground disturbance would occur as part of the proposed Columbia Solar Projects. The proposed projects include at least 20-foot setbacks from wetlands, streams, and the Yakima River. Additionally, sediment and erosion control measures would be implemented to avoid water quality impacts to adjacent wetlands, streams, and the Yakima River. As a result, there would be no impacts to water quality. The access roads, concrete pads for the electrical infrastructure, and solar tracker posts are the only impervious surfaces proposed for the site. The portion of the solar panel array installations that actually disturb the ground is also very minimal. Because of this, existing topography and drainage patterns would remain relatively undisturbed, and the proposed drainage basins would encompass the same area as the existing drainage basins (see Figures 3.3-18 through 3.3-22).

See also Sections 2.11, 3.3.7, and 3.3.8. No discharge of water or contaminants is proposed for any of the five Columbia Solar Project sites; therefore, no hydrographic study data and analysis of the receiving waters within 0.5 mile of the solar project sites would be necessary. However, because impervious surfaces would be added to each project site, hydrologic modeling was conducted. All site and location factors were taken into account to perform the hydrologic modelling. These results are further summarized below for each site; the detailed analyses can be found in Appendices G through K (Encompass 2017a, 2017b, 2017c, 2017d, 2017e). The modeled increased runoff can be handled by full dispersion throughout each project site, as a majority of the existing vegetation at the sites would be protected. See detailed discussion of this in Appendices G through K (Encompass 2017a, 2017b, 2017c, 2017d, 2017e). The increased runoff is also considered negligible, due to the reduction of flood irrigation that would accompany each of the Columbia Solar Projects.

The Columbia Solar Projects would not impact the surface water quality and there would be minor permanent impacts to the surface water movement and quantity. However, no impacts are expected to occur in waters downstream of the solar project sites.

3.3.5.2 Solar Project Sites

Camas Solar Project Site

The Camas Solar Project would convert 2.00 acres into impervious surfaces. The modelling calculations showed that the runoff generated from a 2-year storm increased by 0.02 cubic feet per second (cfs) for Basin 1 while it did not increase for Basin 2. Runoff generated from a 25-year storm increased 0.07 cfs for Basin 1 and 0.01 cfs for Basin 2.

Fumaria Solar Project Site

Basin 1B would remain undisturbed throughout the Fumaria Solar Project, with no appreciable impervious surface added. The project would convert 1.71 acres into impervious surfaces in Basin 1A. The modelling calculations showed that the runoff generated from a 2-year storm increased 0.04 cfs. Runoff generated from a 25-year storm increased 0.11 cfs.

Penstemon Solar Project Site

The Penstemon Solar Project would convert 1.31 acres into impervious surfaces. The modelling calculations showed that the runoff generated from 2-year and 25-year storms would remain the same as under the existing condition.

Typha Solar Project Site

The Typha Solar Project would convert 1.40 acres into impervious surfaces. The modelling calculations showed that the runoff generated from a 2-year storm would increase 0.01 cfs for Basin 1 and remain the same as under the existing condition for Basins 2 and 3. Runoff generated from a 25-year storm increased 0.02 cfs for Basin 1 and 0.01 cfs for Basin 3, while Basin 2 remained unchanged.

Urtica Solar Project Site

The Urtica Solar Project would convert 1.65 acres into impervious surfaces. The modelling calculations showed that the runoff generated from a 2-year storm increased 0.02 cfs for Basin 1 while it did not increase for Basin 2. Runoff generated from the 25-year storm increased 0.01 cfs for Basin 1 and 0.02 cfs for Basin 2.

(3) Runoff/absorption. The application shall describe how surface water runoff and erosion are to be controlled during construction and operation, how runoff can be reintroduced to the ground for return to the groundwater supply, and to assure compliance with state water quality standards.

3.3.6 Affected Environment for Runoff/Absorption

The estimated infiltration rates for the Columbia Solar Project sites are 1.02 inches/hour for the upper, silty sand unit and 0.27 inch/hour for the underlying sandy gravel (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). The rate for the sandy gravel unit is assumed to be low because of the presence of fine-grained silt and clay minerals in the interstitial spaces and fractures of this partially cemented unit.

Site-specific seepage and perched groundwater observations are included below in Section 3.3.11.

3.3.7 Impacts to Runoff/Absorption

3.3.7.1 General County

See also the Drainage Design and Current and Proposed Hydrology sections in Section 2.3.3.1, as well as Section 3.3.5.

No export of soil is anticipated for any of the five Columbia Solar Project sites. During site construction, open soil exposure would be minimized through minimization of grading activities, and erosion from runoff would be reduced or eliminated by the utilization of BMPs, including but not limited to installation of silt fences and tarps where appropriate. At the conclusion of construction, all disturbed areas surrounding graded areas would be remediated through reseeding with native low cover vegetation. No ditches or outfall pipes would be installed as part of the proposed solar projects. Therefore, all water in the project impact areas would either be absorbed through infiltration or runoff through overland flow at very low velocities that are unlikely to cause excessive erosion. No discharges to water resources are proposed for the construction and operation of the solar project sites. As a result, the temporary runoff/absorption impacts would be minor.

Infiltration and Temporary Erosion and Sedimentation Control

TUUSSO would implement BMPs based on applicable stormwater guidelines for eastern Washington to reduce or eliminate concentrated stormwater runoff and erosion. Additional details regarding BMPs can be found in Section 3.1.6.

Construction of the solar arrays at the Columbia Solar Project sites could create a minor increase in the total and effective impervious area of the sites that is equivalent to the area of the solar panel footings and associated infrastructure. There would also be an increase in less pervious areas because of the proposed gravel access roads.

Based on the results of the geotechnical study, infiltration into the upper, topsoil-like silty sand/sandy silt soils at the Columbia Solar Project sites is feasible and ongoing (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). The solar project sites have been cultivated using flood irrigation methods, and the irrigation water percolates into the soil and is stored above the underlying relatively impervious layer found throughout the valley. The soils are capable of infiltrating stormwater during an average year (Swiftwater 2017). The solar project sites are located in Climate Region 2 – Central Basin and receive an average of about 8 inches of precipitation per year, some of it in the form of snow (Ecology 2013). Given the relatively low precipitation in the area, combined with the natural permeability of the upper soil horizon, infiltration of normal stormwater amounts would occur on the solar project sites and normal levels of stormwater would not be concentrated to a significant extent (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). As a result, there would be permanent minor runoff/absorption impacts.

Drainage

Appreciable amounts of seepage are not anticipated during excavation of the Columbia Solar Project sites; however, during the rainy winter months, it is prudent to anticipate seepage in excavations and groundwater control measures would be on-site or readily available. These would include trash pumps, sumps, and discharge ditches. Seepage may create instability in the excavation walls. The solar project sites would be graded such that surface water would be directed away from structures and slopes and not allowed to pond near the tops or toes of slopes. Given the relatively low precipitation in the solar project areas, combined with the natural permeability of the upper soil horizon, infiltration of normal stormwater amounts would occur on the project sites and normal levels of stormwater would not be concentrated to a significant extent (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). Stormwater discharge BMPs would be implemented on the project sites to control runoff from the sites and ensure that state water quality standards are achieved.

3.3.8 Mitigation for Runoff/Absorption

The following runoff/absorption mitigation measures would be used:

- Off-site flows have been calculated for the Columbia Solar Project sites, and would bypass the sites via the existing flow paths, which run throughout the sites in poorly defined flow paths. The solar project sites have been laid out to minimize the area that would encroach into the flow paths. Any grading of the solar project sites would direct surface water away from structures and slopes.
- Surface water would not be allowed to pond near the tops or toes of slopes of the solar project sites.
- Stormwater discharge BMPs would be implemented to control runoff from each of the solar project sites.
- Sediment-laden surface water would be treated such that water discharged from each of the solar project sites meets all water quality standards.
- Stormwater would not be discharged over the project site slopes to the north of each solar project site.

(4) Floods. The application shall describe potential for flooding, identify the five, fifty, and one hundred-year flood boundaries, and describe possible flood impacts at the site, as well as possible flood-related impacts both upstream and downstream of the proposed facility as a result of construction and operation of the facility and all protective measures to prevent possible flood damage to the site and facility.

3.3.9 Affected Environment for Floodplains

3.3.9.1 General County

The Flood Emergency Management Agency (FEMA) maps floodplains throughout the country. FEMA-mapped floodplains are found at every Columbia Solar Project site, except for the Fumaria Solar Project site. The FEMA-mapped 100-year floodplain is depicted on the site plans for each of the project sites in Appendix L (FEMA 1981a). The 50-year floodplain is not depicted on FEMA Flood Insurance Rate Maps (FIRMs) for Kittitas County; however, it is described in the FEMA Flood Insurance Study (FIS) for the city of Ellensburg. An FIS is a compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community and contains detailed flood elevation data in flood profiles and data tables (FEMA 1981b). The 5-year floodplain is not included in the FIS or depicted on FIRMs. This Application for Site Certification (ASC) assumes that because the 100-year floodplain boundary occurs at a higher elevation than the 5- and 50-year floodplains, that analysis of impacts within the 100-year floodplain boundary are representative of those to the 5- and 50-year floodplains, with fewer impacts occurring within the 5- and 50-year floodplains.

3.3.10 Impacts to Floodplains

3.3.10.1 General County

TUUSSO utilized avoidance measures during design of the Columbia Solar Projects to avoid, reduce, or eliminate impacts to the 100-year floodplain. Minor encroachment into the FEMA-mapped 100-year floodplain would be unavoidable based on the current project designs and would occur over a total of 7.94 acres across all of the solar project sites. However, actual fill in the solar project sites would be limited to solar panel footings, inverters, and access road installation, with all other areas remaining at the current site elevation. Impacts to the FEMA-mapped 100-year floodplain would be limited to 0.57 acre across all of the solar project sites. All inverters would be located outside of the FEMA-mapped 100-year floodplain.

Refer to Table 3.3-6 for the total area of FEMA-mapped 100-year floodplain within the solar project sites, average distance from the edge of the floodplain boundary to the nearest project disturbance, total 100-year floodplain encroachment, and total impacts to the 100-year floodplain within each of the solar project sites. Impacts to the FEMA-mapped 100-year floodplain along the Fumaria and Typha Solar Project generation tie lines would be avoided by using existing power poles and spanning all floodplain areas; therefore, the generation tie lines are excluded from Table 3.3-6.

Table 3.3-6. FEMA-Mapped 100-year Floodplain Project Encroachment and Impacts within Each Columbia Solar Project Site

Project Site	Total Area of 100-year Floodplain within Project (acres)[1]	Average Distance from Floodplain Boundary Edge to Project Disturbance (feet)	Total 100-year Floodplain Encroachment (acres)	Total Impacts to 100-year Floodplain (acres)
Camas Solar Project Site				
100-year Floodplain	12.41	10	6.78	0.19
Fumaria Solar Project Site				
100-year Floodplain	0.00	626	0.00	0.00
Penstemon Solar Project Site				
100-year Floodplain	1.96	9	0.00	0.00
Typha Solar Project Site				
100-year Floodplain	0.53	60	0.00	0.00
Urtica Solar Project Site				
100-year Floodplain	6.09	30	1.16	0.38

1. 100-year floodplain mapping is based on the FEMA-mapped floodplains depicted on FIRMs (FEMA 1981a).

See Appendix L for site plans for each of the Columbia Solar Project sites. Encroachment and impacts to the FEMA-mapped 100-year floodplain and discussion of the 50-year floodplain are described below for each solar project site.

3.3.10.2 Solar Project Sites

Camas Solar Project Site

The FEMA-mapped 100-year floodplain associated with Little Naneum Creek encompasses approximately 12.41 acres of the Camas Solar Project site. The northernmost 100-year floodplain appears to have been a former overflow channel of Little Naneum Creek. This area of the 100-year floodplain enters the study area in the north, heads west slightly, makes a gradual curve to the south, and follows the edge of the highway, encompassing wetland CW01, to its confluence with Little Naneum Creek in the southwestern corner of the site. The 100-year floodplain is described on the FIRM as ranging from 1,454 to 1,470 feet above mean sea level (amsl) within the "limit of detailed study," which does not extend north of the intersection of Bull Ditch and Little Naneum Creek (FEMA 1981a). The 50-year floodplain for Little Naneum Creek was described in the FEMA FIS, depicted as Naneum Creek in the FIS, as being 0.2 feet lower in elevation than the 100-year floodplain boundary (FEMA 1981b).

Encroachment of the Camas Solar Project area into the FEMA-mapped 100-year floodplain would be approximately 6.78 acres based on the current design plans. Proposed impacts to the FEMA-mapped 100-year floodplain were avoided to the extent possible through project design to reduce possible fill in these areas. The total proposed project impacts to the FEMA-mapped 100-year floodplain would be approximately 0.19 acre, which includes less than 0.01 acre of fill from the solar panel footings and 0.18 acre of fill from access road installation. The number and placement of panel footings have not been determined in the project design but would not be expected to exceed 0.01 acre within the FEMA-mapped 100-year floodplain. Therefore, the project would result in minimal impacts to floodplains.

Based on observations during Camas Solar Project site visits, the FEMA-mapped 100-year floodplain area does not appear to match the current site conditions and may be smaller than what is depicted on the FIRM.

Fumaria Solar Project Site

No FEMA-mapped 100-year floodplains are depicted within the Fumaria Solar Project site. Therefore, no impacts are proposed to any FEMA-mapped 5-, 50-, or 100-year floodplains within the project site. The nearest 100-year floodplain is along Reecer Creek, over 600 feet from the site. All impacts to FEMA-mapped floodplains would be avoided through project design.

Fumaria Solar Project Generation Tie Line

The FEMA-mapped 100-year floodplain, associated with Reecer Creek, encompasses approximately 1.91 acres along the Fumaria Solar Project generation tie line. The FEMA-mapped 100-year floodplain for Reecer Creek would cross the generation tie line three times. The 100-year floodplain is depicted on the FIRM but does not include elevation ranges (FEMA 1981a). The 50-year floodplain for the portion of Reecer Creek along the generation tie line was not described in the FEMA FIS but can be assumed to be lower in elevation than the 100-year floodplain boundary (FEMA 1981b).

The FEMA-mapped 100-year floodplain would be avoided by spanning the Reecer Creek floodplain using existing power poles. If new power poles need to be installed, then TUUSSO would install them in upland areas outside of the FEMA-mapped 100-year floodplain along the Fumaria Solar Project generation tie line. Impacts to the FEMA-mapped 100-year floodplain would be avoided through project design.

Penstemon Solar Project Site

The FEMA-mapped 100-year floodplain associated with Coleman Creek encompasses approximately 1.96 acres within the Penstemon Solar Project site. The FEMA-mapped 100-year floodplain for Coleman Creek runs along the eastern project site boundary and appears to flood Moe Road regularly. The 100-year floodplain is depicted on the FIRM but does not include elevation ranges (FEMA 1981a). The 50-year floodplain for the portion of Coleman Creek within the project site was not described in the FEMA FIS but can be assumed to be lower in elevation than the 100-year floodplain boundary (FEMA 1981b).

Encroachment into and impacts to the FEMA-mapped 100-year floodplain from the Penstemon Solar Project would be avoided through project design.

Typha Solar Project Site

The FEMA-mapped 100-year floodplain associated with the Yakima River encompasses approximately 0.53 acre within the Typha Solar Project site. The FEMA-mapped 100-year floodplain for the Yakima River runs along the eastern project site boundary, entering the site near where wetland TW02 leaves the site and in the northeastern corner of the site. The 100-year floodplain is described on the FIRM as ranging from 1,567 to 1,572 feet amsl within and directly adjacent to the project site (FEMA 1981a). The 50-year floodplain for this portion of the Yakima River was described in the FEMA FIS as being 0.7 feet lower in elevation than the 100-year floodplain boundary (FEMA 1981b).

Encroachment into and impacts to the FEMA-mapped 100-year floodplain from the Typha Solar Project would be avoided through project design.

Typha Solar Project Generation Tie Line

No FEMA-mapped 100-year floodplains are depicted along the Typha Solar Project generation tie line. Therefore, no impacts are proposed to any FEMA-mapped 5-, 50-, or 100-year floodplains along the Typha Solar Project generation tie line.

Urtica Solar Project Site

The FEMA-mapped 100-year floodplain associated with McCarl Creek encompasses approximately 6.09 acres of the Urtica Solar Project site. The FEMA-mapped 100-year floodplain depicted on the FIRM crosses the site along McCarl Creek (described as Distributary to Manastash Creek on the FIRM) and encompasses the two on-site ponds and their surrounding wetlands, UW02 and UW03. The 100-year floodplain is depicted on the FIRM but does not include elevation ranges (FEMA 1981a). The 50-year floodplain for the portion of Coleman Creek within the project site was not described in the FEMA FIS but can be assumed to be lower in elevation than the 100-year floodplain boundary (FEMA 1981b).

Encroachment of the Urtica Solar Project area into the FEMA-mapped 100-year floodplain would be approximately 1.16 acres based on the current design plans. Proposed impacts to the FEMA-mapped 100-year floodplain were avoided to the extent possible through project design, to reduce possible fill in these areas. The total proposed project impacts to the FEMA-mapped 100-year floodplain would be 0.38 acre, which includes less than 0.01 acre of fill from the solar panel modules and 0.37 acre of fill from access road installation. The number and placement of panel footings have not been determined in the project design but would not be expected to exceed 0.01 acre within the FEMA-mapped 100-year floodplain. Therefore, the project would result in minimal impacts to floodplains.

(5) Groundwater movement/quantity/quality. The application shall describe the existing groundwater movement, quality, and quantity on and near the site, and in the vicinity of any points of water withdrawal associated with water supply to the project. The application shall describe any changes in surface and groundwater movement, quantity, quality or supply uses which might result from project construction or operation and from groundwater withdrawals associated with water supply for the project, and shall provide mitigation for adverse impacts that have been identified.

3.3.11 Affected Environment for Groundwater

3.3.11.1 General County

The Columbia Solar Project sites are located within the Upper Yakima sub-basin of the Yakima groundwater basin. Basaltic rocks beneath most of the Yakima River basin are part of the larger Columbia River Basalt Group (CRBG). The CRBG comprises more than 300 individual basalt flows, and multiple aquifers reside within them (U.S. Bureau of Reclamation [Reclamation] 2012). Reported “depth to water” levels are as shallow as 10 feet below ground surface (bgs) near river valley bottoms, to more than 200 feet bgs. Well yields are generally less than 100 gallons per minute. Groundwater flows in the basin converge toward the Yakima River.

Groundwater quality in the Yakima basin is generally good; most issues are related to the impacts of agricultural operations on drinking water wells (Reclamation 2012). Water quality issues involve excess nitrate levels and bacterial contamination, particularly in the lower portions of the Yakima basin.

Results from Swiftwater’s April 2017 geotechnical survey are discussed above in Section 3.1 and the detailed reports are included as Appendices G through K (Swiftwater 2017a, 2017b, 2017c, 2017d, 2017e). The following site-specific discussions include groundwater observations.

3.3.11.2 Solar Project Sites

Camas Solar Project Site

Regarding existing water quality issues, there is a short segment of the Yakima River mapped as impaired (EPA 2017b). The impaired segment intersects with Wilson Creek, of which the Camas Solar Project's primary drainage is a tributary. There are also short impaired segments up-gradient of the project site, on Cooke Creek. These are located cross-gradient or up-gradient on different local drainage systems not connected to the site.

Well registry data (Washington State Department of Ecology [Ecology] 2017a) identified no wells on the Camas Solar Project site. Two wells were located approximately 400 feet east of the project site. The wells had depths of 80 and 120 feet, but no depth to water or pump capacity was listed in the data files. Other wells in the vicinity had depths of 45 to 180 feet.

A 6-inch-thick, wet sand seam was observed at 10.0 to 11.0 feet below grade on the Camas Solar Project site. This water was encountered in thin, relatively clean sand seams and appears to have been perched within the seams, as additional groundwater was not noted below these depths. Additional groundwater flow may be observed during the wetter winter months.

Fumaria Solar Project Site

Regarding existing water quality issues, there are no impaired reaches in, adjacent to, or up-gradient of the Fumaria Solar Project site (EPA 2017b).

Well registry data (Ecology 2017a) identified one well on the Fumaria Solar Project site (Well Log ID 339775), which had a recorded depth of 120 feet bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had depths of 80 to 170 feet bgs.

Minor seepage was observed at Boring F-2 on the Fumaria Solar Project site. Groundwater may be present during wetter parts of the year.

Penstemon Solar Project Site

Regarding existing water quality issues, there is a short segment of the Yakima River mapped as impaired (EPA 2017b). The impaired segment intersects with Wilson Creek, of which the Penstemon Solar Project's primary drainage is a tributary. There are also short impaired segments up-gradient of the project site, on Cooke Creek. These are located cross-gradient or up-gradient on a different local drainage system not connected to the project site.

Well registry data (Ecology 2017a) identified no wells on the Penstemon Solar Project site. Two wells were mapped approximately 700 feet east and north of the project site. The wells had depths of 125 to 150 feet bgs, but no depth to water or pump capacity was listed in the data files. Other wells within 1 mile of the project site had depths of 12 to 335 feet bgs.

Below about 10 feet, fine sand seams with minor amounts of perched groundwater were observed on the Penstemon Solar Project site. It is possible, though not likely, that groundwater seepage might be encountered elsewhere on the site.

Typha Solar Project Site

Regarding existing water quality issues, there are no impaired reaches in, adjacent to, or up-gradient of the Typha Solar Project site (EPA 2017b).

Well registry data (Ecology 2017a) identified one well on the Typha Solar Project site (Well Log ID 339775), which had a recorded depth of 120 feet bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had recorded water depths of 80 to 170 feet bgs.

At 4.5 to 5 feet below grade, there was a 6-inch silty sand seam with perched groundwater seepage on the Typha Solar Project site. The seepage was not continuous. Additional groundwater flow may be observed during the wetter winter months.

Urtica Solar Project Site

Regarding existing water quality issues, there are no impaired reaches in, adjacent to, or up-gradient of the Urtica Solar Project site (EPA 2017b).

Well registry data (Ecology 2017a) identified one well on the Urtica Solar Project site (Well Log ID 339775), which had a recorded depth of 172 feet below bgs. No depth to water or pump capacity data were available. Other wells within 1 mile of the project site had depths of 15 to 290 feet bgs.

No seepage was observed in either boring at the Urtica Solar Project site.

3.3.12 Impacts to Groundwater

No points of groundwater withdrawal, associated with water supplies to the Columbia Solar Projects, are planned. No impacts to groundwater movement, quantity, quality, or supply uses would result from project construction or operation of the solar projects. If grading and/or construction is carried out during the winter or spring months, groundwater seepage might be present. Appreciable amounts of seepage are not anticipated during excavation. However, during the rainy winter months, seepage in excavations at any of the Columbia Solar Project sites could occur and groundwater control measures would be on-site or readily available, including trash pumps, sumps, and discharge ditches.

3.3.13 Mitigation for Groundwater

Groundwater control measures for the Columbia Solar Projects would be on-site or readily available, including trash pumps, sumps, and discharge ditches.

(6) Public water supplies. The application shall provide a detailed description of any public water supplies which may be used or affected by the project during construction or operation of the facility.

3.3.14 Public Water Supply

The Columbia Solar Projects will utilize either municipal water sources (such as from the city of Ellensburg), water from other off-site vendors with a valid water right, or on-site existing water allocations to provide the water for construction and ongoing operational needs.

For each of the Columbia Solar Project sites, TUUSSO has conservatively estimated that approximately 10 acre-feet of water would be needed for construction, and 400 acre-feet of water would be needed per site per year during the first 3 years of operation for irrigation. Irrigation water for all but the Fumaria Solar Project will very likely be supplied by on-site existing water allocations. After the initial 3 years of operation, TUUSSO would require less than 1 acre-foot of water per site per year for panel washing and dust suppression. The construction needs are likely to be supplied by municipal water sources or water from other off-site vendors with a valid water right, as are the panel washing and dust suppression needs. However, the irrigation needs are very likely to be supplied by the on-site existing water allocations.

None of the five Columbia Solar Projects would require or use water intake or conveyance structures. If the solar projects use existing on-site water resources, they would be conveyed using existing piping systems or would be trucked from such systems. TUUSSO has incorporated water conservation methods into its operational water plan as well. Where feasible, TUUSSO would work with the current landowners to incorporate more efficient irrigation systems to water the trees and shrubs forming the visual buffers.

In summary, the Columbia Solar Projects would likely use up to 10 acre-feet of water per site from municipal water sources during construction, and then less than 1 acre-foot of water per site per year from municipal water sources. Further details of the proposed construction and operational water uses are described in Sections 2.6.1 and 2.6.2 of this application.

3.4 Habitat, Vegetation, Fish, and Wildlife 463-60-332

The application shall describe all existing habitat types, vegetation, wetlands, fish, wildlife, and in-stream flows on and near the project site which might reasonably be affected by construction, operation, decommissioning, or abandonment of the energy facility and any associated facilities. For purposes of this section, the term "project site" refers to the site for which site certification is being requested, and the location of any associated facilities or their right of way corridors, if applicable. The application shall contain the following information:

(1) Assessment of existing habitats and their use. The application shall include a habitat assessment report prepared by a qualified professional. The report shall contain, but not be limited to, the following information:

(a) A detailed description of habitats and species present on and adjacent to the project site, including identification of habitats and species present, relative cover, density, distribution, and health and vigor;

3.4.1 Affected Environment for Habitat and Species

3.4.1.1 General County

Analysis Areas

The solar project sites are defined as the footprint of each of the five proposed Columbia Solar Project sites, and the generation tie line corridors associated with two of the sites (Figure 3.4-1). To provide a baseline for analysis of potential impacts to biological resources from the proposed solar projects, two analysis areas are evaluated, a project-scale and a landscape-scale analysis area. These areas are further described below.

Project-scale Analysis Area

The project-scale analysis areas include each Columbia Solar Project site and an associated surrounding 500-meter buffer (Figure 3.4-1). These analysis areas include the habitat that would be directly impacted from construction and operation of each project, through ground disturbance, noise, and habitat alteration. A project-scale analysis area is appropriate for evaluating the potential impacts on species with small home ranges or territories, such as small birds, rodents, mammals, and amphibians.

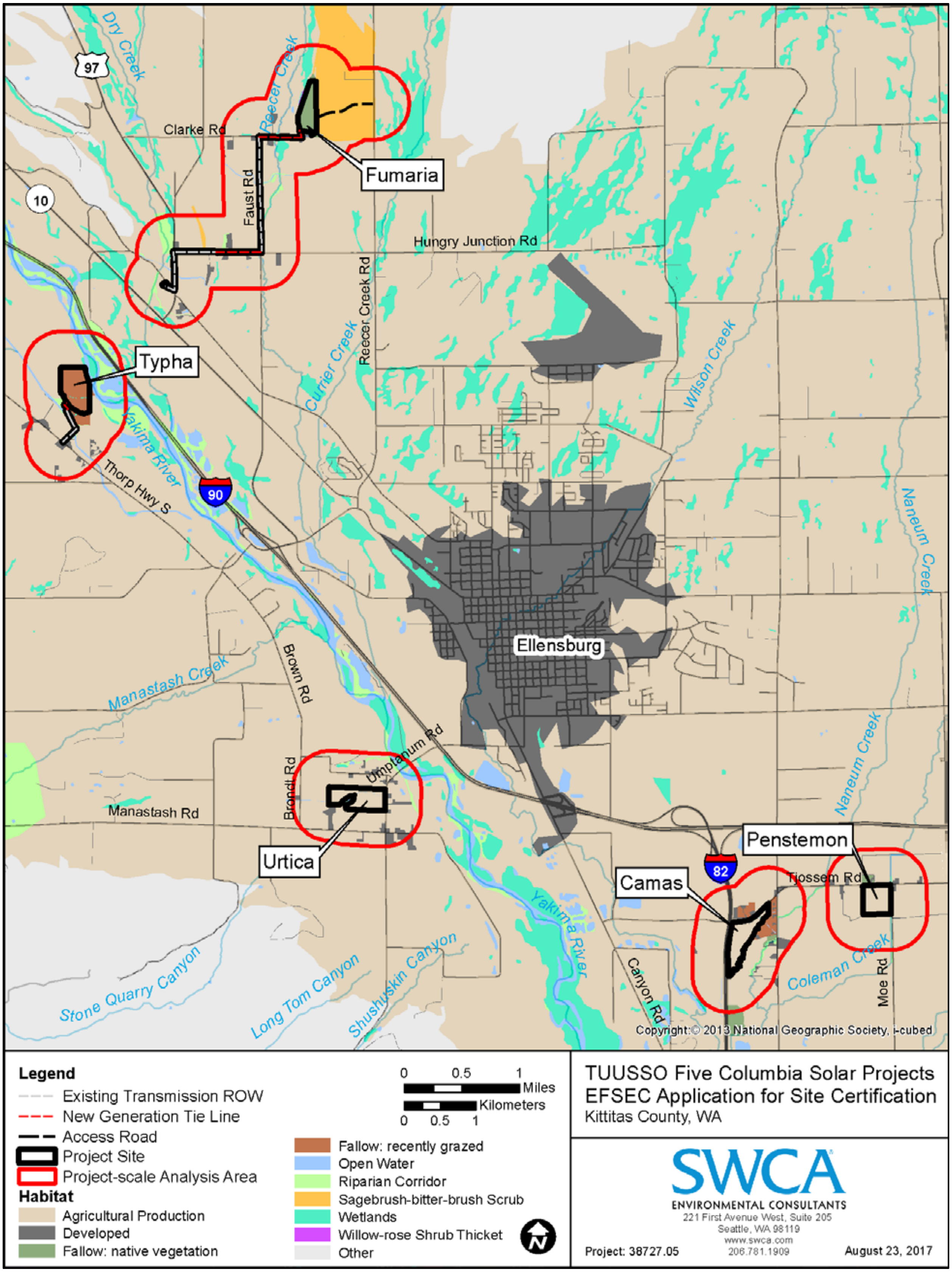


Figure 3.4-1. Columbia Solar Projects project-scale analysis areas.

Landscape-scale Analysis Area

The landscape-scale analysis area includes all five of the project-scale analysis areas, as well as the surrounding sub-watersheds (Figure 3.4-2). This analysis area is intended to evaluate the indirect impacts of Columbia Solar Project construction and operation on habitat in the region, and is appropriate for evaluating the potential impacts on migratory species or those species with larger home ranges such as raptors and large mammals. Although biotic effects could occur outside of the selected sub-watersheds, they become more difficult to accurately predict with increased distance from the source of the impact.

As shown in Figure 3.4-2 and Table 3.4-1, the five Columbia Solar Project sites are all within approximately 2.5 miles of the Yakima River and 3.5 miles of the nearest areas only minimally inhabited by humans (for example foothills, draws, canyons, and mountains). Migratory species are known to occupy and travel through all of these sites.

Habitats and Vegetation

Available habitats within the analysis areas were mapped based on dominant vegetation type as well as past and present land use, and habitat mapping was used to determine the potential impacts from the proposed Columbia Solar Projects' activities. Site-specific descriptions of habitat and vegetation species documented during the April 3 to 12, 2017, field survey are provided to characterize the general habitat, and are considered representative of similar habitats found throughout the landscape-scale analysis area. Areas not surveyed were characterized using vegetation data from the Gap Analysis Project (GAP) (University of Washington, Washington Cooperative Fish and Wildlife Research Unit [WCFWRU] 1997).

The majority of the Columbia Solar Projects project-scale analysis areas are made up of productive agricultural areas, fallow fields, recently grazed areas, and natural vegetation with several riparian, wetland, and open-water areas present. Wetlands and open-water areas are described in detail in Sections 3.3 and 3.5, as well as in the five Critical Areas Reports (Appendices G–K). These aquatic habitats are not anticipated to be affected by the proposed solar projects. Developed areas are mostly located outside or adjacent to the solar project sites, but are common in the landscape-scale analysis area.

Other habitats not observed during the field visits are found in the landscape-scale analysis area, but are not heavily represented in the project-scale analysis areas, and do not provide habitat that is similar to areas potentially impacted by the projects. The habitat types grouped into the "other" category in this report are located within the landscape-scale analysis area, but were not observed during the field surveys. These types include: 1) conifer forest; 2) areas that are non-forested, but are apparently natural, parkland meadows with scattered trees; and 3) areas that are non-forested due to having been logged, and are in various stages of regrowth to herbs or small shrubs. Some of this habitat category is likely sagebrush-bitter-brush, fallow (native vegetation and recently grazed), and willow-rose shrub thicket scrub, but because field surveys were not performed in these areas, their mapping was not altered from the original base mapping (WCFWRU 1997).

The *Habitat, Vegetation, Fish, and Wildlife Assessment Report for Five Proposed TUUSSO Solar Project Sites* provides representative photographs of the vegetation and habitat types found in the Columbia Solar Project project-scale analysis areas (Appendix C). The following sections provide detailed descriptions of the habitat types found in the project-scale analysis areas (Figures 3.4-3 to 3.4-10).

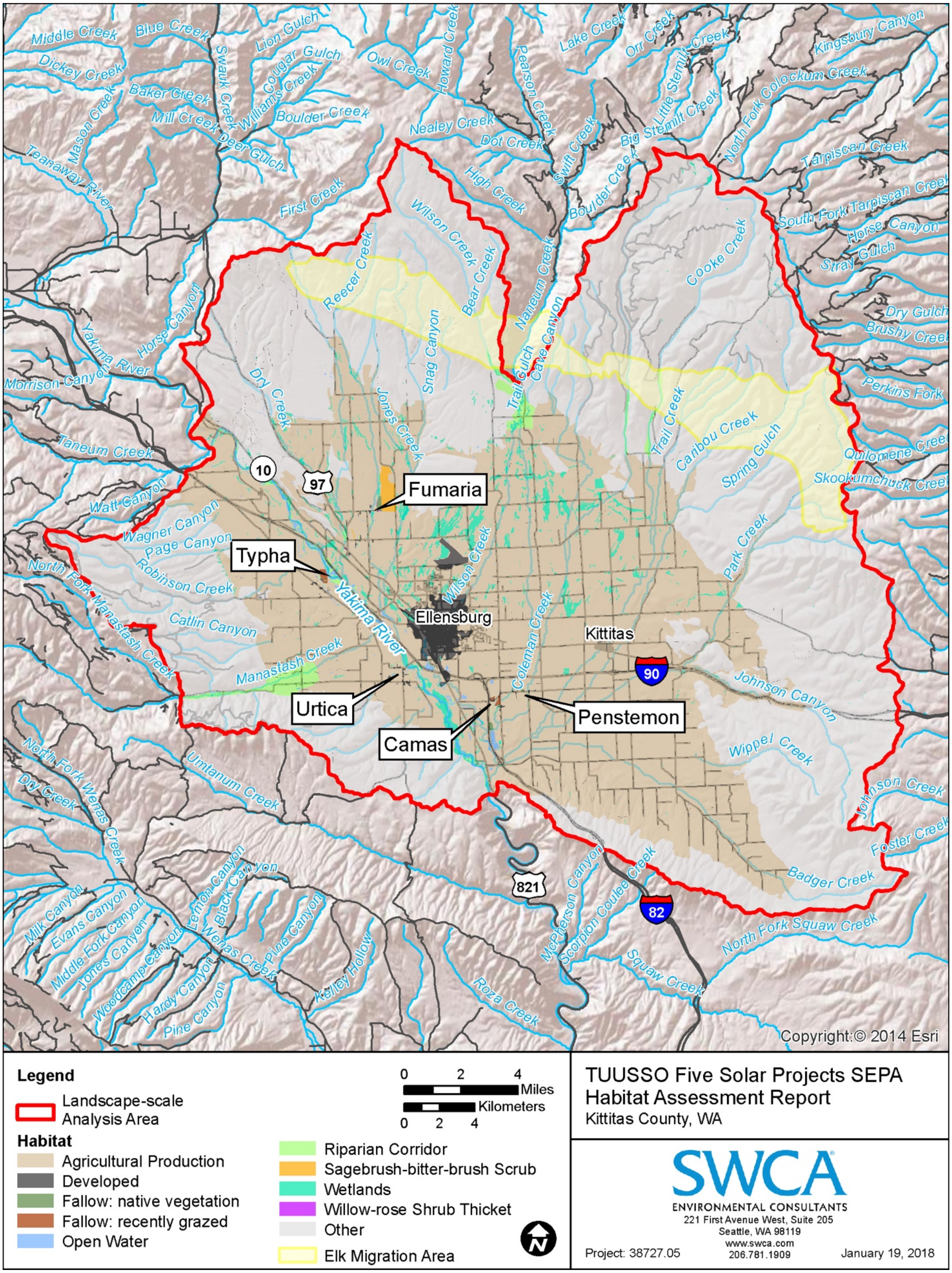


Figure 3.4-2. Columbia Solar Projects landscape-scale analysis area.

Table 3.4-1. Available Habitat Types within the Columbia Solar Project Analysis Areas

Habitat Type	Landscape-scale Analysis Area		Project-scale Analysis Areas (500-meter buffer surrounding each solar project site)									
			Camas		Fumaria (Site with Access Road and Generation Tie Line)		Penstemon		Typha (Site and Generation Tie Line)		Urtica	
	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total	Acres	% of Total
Agricultural Production	115,057	36%	462	82%	1,155 (289 & 1,004)	72% (46% & 65%)	401	93%	352 (249 & 248)	59% (52% & 37%)	433	84%
Developed	4,805	1%	50	9%	58 (14 &55)	4% (2% & 25%)	19	4%	33 (22 & 25)	6% (5% & 39%)	47	9%
Fallow: vegetated	72	<1%	6	1%	41 (41 & 32)	3% (7% & 1%)	5	1%	–	–	–	–
Fallow: recently grazed	94	<1%	29	5%	–	–	–	–	64 (64 & 64)	11% (11% & 4%)	–	–
Open Water	1,247	<1%	4	1%	12 (3 & 12)	1% (<1% & 2%)	2	<1%	70 (69 & 16)	12% (14% & 10%)	13	3%
Riparian Corridor	2,801	1%	13	2%	40 (0 & 41)	2% (0% & 2%)	3	1%	56 (56 & 9)	9% (12% & 6%)	13	3%
Sagebrush-bitter-brush Scrub	442	<1%	–	–	233 (228 & 36)	14% (36% & 1%)	–	–	–	–	–	–
Wetlands	5,315	2%	2	<1%	67 (49 & 27)	4% (5% & 2%)	<1	<1%	19 (19 & 5)	4% (4% & 2%)	9	2%
Willow-rose Shrub Thicket	4	<1%	–	–	3 (2 & 3)	<1% (<1% & 4%)	–	–	<1 (<1 & 0)	<1% (<1% & 2%)	–	–
Other	193,188	60%	–	–	–	–	–	–	–	–	–	–
Total Acres	**323,025**		**566**		**1,609** (626 & 1,210)		**430**		**594** (479 & 366)		**515**	
Distance from project site to: Yakima River			**1.32 miles west**		**Site: 2.12 miles west Generation Tie Line: 0.86 mile west**		**2.54 miles west**		**Site: 0 mile east Generation Tie Line: 0.25 mile east**		**0.19 mile northeast**	
Distance from project site to: nearest area minimally-inhabited by humans			**2.1 miles south**		**Site: 1.07 miles east Generation Tie Line: 1.19 mile east**		**3.31 miles south**		**Site: 2.57 miles southwest Generation Tie Line: 2.35 miles southwest**		**1.02 miles southwest**	

Note: the area calculated for the generation tie line overlaps each of the Fumaria and Typha Solar Project project-scale analysis areas by a 500-meter buffer.

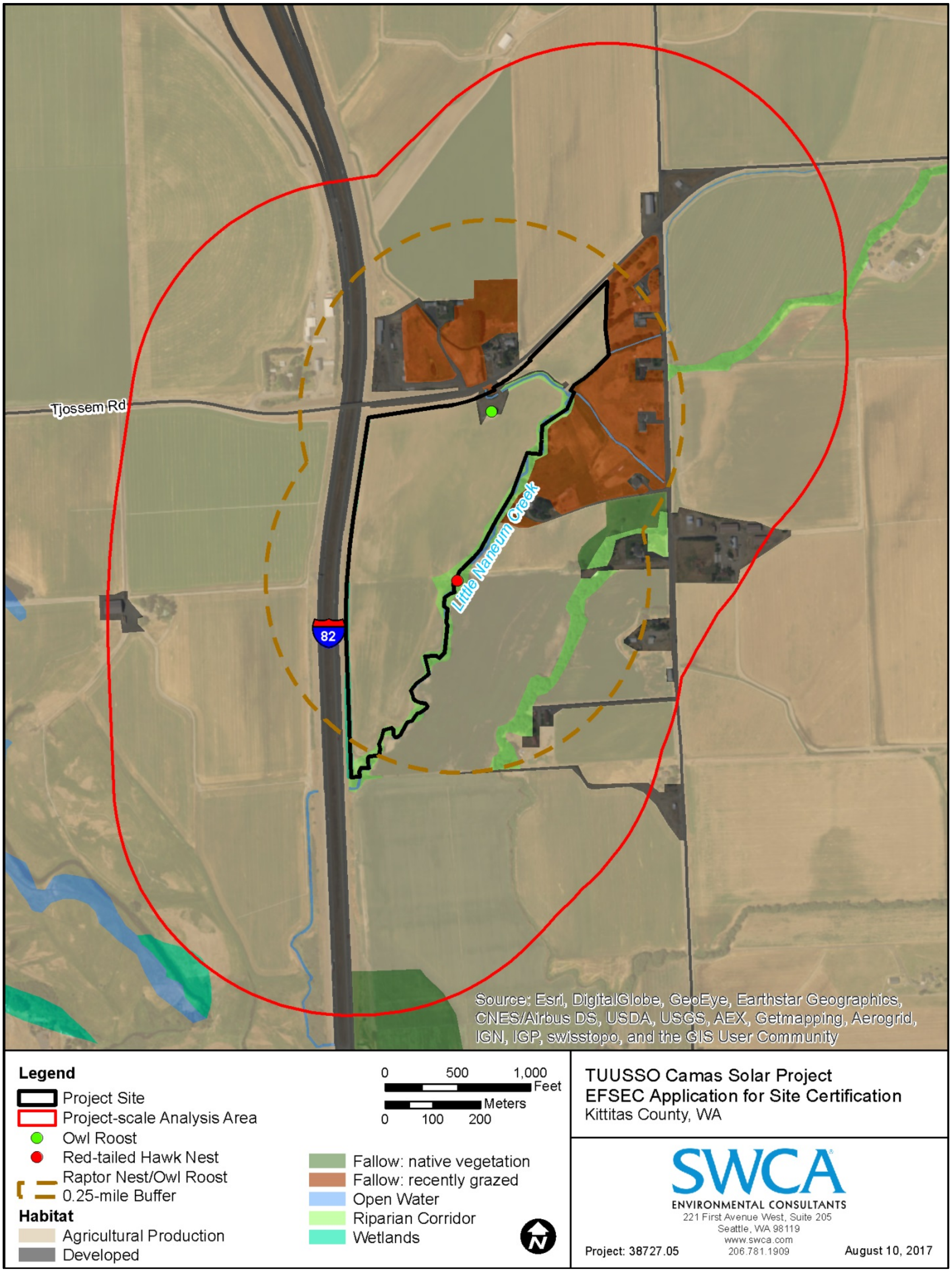


Figure 3.4-3. Habitat types within the project-scale analysis area for the Camas Solar Project site.

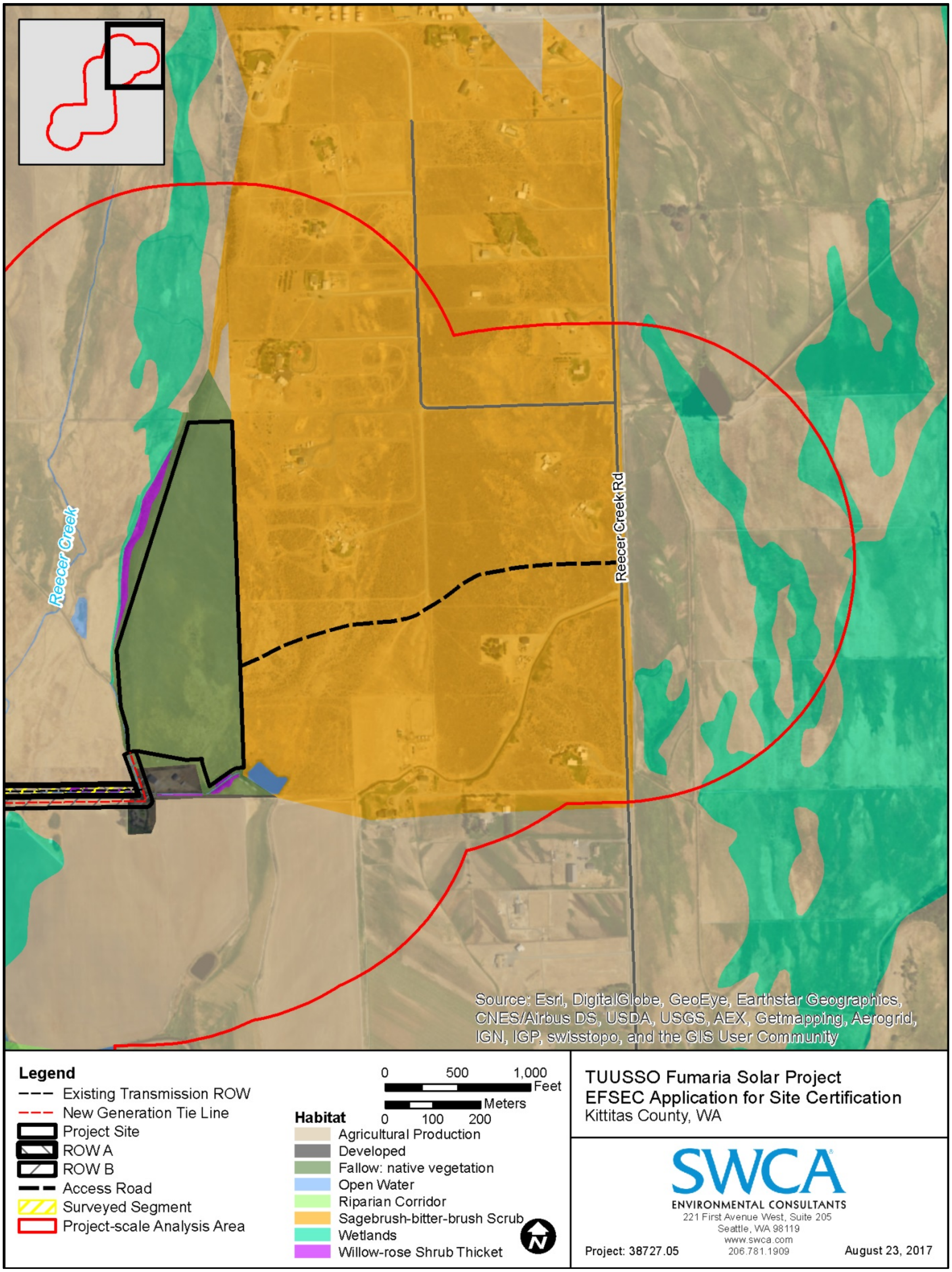


Figure 3.4-4. Habitat types within the project-scale analysis area for the Fumaria Solar Project, Map 1 of 4.

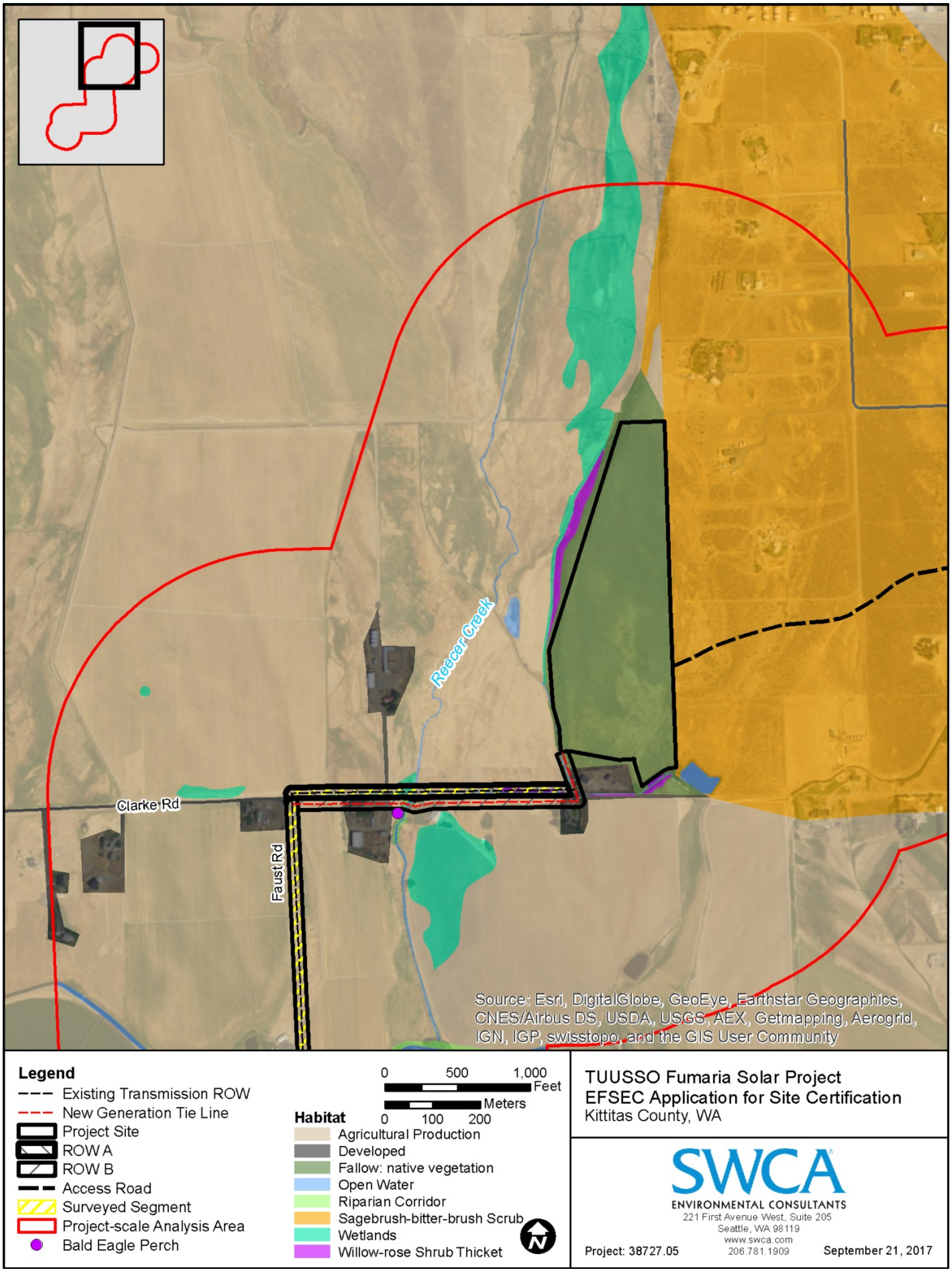


Figure 3.4-5. Habitat types within the project-scale analysis area for the Fumaria Solar Project, Map 2 of 4.

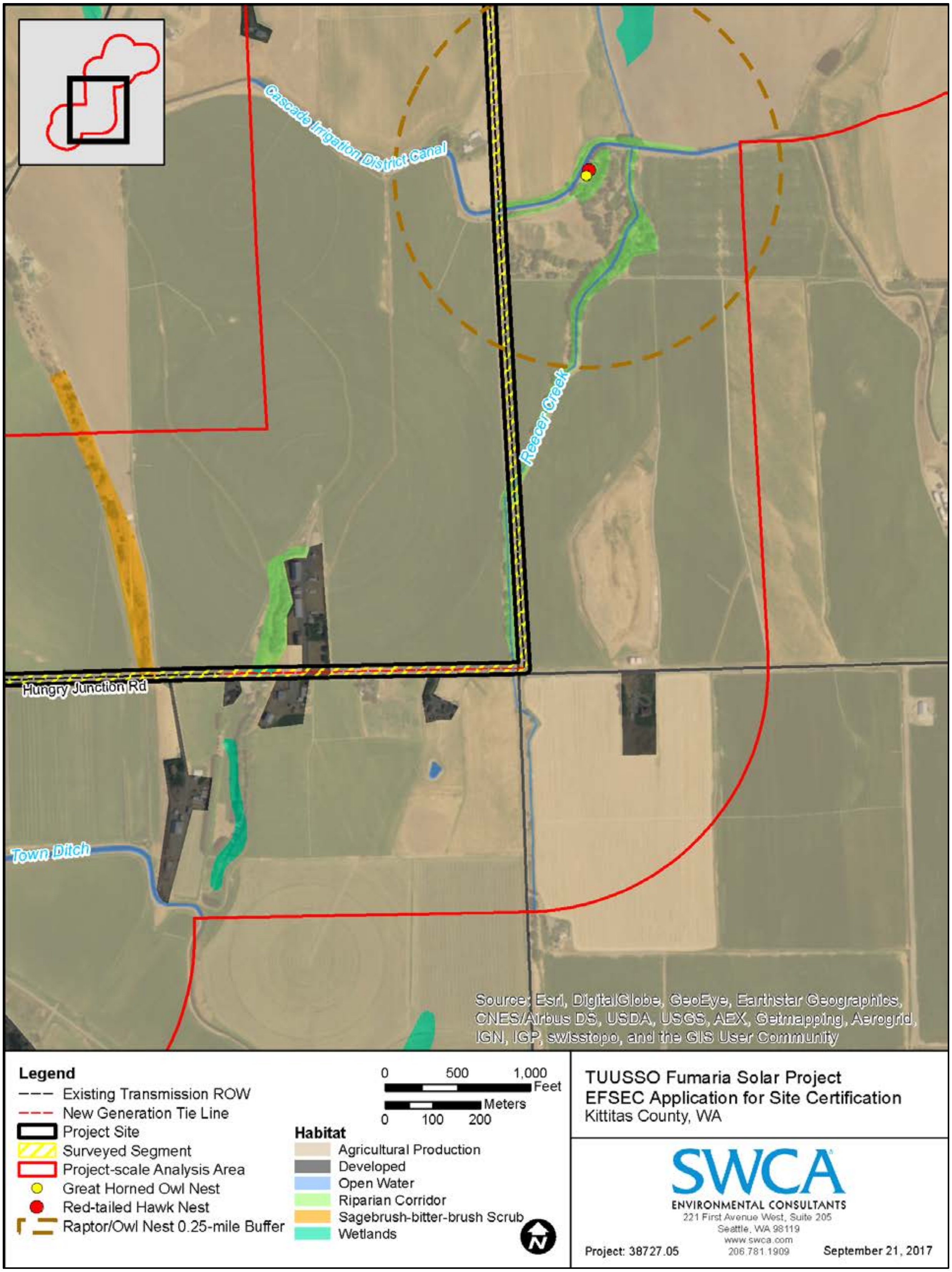


Figure 3.4-6. Habitat types within the project-scale analysis area for the Fumaria Solar Project, Map 3 of 4.

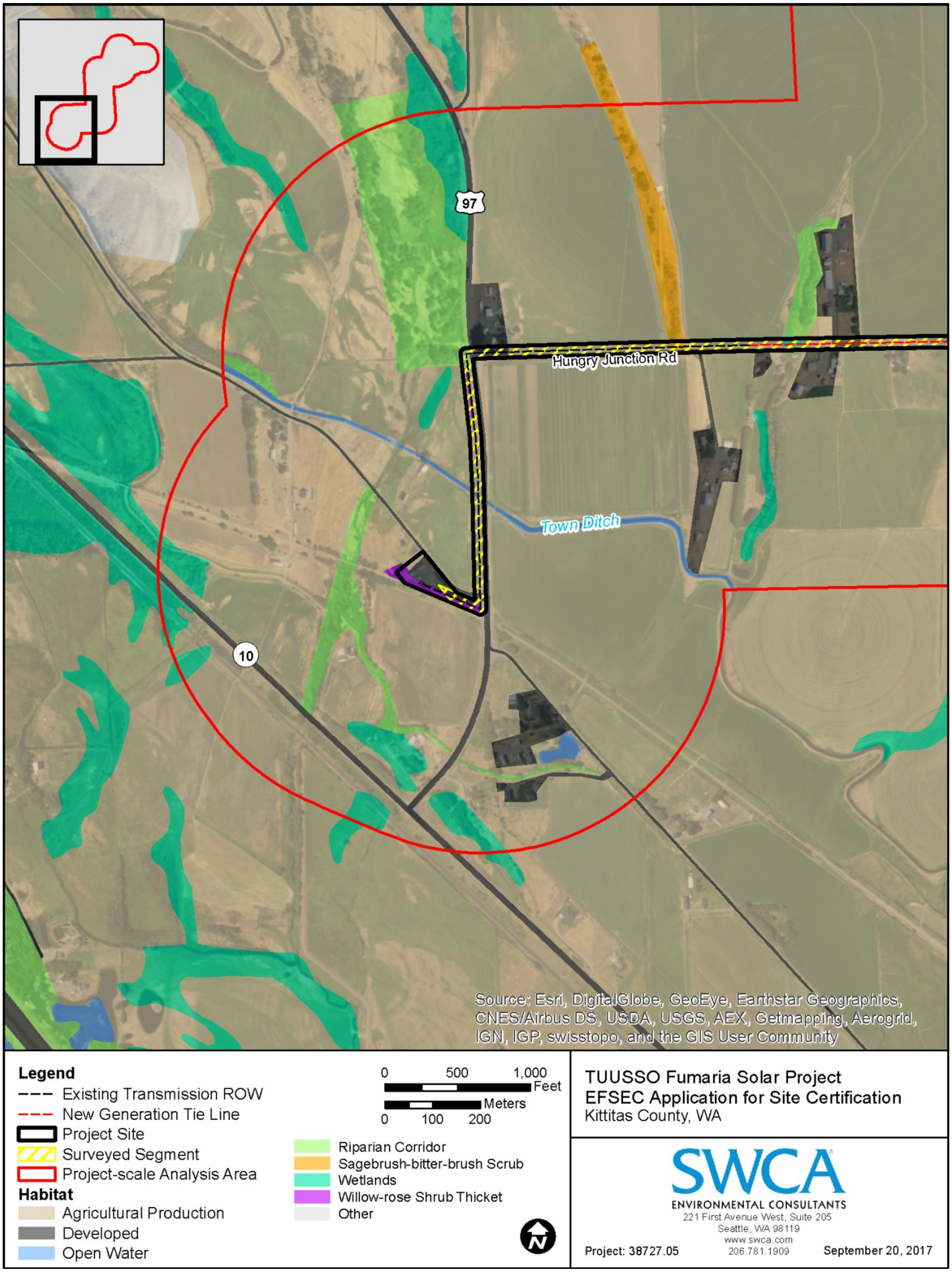


Figure 3.4-7. Habitat types within the project-scale analysis area for the Fumaria Solar Project, Map 4 of 4.

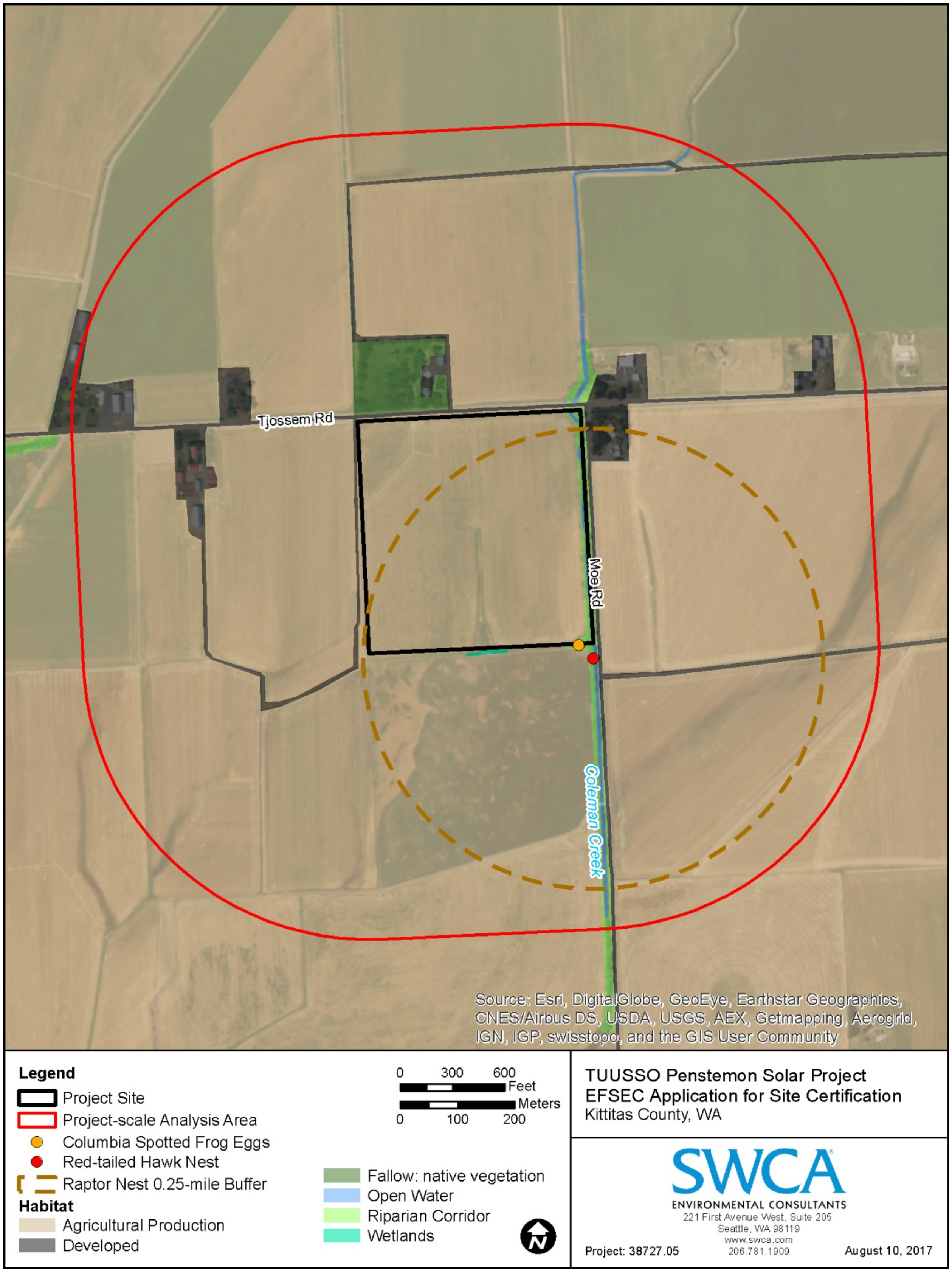


Figure 3.4-8. Habitat types within the project-scale analysis area for the Penstemon Solar Project.

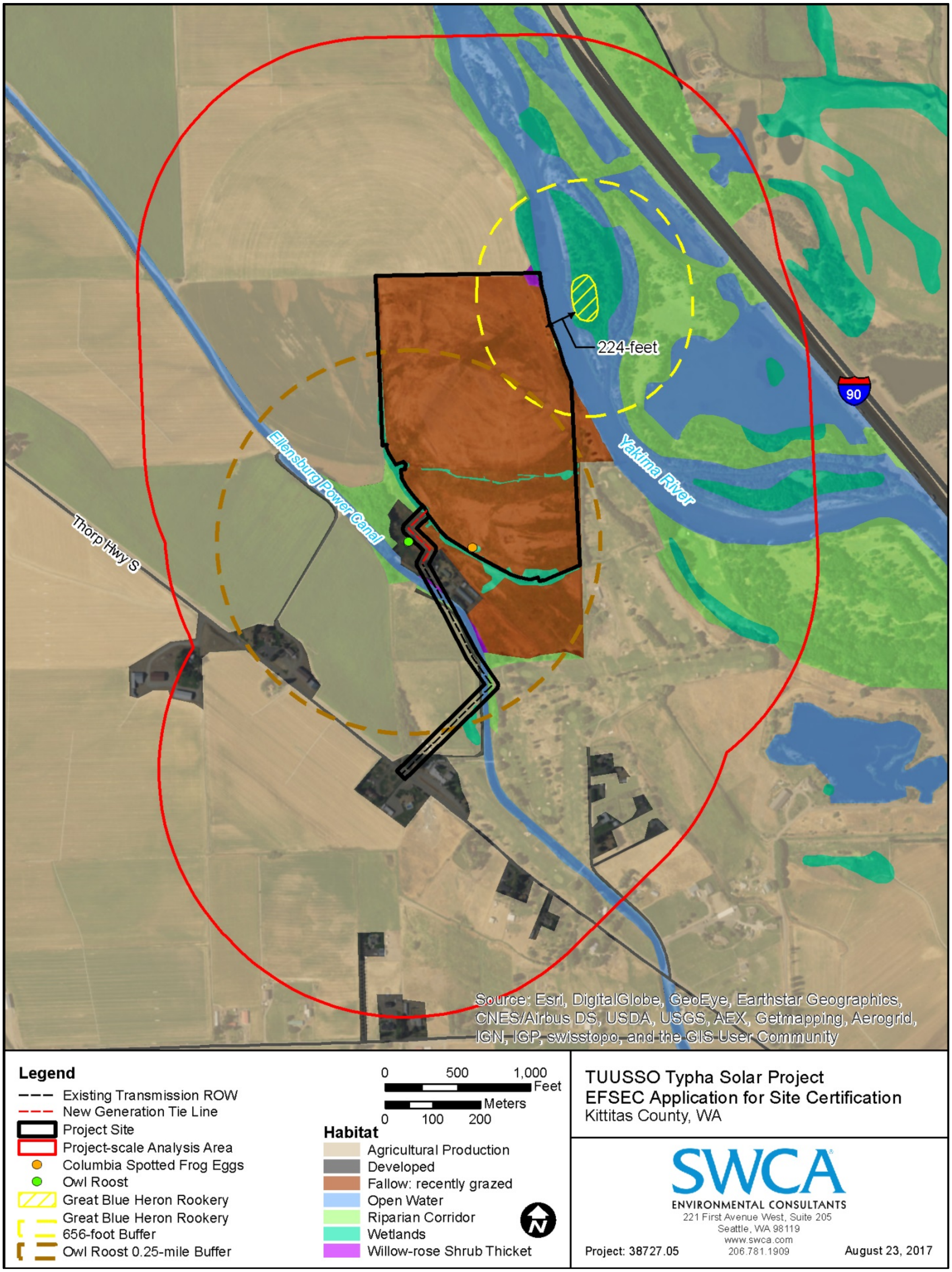


Figure 3.4-9. Habitat types within the project-scale analysis area for the Typha Solar Project.

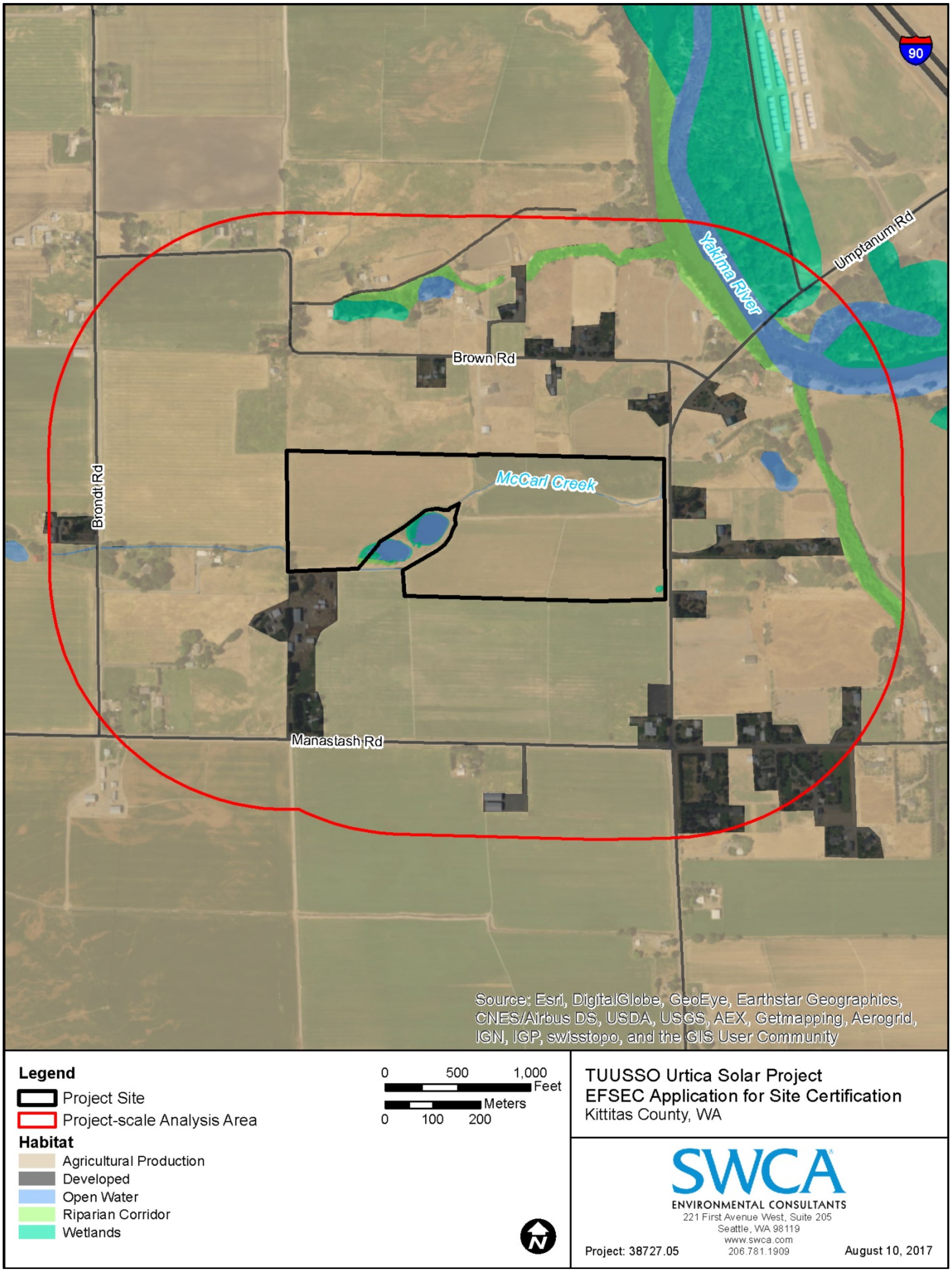


Figure 3.4-10. Habitat types within the project-scale analysis area for the Urtica Solar Project.

Agricultural Production

Three of five of the proposed Columbia Solar Project sites are primarily used for agricultural production (see Figure 3.4-1), including the production of alfalfa (*Medicago sativa*) on the Camas Solar Project site, Sudangrass (*Sorghum bicolor* ssp. *drummondii*) on the Penstemon Solar Project site, and the production of common timothy (*Phleum pratense*) for hay on the Urtica Solar Project site. These sites are dominated by the crops being produced, but often have other species encroaching into the crops in the space between plantings, which usually include bluegrass (*Poa* spp.), tall fescue (*Schedonorus arundinaceus*), hairy cat's-ear (*Hypochaeris radicata*), and common dandelion (*Taraxacum officinale*). In addition, these areas may go through periods during the production lifecycle in which they are unvegetated with exposed soil. Along the edges of these areas, more weedy species usually dominate, including garden yellow-rocket (*Barbarea vulgaris*), downy cheat grass (*Bromus tectorum*), sticky-willy (*Galium aparine*), prickly lettuce (*Lactuca serriola*), great mullein (*Verbascum thapsus*), and Canadian thistle (*Cirsium arvense*).

Developed

This habitat type occurs throughout the Columbia Solar Projects project-scale analysis areas, borders most of the solar project sites, and consists of buildings, roads, and driveways (see Figure 3.4-1). Vegetation in this habitat consists mostly of ruderal species (species that colonize and thrive in disturbed areas), such as the noxious weeds documented below.

Many areas near the proposed Columbia Solar Project sites are partially developed or heavily manicured. The vegetation communities in these areas are either planted ornamental trees and shrubs or routinely mowed grass, and include rural residential landscaping, road ROWs, and manicured golf course areas. Planted trees observed near the proposed sites include quaking aspen (*Populus tremuloides*), ponderosa pine (*Pinus ponderosa*), and grand fir (*Abies grandis*). The maintained lawns and golf course areas are dominated by a mix of grass species likely to include tall fescue, bluegrass, and creeping wild rye (*Elymus repens*). In addition, various weeds and non-native species can dominate roadside areas.

Fallow

Fallow fields are areas that were previously under agricultural production that have been left unsown for a period of time, long enough to allow other non-native, invasive, and native species to become dominant. Areas that are irrigated and used as pasture were included as fallow habitats in this assessment. This habitat type is dominant at the Fumaria and Typha Solar Project sites.

Fallow – Vegetated

At the Fumaria Solar Project site (see Figure 3.4-5), the vegetation community has returning some native species, including common spring-gold (*Crocidium multicaule*), spring draba (*Draba verna*), Gorman's desert-parsley (*Lomatium gormanii*), and bitter-brush (*Purshia tridentata*). It is principally dominated by weedy and non-native plant species, including downy cheat grass, garden yellow-rocket, shepherd's-purse (*Capsella bursa-pastoris*), chicory (*Cichorium intybus*), common dandelion, prickly lettuce, and yellow salsify (*Tragopogon dubius*).

Fallow – Recently Grazed

At the Typha Solar Project site (see Figure 3.4-9), the vegetation community is dominated by mostly low-growing weedy species, including tall fescue, remnant common timothy, hairy cat's-ear, common dandelion, and bluegrass, with patches of Canadian thistle and scotch thistle (*Onopordum acanthium*) scattered throughout the site, as well as Baltic rush (*Juncus balticus*), curly dock (*Rumex crispus*), and Rocky Mountain iris (*Iris missouriensis*) in the lower elevation areas.

Open Water

The open water habitats found in the Columbia Solar Projects project-scale analysis areas are the Yakima River, streams, canals or ditches, and ponds. For more information about the open-water areas documented during the April 3 to 12, 2017, field surveys, refer to each project site's Critical Areas Report (Appendices G–K).

Riparian Corridor

Riparian corridors generally occur along every river, stream, and some ditches and canals, in and adjacent to the proposed Columbia Solar Project sites. Some of these areas are lacking mature trees, but where present the dominant trees typically include crack willow (*Salix* X *fragilis*), quaking aspen, balsam poplar (*Populus balsamifera*), and occasionally ponderosa pine. The herbaceous species that often accompany these riparian corridors include reed canary grass (*Phalaris arundinacea*), Fuller's teasel (*Dipsacus fullonum*), Canadian thistle, stinging nettle (*Urtica dioica*), tall scouring-rush (*Equisetum hyemale*), true forget-me-not (*Myosotis scorpioides*), curly dock, and great mullein.

Sagebrush-bitter-brush Scrub

The upland sagebrush-bitter-brush scrub community is dominant to the east of the Fumaria Solar Project site and is beginning to return to that area (see Figure 3.4-4). This community is characterized by the dominance of native shrubs, including bitter-brush and big sagebrush (*Artemisia tridentata*), and a low-growing herbaceous community, including common spring-gold, spring draba, yellow bell (*Fritillaria pudica*), and various small bunchgrasses.

Wetlands

Wetlands surveyed within the Columbia Solar Projects project-scale analysis areas ranged from <0.01 to 8.45 acres. The wetlands inventoried were depressional, riverine, and slope. Wetland ratings, based on the *Washington State Wetland Rating System for Eastern Washington – Revised*, were typically II, III, or IV (Hruby 2014). For more information about the wetlands documented during the April 3 to 12, 2017, field surveys, refer to the each project site's Critical Areas Report (Appendices G–K).

Willow-rose Shrub Thicket

Shrub thickets are often found along smaller drainages (i.e., small streams and ditches) and are dominated by narrow-leaf willow (*Salix exigua*) and rose (*Rosa* spp.), with occasional inclusions of red osier dogwood (*Cornus alba*) and black hawthorn (*Crataegus douglasii*). This vegetation community often lacks an herbaceous layer because the shrubs are too thick to allow adequate light penetration to the understory. Willow-rose shrub thickets occur in the southeast corner of the Fumaria Solar Project site, as well as along this site's northwest boundary (see Figures 3.4-4 to 3.4-7), and just outside of the northeast corner of the Typha Solar Project site and along the EP Canal.

Available Habitat within the Analysis Areas

The acreage for each habitat type and the percent of the total available habitat has been calculated for both the Columbia Solar Project landscape-scale and project-scale analysis areas (see Table 3.4-1). The majority of the landscape-scale analysis area contains the "other" habitat category (60%) and agricultural production (36%). The majority of the project-scale analysis areas are a mix of agricultural production and developed areas, interspersed with a variety of the remaining habitat types. Available habitat types in the project-scale analysis areas are shown in Figures 3.4-3 through 3.4-10.

Special-status Plants

No sensitive or special-status plant species occur on any of the Columbia Solar Project sites. TUUSSO prepared a Vegetation Management Plan (Appendix B) through coordination with the landowners, the Washington Department of Fish and Wildlife (WDFW), and Kittitas County.

The Washington State Noxious Weed Control Board has produced a noxious weed list for the state that categorizes weeds into three classes: A, B, and C (Washington State Noxious Weed Control Board 2017). A-Listed species are non-native species whose distribution in Washington State is still limited. B-Listed species are non-native species whose distribution is limited to portions of Washington State. C-Listed noxious weeds are widespread in Washington or are of special interest to the agricultural industry. Eleven noxious weeds have been identified in the Columbia Solar Projects project-scale analysis areas, all B- or C-Listed species. A list of noxious weeds identified in the project-scale analysis areas, and a ranking of their relative prevalence at each site, is provided in Table 3.4-2.

Table 3.4-2. Noxious Weeds Documented in the Columbia Solar Projects Project-scale Analysis Areas

Common Name	Scientific Name	Status[1]	Weed Class[2]	Habitat Type Where Observed[3]	Weed Relative Prevalence at Each Solar Project Site (1 = low, 5 = high)				
					Camas	Fumaria	Penstemon	Typha	Urtica
Canadian thistle	*Cirsium arvense*	Invasive, noxious	C	AP, FG, FV, RIP	2	1	2	3	1
Chufa (yellow nutsedge)	*Cyperus esculentus*	Native, noxious	B	WET		1		1	
False mayweed	*Tripleurospermum maritimum*	Non-native, noxious	C	AP, FG	1			1	
Field sow-thistle	*Sonchus arvensis*	Non-native, noxious	C	FV, RIP		1			
Fuller's teasel	*Dipsacus fullonum*	Invasive, noxious	C	RIP, WET	1	1	1	1	2
Hairy cat's-ear	*Hypochaeris radicata*	Non-native, noxious	C	AP, FG, FV	3	3	1	3	3
Pale-yellow iris	*Iris pseudacorus*	Noxious	C	WET	2				
Queen Anne's lace	*Daucus carota*	Non-native	C	AP					1
Reed canary grass	*Phalaris arundinacea*	Invasive, noxious	C	RIP, WET	3	1	2	2	3
Scotch thistle	*Onopordum acanthium*	Noxious	B	FG, RIP	1			3	1
Spotted knapweed	*Centaurea stoebe*	Noxious	B	AP, FV		1			1

1. Native per Hitchcock and Cronquist (1973) and NRCS (2017b); Noxious per Washington State Noxious Weed Control Board (2017).
2. Washington State Noxious Weed Control Board (2017).
3. AP = Agricultural production; DEV = Developed; FG = Fallow, recently grazed; FV = Fallow, vegetated; RIP = Riparian corridor; SBB = Sagebrush-bitter-brush shrub; WRS = Willow–rose shrub thicket; OW = Open water; WET = Wetlands; OTH = Other.

Fish and Wildlife

In all, 39 bird species were documented in the Columbia Solar Project project-scale analysis areas during field surveys conducted from April 3 to 12, 2017, including raptors, passerines, near-passerines, and water birds (Appendix C). The list of documented bird species is not comprehensive and only includes those that were readily identifiable. Of the 39 bird species documented in the project-scale analysis areas, 35 are protected under the Migratory Bird Treaty Act (MBTA) (16 United States Code [USC] 703-711). Habitats within the analysis areas provide nesting and foraging habitat for these MBTA-protected species. These species include ground-nesters, birds that nest in tall grass or shrubs, cavity nesters, and birds that build nests in trees. The Columbia Solar Projects are located within the Pacific Flyway, a major north-south flyway for migratory birds that extends from the arctic regions of Alaska and Canada to South America and is bounded on the west by the Pacific Ocean.

Non-listed fish species were observed in some irrigation ditches and wetlands during the April 2017 field surveys. Fish species listed under the federal Endangered Species Act (ESA) of 1973 (as amended) also occur in streams and the Yakima River adjacent to the Columbia Solar Project sites and are briefly listed in Table 3.4-3. The ESA-listed species are further discussed in Section 3.4.2, below.

Columbia spotted frog (*Rana lutreveinus*) egg masses and Pacific tree frogs (*Pseudacris regilla*) were documented in the Columbia Solar Projects project-scale analysis areas.

Signs of several mammals, including of mule deer (*Odocoileus hemionus*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and Virginia opossum (*Didelphis virginiana*), were observed throughout the Columbia Solar Projects project-scale analysis areas. Several burrows likely associated with American badger (*Taxidea taxus*) were observed at the Camas and Fumaria Solar Project sites, but the exact source of the burrows could not be identified. When vegetated, the habitats at all of the solar project sites and generation tie line corridors support small rodents (e.g., mice and voles) that are a prey source for raptors, great blue herons (*Ardea herodias*), and coyotes (*Canis latrans*). As shown in Figure 3.4-1 and Table 3.4-1, the sites are all within approximately 2.5 miles of the Yakima River and 3.5 miles of the nearest areas only minimally inhabited by humans (for example foothills, draws, canyons, and mountains). Migratory species, such as mule deer and coyote, are known to occasionally occupy and travel through all of the solar project sites, but no known migratory corridors exist within the project-scale analysis area. Some were directly observed during the April 2017 field surveys, sign (i.e., tracks and scat) was observed, and landowners confirmed that these species occur at the solar project sites. Review of the WDFW PHS data, which includes areas identified as priority habitats and occurrences, showed that regular concentrations of elk, mule deer, and bighorn sheep occur in areas within 1 mile of the project-scale analysis areas. However, the closest identified migration corridor is the Quilomene elk migration corridor, located more than 5 miles north of the Fumaria Solar Project site, as shown in Figure 3.4-2.

To evaluate the potential Columbia Solar Projects impacts on fish and wildlife habitat, a list of representative species known or suspected to occur in the analysis areas was compiled and their preferred habitat was compared to the habitat types available in the analysis areas. The results of this evaluation are shown in Table 3.4-3. Of the bird species documented in the project-scale analysis areas, four are currently being monitored by the State of Washington: great blue heron, prairie falcon (*Falco mexicanus*), osprey (*Pandion haliaetus*), and turkey vulture (*Cathartes aura*). The Columbia spotted frog is a state candidate for listing, and the American badger is also being monitored by the State of Washington.

Table 3.4-3. Representative Species Observed or Likely to Occur in the Columbia Solar Project Analysis Areas

Common Name	Scientific Name	Management Category	Habitat Description	Habitat Types Used[1]										Acres Available in LSAA[2]
				AP	DEV	FG	FV	RIP	SBB	WRS	OW	WET	OTH	
Birds														
Bald eagle	*Haliaeetus leucocephalus*	MBTA, BGEPA, and Federal Species of Concern	Habitat generalist, associated with most aquatic habitats. Prefer rivers, lakes, and reservoirs with lots of fish and surrounding forests.					X				X	X	8,116
Canada goose	*Branta canadensis*	MBTA	Habitat generalist that occurs near water, grassy fields, and grain fields. Always nests near water and winters where feeding areas are within short distances of water.	X	X	X	X	X		X	X	X	X	129,395
Great blue heron	*Ardea herodias*	MBTA, State Monitored	Found in a wide variety of habitats, including sheltered, shallow bays and inlets, sloughs, marshes, wet meadows, shores of lakes, and rivers. Nesting colonies are typically found in mature forests, on islands, or near mudflats, and do best when they are free of human disturbance and have foraging areas close by.	X		X	X	X			X	X	X	124,586
Great horned owl	*Bubo virginianus*	MBTA	Prefers secondary-growth woodlands, swamps, orchards, and agricultural areas, but are found in a wide variety of deciduous, coniferous, or mixed forests. Home range usually includes some open habitats, such as fields, wetlands, pastures, or croplands, in addition to forested areas.	X		X	X	X				X	X	123,339
Killdeer	*Charadrius vociferus*	MBTA	Inhabits open areas such as sandbars, mudflats, and grazed fields with vegetation generally no taller than 1 inch. Often found near water, but also common in dry areas.	X	X	X	X	X	X		X	X	X	129,833
Northern Harrier	*Circus cyaneus*	MBTA	Breeds in freshwater and brackish marshes, lightly grazed meadows, old fields, tundra, dry upland prairies, drained marshlands, high-desert shrub-steppe, and riverside woodlands. Winter habitat includes areas with low vegetation, including deserts, coastal sand dunes, pasturelands, croplands, dry plains, grasslands, old fields, estuaries, open floodplains, and marshes.	X		X	X	X	X			X	X	123,781

Common Name	Scientific Name	Management Category	Habitat Description	Habitat Types Used[1]										Acres Available in LSAA[2]
				AP	DEV	FG	FV	RIP	SBB	WRS	OW	WET	OTH	
Red-tailed hawk	*Buteo jamaicensis*	MBTA	Occupies most open habitat, including desert, scrublands, grasslands, roadsides, fields and pastures, parks, broken woodland, and (in Mexico) tropical rainforest.	X	X	X	X		X				X	120,470
Sandhill Crane	*Grus canadensis*	MBTA, State Endangered	Prefers open shallow waters along river channels, on alluvial islands of braided rivers, or in natural basin wetlands, but can sometimes occur in fields and agricultural lands during feeding and resting. They typically avoid visual obstructions, such as houses and bridges, and paved or gravel roads.	X		X	X	X			X	X		124,586
Fish														
Bull trout	*Salvelinus confluentus*	Federal Threatened; State Candidate	Both resident or migratory varieties, with migratory bull trout spawning in tributary streams where juvenile fish rear for 1 to 4 years before migrating to either a larger river (fluvial) or lake (adfluvial) as adults. Successful egg incubation and survival requires very cold, clear, well-oxygenated waters, as found in pristine headwater stream habitats.								X			1,247
Dace species	*Rhinichthys* spp.	None	Occurs in many types of aquatic habitats, ranging from cool to warm waters. Typically young are observed in shallow edges.								X	X		6,562
Spring chinook (Upper Columbia River)	*Oncorhynchus tshawytscha*	Federal Endangered; State Candidate	Requires sufficient invertebrate organisms for food; cool, flowing waters free of pollutants; high dissolved oxygen concentrations in rearing and incubation habitats; water of low sediment content during the growing season (for visual feeding); clean gravel substrate for reproduction; and unimpeded migratory access to and from spawning and rearing areas.								X			1,247

Common Name	**Scientific Name**	**Management Category**	**Habitat Description**	**Habitat Types Used[1]**										**Acres Available in LSAA[2]**
				AP	**DEV**	**FG**	**FV**	**RIP**	**SBB**	**WRS**	**OW**	**WET**	**OTH**	
Steelhead (Middle Columbia River)	*Oncorhynchus mykiss*	Federal Threatened; State Candidate	Requires sufficient invertebrate organisms for food; cool, flowing waters free of pollutants; high dissolved oxygen concentrations in rearing and incubation habitats; water of low sediment content during the growing season (for visual feeding); clean gravel substrate for reproduction; and unimpeded migratory access to and from spawning and rearing areas.								X			1,247
Summer steelhead (Upper Columbia River)	*Oncorhynchus mykiss*	Federal Threatened; State Candidate	Requires sufficient invertebrate organisms for food; cool, flowing waters free of pollutants; high dissolved oxygen concentrations in rearing and incubation habitats; water of low sediment content during the growing season (for visual feeding); clean gravel substrate for reproduction; and unimpeded migratory access to and from spawning and rearing areas.								X			1,247
Herptiles														
Columbia spotted frog	*Rana luteiventris*	State Candidate	Occurs in a variety of still-water habitats, as well as in some streams and creeks. Breeding habitat includes seasonally flooded margins of wetlands, ponds, and lakes, and even some flooded pools and still-water edges of creeks. Most often found in association with wetland plant communities consisting primarily of non-woody plants, such as sedges, rushes, and grasses.					X			X	X		9,363
Pacific treefrog	*Pseudacris regilla*	None	Found in wetlands, meadows, woodlands, and brushy areas. Breeds in shallow ponds, slow moving streams, seasonal pools, watering tanks, and roadside ditches, and spends the rest of the year in surrounding upland areas.	X			X	X		X	X	X		124,496
Sharp-tailed snake	*Contia tenuis*	State Candidate	Prefers forest openings dominated by Garry oak, particularly with rock accumulations, and riparian deciduous woodlands with accumulations of decaying down woody logs within ponderosa pine, oak, or shrub-steppe.					X				X	X	8,116

Common Name	Scientific Name	Management Category	Habitat Description	Habitat Types Used[1]										Acres Available in LSAA[2]
				AP	DEV	FG	FV	RIP	SBB	WRS	OW	WET	OTH	
Mammals														
American badger	*Taxidea taxus*	State Monitored	Found in open habitats including semi-desert, sagebrush, grasslands, and meadows. Also found in forested areas with grassy cover.	X		X	X		X				X	115,665
Coyote	*Canis latrans*	None	Habitat generalists found in desert, scrub, grassland, foothills, populated neighborhoods, and urban environments.	X	X	X	X	X	X				X	123,271
Mule deer	*Odocoileus hemionus*	Big game	Uses dense conifer forests with sufficient cover for thermal regulation and resting. Also may be found in pockets of dense brush or trees and rugged, broken terrain. Seasonal migration occurs.	X		X	X	X		X			X	118,028
Raccoon	*Procyon lotor*	None	Habitat generalist that traditionally prefers heavily wooded areas with access to trees, water, and vegetation. Often found in urban and suburban environments.		X			X		X		X	X	129,925
Small rodents (mice, voles, etc.)	Various	None	Large group of small mammals that are habitat generalists and provide prey for other species such as raptors, great blue heron, and badger.	X	X	X	X	X	X	X		X	X	128,590
Striped skunk	*Mephitis mephitis*	None	Habitat generalists, particularly associated with open areas with a mix of habitats such as wooded areas, grasslands, or meadows. Usually in close proximity to a source of water.		X		X	X		X			X	7,682
Virginia opossum	*Didelphis virginiana*	None	Habitat generalist, ranging from wooded areas to open fields. Prefers environments near streams or wetlands. Shelters in burrows of other animals, tree cavities, brush piles, or other cover.		X			X		X		X	X	12,925

1. AP = Agricultural production; DEV = Developed; FG = Fallow, recently grazed; FV = Fallow, vegetated; RIP = Riparian corridor; SBB = Sagebrush-bitter-brush shrub; WRS = Willow–rose shrub thicket; OW = Open water; WET = Wetlands; OTH = Other
2. LSAA = Landscape-scale analysis area. Not including "Other." The Other habitat category was removed from the species habitats because it includes such a wide range of habitats that it is not valuable for the analysis.

3.4.1.2 Solar Project Sites

Camas Solar Project Site

Habitats and Vegetation

The Camas Solar Project project-scale analysis area is 82% (462 acres) alfalfa agriculture, but has other species encroaching into the crops in the space between plantings. In addition, the analysis area may go through periods during the production lifecycle in which it is unvegetated, with exposed soil. Along the edges of the area being farmed, more weedy species dominate. The other major habitats are developed and fallow – recently grazed, representing 9% and 5%, respectively, of the analysis area. There are 6 acres of fallow – vegetated in the analysis area. The southeastern border of the project site is Little Naneum Creek, providing 4 acres of open water and 13 acres of riparian corridor within the analysis area. Two acres of wetlands habitat are available along the western border of the project site. Despite their smaller acreages, these are important fish and wildlife habitats in the analysis area, as demonstrated below by the species occupying these habitats.

Special-status Plants

As indicated in Table 3.4-2, the most prevalent noxious weed species and their associated habitats at the Camas Solar Project site were:

- Canadian thistle along the edges of the agricultural production, within the fallow areas, and along the riparian corridor
- hairy cat's-ear within the agricultural production and fallow areas
- reed canary grass along the riparian corridor and in the wetland (CW01)
- pale-yellow iris in the wetland (CW01)

Other less prevalent noxious weed species observed included Fuller's teasel, scotch thistle, and false mayweed (*Tripleurospermum maritimum*).

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Camas Solar Project project-scale analysis area is provided below in Section 3.4.2.

Fourteen bird species were observed at the Camas Solar Project site during the April 2017 field survey. The majority of the species were observed in the open water, riparian corridor, and wetland habitats. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys. During the field survey, an active red-tailed hawk (*Buteo jamaicensis*) nest was observed in a large willow along Little Naneum Creek (see Figure 3.4-3). Additionally, the floor of the barn in the northeast part of the site was littered with owl pellets and the rafters contained whitewash (see Figure 3.4-3).

During the April 2017 field survey of the Camas Solar Project site, dace, likely speckled dace (*Rinichthys osculus*), were observed in the wetland (CW01) that flows north to south along the west side of the solar project site, into Little Naneum Creek. A Pacific treefrog was also observed in CW01.

There was evidence of beaver (*Castor canadensis*) activity along Little Naneum Creek. A burrow, which could potentially have been created by an American badger, was observed in the Little Naneum riparian corridor, in the northeast portion of the Camas Solar Project site, south of the Bull Ditch. The Yakima River is located 1.32 miles west of the project site, and the nearest area that is only minimally inhabited by humans is 2.10 miles south of the project site (see Figure 3.4-1 and Table 3.4-1). Because of the site's proximity to these less-inhabited areas, migratory species (e.g., deer and coyote) forage or hunt on and travel through the project site.

Fumaria Solar Project Site

Habitats and Vegetation

With eight habitat types represented in its project-scale analysis area, the Fumaria Solar Project site has the most wildlife habitat diversity of the five proposed Columbia Solar Project sites (see Figures 3.4-4 and 3.4-5). The most prevalent habitat type is the surrounding agricultural production, occupying 46% of the analysis area. The surrounding sagebrush-bitter-brush scrub habitat represents 36% of the analysis area, and 2% of the analysis area is developed. The project site is principally fallow – vegetated (some native vegetation, but mostly non-native plant species; 41 acres, 7% of the analysis area). National Wetland Inventory (NWI)-mapped wetlands are present in the Reecer Creek floodplain (northwest and southwest of the proposed solar project site) and within 500 meters of the substation. These NWI-mapped wetlands total 8% of the available habitat in the analysis area. Open water habitat (3 acres) is present southeast of the project site. Willow-rose shrub thicket habitat (2 acres) occurs along the project site borders.

Special-status Plants

As indicated in Table 3.4-2, the most prevalent noxious weed and its associated habitat on the Fumaria Solar Project site is hairy cat’s-ear within the fallow – vegetated habitat. Other less prevalent noxious weed species observed included Canadian thistle, chufa (yellow nutsedge) (*Cyperus esculentus*), field sow-thistle (*Sonchus arvensis*), Fuller’s teasel, reed canary grass, and spotted knapweed (*Centaurea stoebe*).

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Fumaria Solar Project project-scale analysis area is provided below in Section 3.4.2.

The diversity of habitats at the Fumaria Solar Project site supports at least 21 bird species, all observed during the April 2017 field survey. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys.

Dace were observed in the irrigation ditches south of the Fumaria Solar Project site during the April 2017 field survey. Reecer Creek is known to be fish bearing, containing rainbow trout (*Oncorhynchus mykiss*), a non-anadromous form of steelhead. In the past, the landowner has stocked the ponds southeast of the site with triploid rainbow trout. Pacific treefrogs were observed throughout the site in the fallow – vegetated habitat, as well as the open water in the irrigation ditches.

A burrow, which could potentially have been created by an American badger, was observed near the southwestern access entrance to the Fumaria Solar Project site. The Yakima River is located 0.86 mile southwest of the project site, and the nearest area that is only minimally-inhabited by humans is 1.07 miles east of the project site (see Figure 3.4-1 and Table 3.4-1). Because of the site’s proximity to these less-inhabited areas, migratory species (e.g., deer and coyote) forage or hunt on and travel through the project site.

Fumaria Solar Project Generation Tie Line

Habitats and Vegetation

The most prevalent habitat type in the Fumaria Solar Project generation tie line project-scale analysis area is agricultural production, occupying 88% of the analysis area (see Figures 3.4-6 and 3.4-7). Developed and riparian corridor habitats each comprise 4% of the analysis area. The riparian corridor habitat is located along Reecer Creek and within 500 meters of the substation. NWI-mapped wetlands, open water, and sagebrush-bitter-brush scrub habitats comprise the remaining 4% of the analysis area. NWI-mapped wetlands are present within 500 meters of the substation. Open water habitat (9 acres) is present within the 500-meter buffer of the entire generation tie line corridor.

Special-status Plants

Noxious weeds observed along the Fumaria Solar Project generation tie line included Canadian thistle, Fuller's teasel, hairy cat's-ear, reed canary grass, and spotted knapweed.

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Fumaria Solar Project generation tie line project-scale analysis area is provided below in Section 3.4.2.

Twenty-one bird species were observed along the Fumaria Solar Project generation tie line during the April 2017 field survey. The majority of the species were observed in the open water, riparian corridor, sagebrush-bitter-brush scrub, and wetland habitats. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys.

East of the Fumaria Solar Project generation tie line, along North Faust Road, two active raptor nests were observed along the Reecer Creek riparian corridor, belonging to a red-tailed hawk and great horned owl (*Bubo virginianus*) (see Figure 3.4-6).

During the April 2017 field survey, dace were observed in the irrigation ditches that are south of the site and are connected to Reecer Creek. Reecer Creek is known to be fish bearing, containing rainbow trout.

The Yakima River is located 0.86 mile west of the western end of the Fumaria Solar Project generation tie line, and the nearest area that is only minimally inhabited by humans is 1.19 miles east of the eastern end of the generation tie line (see Figure 3.4-1 and Table 3.4-1).

Penstemon Solar Project Site

Habitats and Vegetation

The Penstemon Solar Project project-scale analysis area is 93% (401 acres) Sudangrass agricultural production. The other major habitat is developed, representing 4% of the analysis area. There are 5 acres of fallow – vegetated in the analysis area. The eastern border of the project site is Coleman Creek, providing 2 acres of open water and 3 acres of riparian corridor within the analysis area. A small wetland is located south of the project site. Despite their smaller acreages, these are important fish and wildlife habitats in the analysis area, as demonstrated below by the species occupying these habitats.

Special-status Plants

As indicated in Table 3.4-2, the most prevalent noxious weed species and their associated habitats at the Penstemon Solar Project site were:

- Canadian thistle along the edges of the agricultural production, within the adjacent fallow areas, and along the Coleman Creek riparian corridor
- reed canary grass along the riparian corridor

Other less prevalent noxious weed species observed included Fuller's teasel and hairy cat's-ear.

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Penstemon Solar Project project-scale analysis area is provided below in Section 3.4.2.

Twelve bird species were observed on the Penstemon Solar Project site during the April 2017 field survey. The majority of the species were observed in the riparian corridor habitat. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys. An active red-tailed hawk nest was observed southeast of the southeast site corner, in a cottonwood tree along Coleman Creek (Figure 3.4-8).

The Yakima River is located 2.54 miles west of the Penstemon Solar Project site, and the nearest area that is only minimally inhabited by humans is 3.31 miles south of the project site (see Figure 3.4-1 and Table 3.4-1). Of all the solar project sites, the Penstemon Solar Project site is furthest from less-inhabited areas, but migratory species (e.g., deer and coyote) still forage or hunt on and travel through the project site.

Typha Solar Project Site

Habitats and Vegetation

A review of the WDFW Priority Habitats and Species (PHS) database showed that no priority habitats or species are documented on the Typha Solar Project site. The portion of the Yakima River adjacent to the northeast corner of the site is designated as a shoreline of the state based on the Washington Water Typing Criteria (WAC 222-16-030), and the Shoreline Management Act’s list of streams and rivers constituting shorelines of the state for Kittitas County (WAC 173-18-230).

Because of the Typha Solar Project site’s proximity to the Yakima River, the habitat in the project-scale analysis area is important for fish and wildlife. The most prevalent habitat type is the surrounding agricultural production, occupying 52% of the analysis area; this includes the Ellensburg Golf Course east of the proposed solar project site. The other main habitats in the analysis area are open water (the Yakima River), fallow – recently grazed, and riparian corridor, occupying 14%, 14%, and 11% of the analysis area, respectively. Five percent of the analysis area is developed. Some wetlands were field-delineated, while along the Yakima River there are also NWI-mapped wetlands within 500 meters of the project site. Wetland habitat totals 4% of the analysis area. Some willow-rose shrub thicket habitat (almost 0.5 acre) occurs along the Yakima River (northeast of the project site) and the EP Canal (south of the project site).

Special-status Plants

As indicated in Table 3.4-2, the most prevalent noxious weed species and their associated habitats at the Typha Solar Project site were Canadian and scotch thistle and hairy cat’s-ear throughout the fallow areas. Reed canary grass was present adjacent to riparian corridor and wetland habitats. Other less prevalent noxious weed species observed included chufa (yellow nutsedge), Fuller’s teasel, and false mayweed.

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Typha Solar Project project-scale analysis area is provided below in Section 3.4.2.

Twenty-two bird species were observed at the Typha Solar Project site during the April 2017 field survey. The majority of the species were observed in the open water, riparian corridor, and wetland habitats. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys. A documented great blue heron breeding area is 224 feet east of the site, on a landform within the Yakima River (see Figure 3.4-9). The floor of the barn, located south of the southwest corner of the site, was littered with owl pellets and the rafters contained whitewash (see Figure 3.4-9).

The Yakima River, located adjacent to the northeast corner of the Typha Solar Project site, is a fish-bearing stream containing coho salmon (*Oncorhynchus kisutch*), mountain sucker (*Catostomus platyrhyncus*), rainbow trout, and Westslope cutthroat trout (*O. clarki lewisi*).

The Yakima River is located directly east of the Typha Solar Project site, and the nearest area that is only minimally inhabited by humans is 2.57 miles southwest of the project site (see Figure 3.4-1 and Table 3.4-1). Because of the site's proximity to these less-inhabited areas, migratory species (e.g., deer and coyote) forage or hunt on and travel through the project site.

Typha Solar Project Generation Tie Line

Habitats and Vegetation

The most prevalent habitat type in the Typha Solar Project generation tie line project-scale analysis area is the surrounding agricultural production, occupying 90% of the analysis area, and the Ellensburg Golf Course to the south. The other main habitat in the analysis area is developed, occupying another 10% of the analysis area. The EP Canal provides 1 more acre of open water habitat.

Special-status Plants

The same noxious weed species as observed at the Typha Solar Project site (see Table 3.4-2), were observed along the Typha Solar Project generation tie line corridor.

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Typha Solar Project generation tie line project-scale analysis area is provided below in Section 3.4.2.

The same bird species were observed along the Typha Solar Project generation tie line during the April 2017 field survey as were observed at the Typha Solar Project site. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys.

The Yakima River is located 0.25 mile east of the Typha Solar Project generation tie line, and the nearest area that is only minimally inhabited by humans is 2.35 miles southwest of the generation tie line (see Figure 3.4-1 and Table 3.4-1).

Urtica Solar Project Site

Habitats and Vegetation

A review of the PHS database showed that no priority habitats or species are known to occur on the Urtica Solar Project site. The project-scale analysis area is 84% (433 acres) timothy hay agricultural production (see Figure 3.4-10). The other major habitat is developed, representing 9% of the analysis area. McCarl Creek, which functions as an irrigation ditch and includes human-made ponds, flows through the center of the project site, making 6% of the analysis area open water and riparian corridor habitats. The analysis area provides 9 acres of wetlands habitat. These important fish and wildlife habitats are 8% of the analysis area, and fish and wildlife species are known to occupy them.

Special-status Plants

As indicated in Table 3.4-2, the most prevalent noxious weed species and their associated habitats at the Urtica Solar Project site were Fuller's teasel and reed canary grass, adjacent to riparian corridor and wetland habitats. Hairy cat's-ear was also prevalent adjacent to the agricultural production areas. Other less prevalent noxious weed species observed included Canadian and scotch thistle, Queen Anne's lace (*Daucus carota*), and spotted knapweed.

Fish and Wildlife

Evaluation of special-status species with the potential to occur in the Urtica Solar Project project-scale analysis area is provided below in Section 3.4.2.

Eighteen bird species were observed at the Urtica Solar Project site during the April 2017 field survey. The majority of the species were observed in the open water, riparian corridor, and wetland habitats. All of the species listed in Appendix C are likely to occur in the project-scale analysis area, in addition to species that were not observed during any of the field surveys.

During an April 12, 2017, site visit, WDFW biologists stated that McCarl Creek is likely fish bearing. In the past, the landowner has stocked the ponds with triploid rainbow trout. A Canada goose was observed nesting near the ponds.

The Yakima River is located 0.19 mile northeast of the Urtica Solar Project site, and the nearest area that is only minimally inhabited by humans is 1.02 miles southwest of the project site (see Figure 3.4-1 and Table 3.4-1). Because of the site's proximity to these less-inhabited areas, migratory species (e.g., deer and coyote) forage or hunt on and travel through the project site.

(b) Identification of any species of local importance, priority species, or endangered, threatened, or candidate species that have a primary association with habitat on or adjacent to the project site;

3.4.2 Affected Environment for Special-status Species

Federal and state online databases were accessed to obtain current lists of sensitive species that may occur in or near the Columbia Solar Projects project-scale analysis areas, including the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system (Appendix C). The USFWS IPaC database provides county-level lists of ESA-listed species, including species proposed or candidates for listing, and designated critical habitat within a defined project area. No ESA-listed species are anticipated to be affected by the proposed solar projects.

The WDFW PHS mapper, which lists sensitive wildlife species and habitats within the five proposed Columbia Solar Project sites, was also accessed (Appendix C). Table 3.4-4 lists state-listed species that have the potential to occur on the proposed solar project sites, and is followed by a brief discussion of each one. As the PHS mapper is dependent on existing records of species, other sensitive species may occur in the vicinity of the solar project sites, if suitable habitat is present. Based on the existing conditions of the sites as developed agricultural lands, it is unlikely that other sensitive species occur in the project-scale analysis areas.

No state- or federally listed threatened or endangered species were observed in the Columbia Solar Projects project-scale analysis areas during the April 2017 field survey.

Table 3.4-4. Special-status Species with Potential to Occur in the Columbia Solar Project Project-scale Analysis Areas

Common Name	Scientific Name	Status	Sites with Potential Occurrence	Likelihood to Occur in Project-scale Analysis Areas
Birds				
Bald eagle	*Haliaeetus leucocephalus*	Federal Species of Concern; MBTA and BGEPA Protected	Fumaria	High
Greater sage-grouse	*Centrocercus urophasianus*	Federal Candidate, State Threatened	Camas, Penstemon	Low
Sandhill crane	*Grus canadensis*	State Endangered	Camas, Fumaria, Penstemon, Urtica	Low
Fish				
Bull trout	*Salvelinus confluentus*	Federal Threatened	Typha	None
Spring Chinook salmon (Upper Columbia River)	*Oncorhynchus tshawytscha*	Federal Endangered	Penstemon	None
Steelhead (Middle Columbia River)	*Oncorhynchus mykiss*	Federal Threatened	Typha	None
Summer Steelhead (Upper Columbia River)	*Oncorhynchus mykiss*	Federal Threatened	Penstemon	None
Herptiles				
Columbia spotted frog	*Rana luteiventris*	State Candidate	Camas, Penstemon	High
Sharp-tailed snake	*Contia tenuis*	State Candidate	Camas, Fumaria	Low
Invertebrates				
Giant Palouse earthworm	*Driloleirus americanus*	State Candidate		Low

Bald Eagle

The bald eagle is a Federal Species of Concern, in addition to being Bald and Golden Eagle Protection Act (BGEPA) and MBTA-protected. They are habitat generalists, typically associated with aquatic habitats, preferring forested areas that surround fish-bearing lakes and rivers.

The PHS mapper did not document any bald eagle occurrences or nests in the Columbia Solar Project analysis areas, but eagles were observed during the field survey on the Fumaria and Penstemon Solar Project sites. Both sites are within 3 miles of the Yakima River (potential nesting habitat). Bald eagles are also scavengers, and calves were observed near both sites; it is likely that the observed eagles were scavenging afterbirth in the vicinity of these sites. Based on WDFW guidance, an Avian Protection Plan (APP) would be provided prior to construction, and would include measures to conduct a nest survey within 0.25 mile of construction activities within the same year that construction is scheduled, to determine whether nests could be occupied during construction.

Greater Sage-grouse

The greater sage-grouse (*Centrocercus urophasianus*) is classified as a Federal Candidate by USFWS and a State Threatened species by WDFW. This species lives only on the sagebrush steppe of western North America, and uses several types of sagebrush habitat during different parts of year (Sage Grouse Initiative 2017). Leks, or breeding areas, are located in clear areas such as grassy swales or dry lakebeds. Nesting habitats are usually made up of areas with dense cover from big sagebrush, but can also occur in areas with rabbitbrush (*Chrysothamnus* spp.), greasewood (*Sarcobatus vermiculatus*), and grassy areas (Cornell Lab of Ornithology 2017).

According to the PHS mapper, an occurrence of this species was recorded within the township that includes the entire area of the proposed Camas and Penstemon Solar Project sites (WDFW 2017a). However, the proposed sites do not fit the description for this species' preferred habitat. Therefore, it is unlikely that this species occurs within these two sites.

Sandhill Crane

The sandhill crane (*Grus canadensis*) is classified as a State Endangered species by WDFW. Klickitat and Yakima Counties hold the primary breeding grounds within the State of Washington for sandhill cranes. This species prefers open shallow waters along river channels, on alluvial islands of braided rivers, or in natural basin wetlands, but can sometimes occur in fields and agricultural lands during feeding and resting (California Department of Fish and Game 1990). They typically avoid visual obstructions, such as houses, bridges, and paved or gravel roads (Norling et al. 1992).

Bull Trout

The bull trout (*Salvelinus confluentus*) is classified as a Federally Threatened species by USFWS. Bull trout exhibit a number of life history strategies. Stream-resident bull trout complete their entire life cycle in the tributary streams where they spawn and rear. Most bull trout are migratory, however, spawning in tributary streams where juvenile fish usually rear for 1 to 4 years before migrating to either a larger river (fluvial) or lake (adfluvial) where they spend their adult life, returning to the tributary stream to spawn (Fraley and Shepard 1989). Successful egg incubation and survival requires very cold, clear, well-oxygenated waters as found in pristine headwater stream habitats (Wydoski and Whitney 2003). Bull trout in fresh water feed primarily on whitefish, sculpins, and young salmonids, although they also consume insects, amphibians, crayfish, and other available food (Kraemer 1994). The bull trout has been documented in the Yakima River by PHS, SalmonScape, and StreamNet (Pacific States Marine Fisheries Commission 2016; WDFW 2017a, 2017b). In addition, the part of the Yakima River that is adjacent to the Typha Solar Project site contains designated critical habitat for bull trout (Appendix C).

Chinook Salmon and Steelhead

The Upper Columbia River Spring Chinook and Summer Steelhead are classified as Federally Endangered and Federally Threatened, respectively, by the National Marine Fisheries Service (NMFS). All salmonids require sufficient invertebrate organisms for food; cool, flowing waters free of pollutants; high dissolved oxygen concentrations in rearing and incubation habitats; water of low sediment content during the growing season (for visual feeding); clean gravel substrate for reproduction; and unimpeded migratory access to and from spawning and rearing areas (Spence et al. 1996). Both the Upper Columbia River Spring Chinook and Upper Columbia River Summer Steelhead have been documented in Coleman Creek along the eastern boundary of the Penstemon Solar Project site, by PHS, SalmonScape, and StreamNet (Pacific States Marine Fisheries Commission 2016; WDFW 2017a, 2017b). In addition, the part of Coleman Creek adjacent to the Penstemon Solar Project site contains designated critical habitat for the Upper Columbia River Steelhead (Appendix C). The Middle Columbia River Steelhead has been documented in the Yakima River by PHS, SalmonScape, and StreamNet (Pacific States Marine Fisheries

Commission 2016; WDFW 2017a, 2017b). In addition, the part of the Yakima River that is adjacent to the Typha Solar Project site contains designated critical habitat for Middle Columbia River Steelhead (Appendix C).

Columbia Spotted Frog

The Columbia spotted frog is classified as a State Candidate species by WDFW. This species is rarely found far from water and occurs in a variety of still-water habitats, as well as in some streams and creeks. Their breeding habitat includes seasonally flooded margins of wetlands, ponds, and lakes, and even some flooded pools and still-water edges of creeks. They are most often found in association with wetland plant communities, consisting primarily of non-woody plants such as sedges, rushes, and grasses (Leonard et al. 1993). The egg masses are typically laid in shallow water with little or no shading from vegetation. They are most active in lowland habitats from February through October and hibernate in muddy bottoms near their breeding site in the winter (Licht 1974). Spotted frog tadpoles have been shown to be very sensitive to chemical fertilizers, which may have contributed to the species' decline (Marco 1997).

According to the PHS mapper, an occurrence of this species was recorded within 300 feet of the proposed Camas Solar Project site in a waterway to the northeast, and within 1 mile of the proposed Penstemon Solar Project site in a waterway to the southeast (WDFW 2017a). Egg masses from this species were observed at the Typha and Penstemon Solar Project sites during the April 3 to 12, 2017, field surveys. A pre-construction clearance survey may be recommended by WDFW for developments in or near potential spotted frog habitat, but since current plans are to buffer and avoid water bodies, this is unlikely to be necessary.

Sharp-Tailed Snake

The sharp-tailed snake is classified as a State Candidate species by WDFW. This species prefers forest openings dominated by Garry oak (*Quercus garryana*), particularly with rock accumulations, and riparian deciduous woodlands with accumulations of decaying woody logs within ponderosa pine, oak, or shrub-steppe (Hallock 2009).

According to the PHS mapper, an occurrence of this species was recorded within the quarter-township that includes the entire area of the proposed Camas and Fumaria Solar Project sites (WDFW 2017a). However, the proposed sites do not fit the description for this species' preferred habitat. Therefore, it is unlikely that this species occurs within these two project sites.

Giant Palouse Earthworm

The only special-status invertebrate species known to occur in Kittitas County is the giant Palouse earthworm (*Driloleirus americanus*), a State Candidate species. Known habitats for this species include deep, loamy soils characteristic of the Palouse bunchgrass prairies, and gravelly sandy loam or other rocky soils in forested areas. They have been observed in open forest, shrub-steppe, and prairie habitats and are typically associated with native vegetation (WDFW 2015:Appendix A-5).

3.4.2.2 Solar Project Sites

Camas Solar Project Site

During a site visit to the Camas Solar Project site on April 12, 2017, WDFW biologists stated that Little Naneum Creek could provide anadromous salmon and steelhead habitat.

A review of the PHS database showed that the Camas Solar Project site is located within a township known to support greater sage-grouse, a State Threatened and Federal Candidate species. Greater sage-grouse are closely associated with large uninterrupted areas of sagebrush, native bunchgrasses, wildflowers, and wet meadows. Because the site does not provide this type of habitat, greater sage-grouse are unlikely to occur in this project-scale analysis area.

The Camas Solar Project site also has historic habitat for Columbia spotted frog, a State Candidate species.

Fumaria Solar Project Site

Also observed during the April 12 WDFW site visit, a bald eagle, a federal species of concern, was perched in the riparian habitat along Reecer Creek, within the 500-meter Fumaria Solar Project project-scale analysis area (at the generation tie line northernmost crossing of Reecer Creek, see Figure 3.4-5).

Reecer Creek is known to be fish bearing, containing rainbow trout.

A review of the PHS database showed that the Fumaria Solar Project site is located within a quarter-township known to support sharp-tailed snake, a State Candidate species. Sharp-tailed snake can occur in a wide variety of habitats, but are most commonly associated with wetter soils in coniferous or mixed woodland forests. Because this site does not provide this type of habitat, sharp-tailed snake are unlikely to occur in this project-scale analysis area.

Fumaria Solar Project Generation Tie Line

Reecer Creek, which is crossed several times by the Fumaria Solar Project generation tie line, is known to be fish bearing, containing rainbow trout.

Penstemon Solar Project Site

A review of the PHS database showed that the Penstemon Solar Project site is located within a township known to support greater sage-grouse, a State Threatened and Federal Candidate species. Greater sage-grouse are closely associated with large uninterrupted areas of sagebrush, native bunchgrasses, wildflowers, and wet meadows. Because the site does not provide adequate greater sage-grouse habitat, they are unlikely to occur in this project-scale analysis area. A bald eagle, a federal species of concern, flew over the project site during the April 2017 field survey, likely traveling to the Yakima River.

Coleman Creek is known to be fish bearing, containing anadromous steelhead and Chinook salmon, and resident rainbow trout.

Additionally, several egg masses, thought to be from Columbia spotted frog, were observed in an irrigation ditch that connects with Coleman Creek south of the southeast corner of the Penstemon Solar Project site (see Figure 3.4-8).

Typha Solar Project Site

The Yakima River contains four ESA-listed species: bull trout, Spring Chinook (Upper Columbia River), Steelhead (Middle Columbia River), and Summer Steelhead (Upper Columbia River).

Two egg masses, thought to be from Columbia spotted frog, were observed in TW04, a wetland located along the southern boundary of the Typha Solar Project site (see Figure 3.4-9).

Typha Solar Project Generation Tie Line

No special-status species occurrences, other than those discussed for the Typha Solar Project site, are known within the project-scale analysis area for the Typha Solar Project generation tie line.

Urtica Solar Project Site

During a site visit to the Urtica Solar Project site on April 12, 2017, WDFW biologists stated that McCarl Creek could provide anadromous salmon and steelhead habitat.

(c) A discussion of any federal, state, or local special management recommendations, including department of fish and wildlife habitat management recommendations, that have been developed for species or habitats located on or adjacent to the project area;

No special management recommendations have been made.

(2) Identification of energy facility impacts. The application shall include a detailed discussion of temporary, permanent, direct and indirect impacts on habitat, species present and their use of the habitat during construction, operation and decommissioning of the energy facility. Impacts shall be quantified in terms of habitat acreage affected, and numbers of individuals affected, threatened or removed. The discussion of impacts shall also include:

3.4.3 Impacts to Habitat

3.4.3.1 Construction Impacts

Landscape-Scale Analysis Area

Table 3.4-5 displays the area that would be impacted by construction of the Columbia Solar Projects. The solar projects would include a total of 223 fenced-in acres (not the entire 232 leased acres), a majority of which would be currently in agricultural production (138 acres). Currently, 3 of the 5 sites (Fumaria, Typha, and Urtica) have some form of existing fencing, which could restrict travel for large and medium-sized mammals. Following project construction, all sites would be fenced with a minimum of 8-foot high fencing to prevent deer and elk from entering the sites and becoming trapped or injured, based on comments received from WDFW. The area of each habitat type removed would be less than 1% of that available in the landscape-scale analysis area, except for three habitat types: fallow – vegetated (some native vegetation, but mostly non-native plant species), fallow (recently grazed), and willow-rose shrub thicket. The impacts to these areas relative to that available in the landscape-scale analysis area is large (49%, 41%, and 34%, respectively) because there is a small area of each of these habitat types available prior to project construction. These habitat types may be more prevalent outside of the project-scale analysis areas in the areas base-mapped as the "other" habitat type, but base mapping outside of the project-scale analysis areas was not altered for this analysis. This artificially makes the proportions of these three habitat types higher. See Table 3.4-1 for the area of each habitat type available in the landscape-scale analysis area. As a result, there would be minor temporary impacts to habitat, vegetation, and wildlife.

The nature of these impacts is described in detail in Sections 3.4.3 to 3.4.5.

Solar Project Sites

Camas Solar Project Site

The Camas Solar Project would primarily impact habitat that is currently under agricultural production. The project site has been designed to avoid impacts on Little Naneum Creek, and the facility incorporates a 40-foot setback from the edge of the creek for any electrical generation equipment. The solar project has also been designed to avoid impacts to the wetland habitat along the western boundary of the project site, with a 20-foot setback from the edge of the wetland to the electrical generation equipment.

Table 3.4-5. Construction and Operation Impacts: Acres of Habitat Types Potentially Affected by Construction Activities and from Fencing during Long-term Operation of the Columbia Solar Project

Habitat Type	Landscape-scale Analysis Area (LSAA)		Project-scale Analysis Areas (PSAA) (500-meter buffer surrounding each solar project site)									
			Camas		Fumaria Site with Access Road (Generation Tie Line)[1]		Penstemon		Typha Site (Generation Tie Line)[1]		Urtica	
	Acres	% of Habitat available in LSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]
Agricultural Production	138	<1%	42	9%	– (19)	– (2%)	36	9%	– (2)	– (2%)	40	9%
Developed	8	<1%	<1	<1%	– (7)	– (13%)	–	–	– (2)	– (15%)	–	–
Fallow: vegetated	35	49%	–	–	35 (<1)	85% (<1%)	–	–	–	–	–	–
Fallow: recently grazed	38	41%	<1	<1%	–	–	–	–	38 (<1)	60% (<1%)	–	–
Open Water	1	<1%	–	–	– (<1)	– (1%)	–	–	– (<1)	– (44%)	<1	1%
Riparian Corridor	1	<1%	1	4%	– (<1)	– (1%)	–	–	– (<1)	– (<1%)	<1	<1%
Sagebrush-bitter-brush Scrub	<1	<1%	–	–	<1 (<1)	<1% (<1%)	–	–	–	–	–	–
Wetlands	1	<1%	–	–	– (1)	– (4%)	–	–	<1 (<1)	8% (<1%)	<1	1%
Willow-rose Shrub Thicket	1	34%	–	–	<1 (1)	<1% (5%)	–	–	– (<1)	– (<1%)	–	–
Total Acres	**223**		**43**		**35 (30)**		**36**		**39** (4)		**41**	

1. The entries in each cell add up to the total for the site, including the access road and generation tie line.
2. Where the amount of each habitat type in the landscape-scale or project-scale analysis area equals 100%.

Fumaria Solar Project Site

The Fumaria Solar Project would primarily impact habitat that is currently fallow – vegetated with some native vegetation, but mostly non-native plant species. The associated generation tie line would primarily impact habitat that is currently under agricultural production. The Fumaria Solar Project site has been designed to avoid impacts on Reecer Creek. The solar project has also been designed to avoid impacts to the existing drainage ditch along the southwestern boundary of the project site, and the facility incorporates a 60-foot setback from the edge of the wetland on the site to the electrical generation equipment.

Penstemon Solar Project Site

The Penstemon Solar Project would primarily impact habitat that is currently under agricultural production. The project site has been designed to avoid impacts to Coleman Creek, and the facility incorporates a 60-foot minimum setback from the edge of the creek for any electrical generation equipment, and an average 115-foot setback along the majority of the creek.

Typha Solar Project Site

The Typha Solar Project would primarily impact habitat that is currently fallow but has been recently grazed. The associated generation tie line would primarily impact habitat that is currently under agricultural production and developed. The project site has been designed to avoid impacts to the Yakima River, including a greater than 100-foot setback from the Yakima River to any electrical generation equipment, and a 30-foot setback from the wetlands located within the site to any electrical generation equipment.

Urtica Solar Project Site

The Urtica Solar Project would primarily impact habitat that is currently under agricultural production. The project site has been designed to avoid impacts to McCarl Creek, and the facility incorporates a 40-foot minimum setback from the edge of the creek for any electrical generation equipment.

3.4.3.2 Operation Impacts

Table 3.4-6 shows the area of the Columbia Solar Projects that would be converted to an impervious surface, rendering it unusable for plants or wildlife for the life of the projects. A total of 11.86 acres of the five solar projects would be converted to impervious surfaces, a majority of which would be habitat currently under agricultural production (6.01 acres). The area of each habitat type removed would be less than 1% of that available in the landscape-scale analysis area, except for three habitat types: fallow (native vegetation), fallow (recently grazed), and willow-rose shrub thicket. The impacts to these areas relative to that available in the landscape-scale analysis area is 1% or greater (2%, 2%, and 1%, respectively), because there is a small area of each of these habitat types available prior to project construction. These habitat types may be more prevalent outside of the project-scale analysis areas in the areas base-mapped as the “other” habitat type, but base mapping outside of the project-scale analysis areas was not altered for this analysis. This artificially makes the proportions of these three habitat types higher. See Table 3.4-1 for the area of each habitat type available in the landscape-scale analysis area. As a result, there would be minor permanent impacts to habitat, vegetation, and wildlife.

Impacts due to human noise and activity during operation would be minimal, as there would be little human visitation to each site. Eventual decommissioning impacts would be similar to the Construction Impacts to Habitat (Section 3.4.3.1) with ground disturbance and subsequent revegetation.

Table 3.4-6. Acres of Habitat Types Potentially Affected by Impervious Areas from Long-term Operation of the Columbia Solar Projects

Habitat Type	Landscape-scale Analysis Area (LSAA)		Project-scale Analysis Areas (PSAA) (500-meter buffer surrounding each solar project site)									
			Camas		Fumaria Site; Access Road (Generation Tie Line)[1]		Penstemon		Typha Site (Generation Tie Line)[1]		Urtica	
	Acres (with Fumaria Access Road)	% of Habitat available in LSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]	Acres	% of Habitat available in PSAA[2]
Agricultural Production	6.01	<1%	2.00	<1%	– (0.97)	– (<1%)	1.31	<1%	– (0.08)	– (<1%)	1.65	<1%
Developed	0.45 (0.55)	<1%	–	–	–; 0.10 (0.37)	–; 1% (1%)	–	–	– (0.08)	– (1%)	–	–
Fallow: vegetated	1.72 (2.44)	3%	–	–	1.71 0.72 (0.01)	4% (<1%) (<1%)	–	–	–	–	–	–
Fallow: recently grazed	1.41	1%	–	–	–	–	–	–	1.40 (0.01)	2% (<1%)	–	–
Open Water	0.05	<1%	–	–	– (0.02)	– (<1%)	–	–	– (0.02)	– (2%)	–	–
Riparian Corridor	0.04	<1%	–	–	– (0.02)	– (<1%)	–	–	– (0.01)	– (<1%)	–	–
Sagebrush-bitter-brush Scrub	0.01 (1.27)	<1%	–	–	–; 1.26 (0.01)	–; 1% (<1%)	–	–	–	–	–	–
Wetlands	0.03	<1%	–	–	– (0.03)	– (<1%)	–	–	– (<0.01)	– (<1%)	–	–
Willow-rose Shrub Thicket	0.07	2%	–	–	– (0.07)	– (<1%)	–	–	– (<0.01)	– (<1%)	–	–
Total Acres	**9.78** **(11.86)**	**<1%**	**2.00**	**<1%**	**1.71 Site;** **2.08 Access Road** **(1.50)**		**1.31**	**<1%**	**1.40** **(0.21)**		**1.65**	**<1%**

1. The entries in each cell add up to the total for the site, including the access road and generation tie line.
2. Where the amount of each habitat type in the landscape-scale or project-scale analysis area equals 100%.

3.4.3.3 Other Impacts to Habitat and Species

(a) Impacts to water quality, stream hydrology and in-stream flows;

As described in Sections 2.1 and 2.3, the Columbia Solar Project site designs include at least 20-foot setbacks from wetlands, streams, and the Yakima River; see Table 3.3-5 for the specific setback distances from each water body. Additionally, sediment and erosion control measures would be implemented to avoid water quality impacts to adjacent wetlands, streams, and the Yakima River (see Sections 3.1.6, 3.3.3, 3.3.8, and 3.5.5). As described in Section 3.3, no impacts to stream hydrology and in-stream flow would occur because of the setbacks included in the project site designs. Sections 2.6, 2.8, 2.9, 2.10, and 2.11 provide additional details regarding the lack of impacts to water quality and quantity from the proposed project.

(b) Impacts due to introduction, spread, and establishment of noxious or nonnative species;

As discussed in the Special-status Plants section above, noxious weeds and non-native plant species are present on all five of the proposed Columbia Solar Project sites. Table 3.4-2 indicates their relative prevalence on each site. Construction and operation activities have the potential to introduce and further spread or establish these species, as well as others that do not presently occur at the sites. To prevent introduction, spread, and establishment of noxious or non-native species, TUUSSO has prepared and would implement a Vegetation Management Plan through coordination with the landowners, WDFW, and Kittitas County (Appendix B).

(c) Impacts and changes to species communities adjacent to the project site;

As shown in Table 3.4-1, habitat similar to the types available in the Columbia Solar Project project-scale analysis areas is readily available in the landscape-scale analysis area. Long-term modification of vegetation communities would not result in a significant change to the overall habitat available to species in the analysis areas.

The proposed Columbia Solar Projects have the potential to remove and/or reduce the quality of the vegetation communities and plant species in the project-scale analysis areas where ground disturbance would occur. Vegetation clearing or grubbing activities could also increase or introduce noxious plant populations in undisturbed habitat, contribute to soil erosion, lead to slope destabilization, or result in movement of material beyond the grading activities. Soil erosion from ground-disturbing activities may result in a negative effect on streams in the project-scale analysis areas by increasing sedimentation into the streams.

Potential minor impacts to wildlife may result from temporary construction and permanent operation of the five Columbia Solar Projects. Ground disturbance, vegetation clearing, and noise could result in temporary displacement of wildlife species present in the project-scale analysis areas during construction. Long-term effects of the solar projects would be limited to the long-term modification of habitat in each project-scale analysis area (i.e., fencing or conversion of habitat to impervious substances). Some species, such as small rodents, snakes, and insects, could be affected by the ground-disturbing activities due to temporary habitat alteration and could suffer mortalities from direct contact with construction equipment. More commonly, wildlife would be displaced to adjacent habitat areas. The effects from ground disturbances during construction would be considered low, with respect to common wildlife species, all of which can be expected to have robust populations that would be minimally affected by the temporary and localized construction activities associated with the solar projects.

Section 3.4.6 below details the proposed Columbia Solar Projects' BMPs and mitigation measures that would reduce or minimize the potential for impacts to vegetation, fish, and wildlife.

(d) Impacts to fish and wildlife migration routes;

The five proposed Columbia Solar Projects and their associated generation tie lines would not affect any identified big game migratory corridors or migratory flyways.

The Columbia Solar Project sites are within 2.5 miles of the Yakima River and 3.5 miles of areas that are only minimally inhabited by humans (Figure 3.4-1 and Table 3.4-1). Because all of the solar project sites are near these less-inhabited areas, migratory species (e.g., deer and coyote) occasionally forage or hunt on and travel through the sites, but no migration routes for these species occur within the project-scale analysis areas.

The Pacific Flyway crosses over much of the landscape-scale analysis area, including the Columbia Solar Project sites. During the short period of construction (with its associated human activity and noise), 223 acres comprising the fenced-in areas of the solar project sites (not the entire 232 leased acres) would be less available to migratory bird species using the Pacific Flyway. However, there are 317,997 acres within the landscape-scale analysis area that would still be available to these bird species, so this would not be a significant impact. This is less than a 0.1% temporary impact to the landscape-scale analysis area that forms a small segment of the Pacific Flyway. During operation, the sites will once again be available for migratory bird species to use and hunt on, and so there will not be any significant decrease in the habitat value for migratory bird species using the Pacific Flyway after construction.

(e) Impacts to any species of local importance, priority species, or endangered, threatened, or candidate species;

3.4.4 Impacts to Special-status Species

3.4.4.1 Construction Impacts

No special-status plant species are known to occur within the construction areas. The proposed Columbia Solar Projects have the potential to minimally impact the following special-status wildlife species:

- Bald eagle (BGEPA- and MBTA-protected; Federal Species of Concern)
- Columbia spotted frog (Washington State Candidate)

No other species described in Section 3.4.2 has the potential to be impacted by the Columbia Solar Projects.

Bald eagles were incidentally observed during ground surveys near the Fumaria and Penstemon Solar Project sites, and are likely present throughout the project-scale analysis areas. No aerial nest surveys were conducted. If nests are present in the project vicinity, they have the potential to be affected by noise and visual disturbances during construction. No bald eagle nests have been identified near the solar project sites. The solar projects' APP would include measures to conduct pre-construction surveys to identify raptor nests to establish if buffers will be required during construction activities. If nests are identified near the sites, construction outside of the critical use period (January 1–May 31) is recommended. If construction near active bald eagle nests might occur during the critical use period, local USFWS biologists would be consulted.

Columbia spotted frog is known to occur near the Typha, Camas, and Penstemon Solar Project sites, and could be affected by construction and operation in and around ponds and canals that provide breeding habitat. To avoid impacts to aquatic and semi-aquatic species, setback distances from aquatic habitats would be incorporated into the site plans, and appropriate erosion and sediment control measures would be implemented to protect wetlands and streams from sediment and other contaminants.

Recommended mitigation measures for special-status species are described below in Section 3.4.6.

Table 3.4-7 displays the amount of special-status species habitat that would be impacted by the fenced and impervious areas from implementation of the Columbia Solar Projects (all sites combined). Within the project-scale analysis areas, bald eagles primarily occupy riparian corridors and wetlands, as shown in Table 3.4-3, limiting impacts to approximately 2 acres of habitat due to fencing and conversion to impervious areas during construction. Similarly, fencing and impervious surfaces would result in 3 acres of impacts to Columbia spotted frog habitat in the project-scale analysis areas (riparian corridors, wetlands, and open water). Bald eagles and Columbia spotted frogs would continue to be able to access fenced habitat following construction, and impacts from fencing are considered to be minor and temporary from the construction activity that would occur within this area.

Table 3.4-7. Acres of Special-status Species Habitat Impacted by Fencing and Conversion to an Impervious Area of the Columbia Solar Projects

Representative Species	Habitat Available in Landscape Scale Analysis Area[1]	Fenced Area		Impervious Area	
		Acres	Percent of Available Habitat	Acres	Percent of Available Habitat
Bald eagle	8,116	2	<1%	0.07	<1%
Columbia spotted frog	9,363	3	<1%	0.11	<1%

1. The “other” habitat category was removed from the species habitats because it includes such a wide range of habitats that it is not valuable for the analysis.

3.4.4.2 Operation Impacts

Except for the 11.86 acres of impervious surfaces that would remove 0.07 acre and 0.11 acre of available bald eagle and Columbia spotted frog habitat (a minor permanent impact), respectively (see Table 3.4-7), no long-term operational impacts to special-status species would occur from the five Columbia Solar Projects. Eventual decommissioning impacts would be similar to the Construction Impacts to Special-status Species (Section 3.4.4.1) with human noise and activity and subsequent habitat revegetation.

(f) Impacts due to any activities that may otherwise confuse, deter, disrupt or threaten fish or wildlife;

3.4.5 Impacts to Fish and Wildlife

3.4.5.1 Construction Impacts

Landscape-Scale Analysis Area

As described in Section 3.4.6.1, to ensure compliance with MBTA, vegetation clearing for the Columbia Solar Projects would ideally be undertaken from August 1 through the end of February. If construction or vegetation clearing is required between March 1 and August 1, nest surveys would be conducted in the proposed area of disturbance. If active migratory bird nests are encountered during the surveys, land-disturbing construction activities would be avoided until the birds fledge. An appropriate species avoidance buffer, as determined in conjunction with WDFW and local agencies, would apply to all active nests for migratory bird species.

Setbacks from wetlands, streams, and the Yakima River have also been included in the design of each project site (see Section 2.3.3), so impacts to fish and aquatic species would be avoided.

Table 3.4-3 shows the types of habitats used by the representative species analyzed for the Columbia Solar Projects. Table 3.4-8 shows the amount of representative habitat used by these species (within the landscape-scale analysis area) that would be impacted by the fenced and impervious areas of the Columbia Solar Projects (all sites combined). These species were chosen to represent wildlife that are likely to occur in the project-scale analysis areas. Not all species listed in Section 3.4.1 are listed here. For most species, less than 1% of the available habitat used by that species (within the landscape-scale analysis area) would be affected from solar project fencing or conversion to impervious areas, except for the spotted skunk, for which 1% of its habitat would be converted to impervious area. As a result, there would no impacts to fish (because of setbacks from water bodies), and there would be minor permanent impacts to habitat, vegetation, and wildlife.

Table 3.4-8. Acres of Representative Species Habitat (in the Landscape-scale Analysis Area) Impacted by Fencing and Conversion to an Impervious Area of the Columbia Solar Projects

Representative Species	Habitat Available in Landscape-scale Analysis Area[1]	Fenced Area		Impervious Area	
		Acres	Percent of Available Habitat	Acres	Percent of Available Habitat
Birds					
Canada goose	129,395	223	<1%	11	<1%
Great blue heron	124,586	214	<1%	10	<1%
Great horned owl	123,339	213	<1%	10	<1%
Killdeer	129,833	222	<1%	12	<1%
Northern Harrier	123,781	214	<1%	11	<1%
Red-tailed hawk	120,470	219	<1%	12	<1%
Sandhill Crane	124,586	214	<1%	10	<1%
Fish					
Bull trout	1,247	1	<1%	0	<1%
Dace species	6,562	2	<1%	0	<1%
Spring chinook (Upper Columbia River)	1,247	1	<1%	0	<1%
Steelhead (Middle Columbia River)	1,247	1	<1%	0	<1%
Summer steelhead (Upper Columbia River)	1,247	1	<1%	0	<1%
Herptiles					
Pacific treefrog	124,496	177	<1%	9	<1%
Sharp-tailed snake	8,116	2	<1%	0	<1%
Mammals					
American badger	115,665	212	<1%	11	<1%
Coyote	123,271	221	<1%	12	<1%
Mule deer	118,028	214	<1%	10	<1%
Raccoon	129,925	11	<1%	1	<1%
Small rodents (mice, voles, etc.)	128,590	223	<1%	12	<1%
Striped skunk	7,682	45	<1%	3	1%
Virginia opossum	12,925	11	<1%	1	<1%

1. The “other” habitat category was removed from the species habitats because it includes such a wide range of habitats that it is not valuable for the analysis.

Solar Project Sites

Camas Solar Project Site

During field surveys of the Camas Solar Project site, an active red-tailed hawk nest was observed in a large willow along Little Naneum Creek (see Figure 3.4-3). Additionally, the floor of the barn in the northeast part of the site was littered with owl pellets and the rafters contained whitewash (see Figure 3.4-3). This barn would remain in place following solar project construction, based on current design plans. If nesting activity is observed at the nest and barn, then a 0.25-mile seasonal construction avoidance buffer may be requested by WDFW until the young have fledged (see Section 3.4.6 and Appendix C).

Fumaria Solar Project Generation Tie Line

East of the Fumaria Solar Project generation tie line, along North Faust Road, two active raptor nests were observed from a red-tailed hawk and a great horned owl (see Figure 3.4-6). If nesting activity is observed at the nests, then a 0.25-mile seasonal construction avoidance buffer may be requested by WDFW until the young have fledged (see Section 3.4.6 and Appendix C).

Penstemon Solar Project Site

An active red-tailed hawk nest was observed southeast of the southeast site corner of the Penstemon Solar Project site, in a cottonwood tree along Coleman Creek (see Figure 3.4-8). If nesting activity is observed at the nest, then a 0.25-mile seasonal construction avoidance buffer may be requested by WDFW until the young have fledged (see Section 3.4.6 and Appendix C).

Typha Solar Project Site

A documented great blue heron breeding area is 224 feet east of the Typha Solar Project site, on a landform within the Yakima River (see Figure 3.4-9). The great blue heron nesting season is February through September. WDFW may request a seasonal avoidance buffer during the first half of the season, i.e., February through May (Appendix C).

The floor of the barn, located south of the southwest corner of the Typha Solar Project site, was littered with owl pellets and the rafters contained whitewash (see Figure 3.4-9). Current project plans include leaving this barn in place. If nesting activity is observed at the barn, then a 0.25-mile seasonal construction avoidance buffer may be requested by WDFW until the young have fledged (see Section 3.4.6 and Appendix C).

Urtica Solar Project Site

No nests were observed in the Urtica Solar Project project-scale analysis area. Still, if construction occurs between March 1 and August 1, nest surveys would take place to ensure new nests have not been built.

3.4.5.2 Operation Impacts

Table 3.4-8 summarizes the acres of habitat for representative species that may be affected by the long-term operation of the Columbia Solar Projects (i.e., from fencing or conversion of habitat to impervious surfaces). Each site would be visited minimally by humans for maintenance, resulting in minimal permanent impacts due to human noise and activity. Eventual decommissioning impacts would be similar to the Construction Impacts to Fish and Wildlife (Section 3.4.5.1) with human noise and activity and subsequent habitat revegetation.

(g) An assessment of risk of collision of avian species with any project structures, during day and night, migration periods, and inclement weather;

Potential impacts to avian species on Columbia Solar Project sites can include traumatic impact with fencing, PV panels, and other solar structures, and predation due to collision-related injuries (Hernandez et al. 2014; Kagan et al. 2014).

Birds representing a broad range of body sizes, ecological types, resident and non-resident, and nocturnal and diurnal species can be impacted by solar facilities (Kagan et al. 2014). Passerines are the taxonomic group most frequently found dead or injured at solar facilities, ranging between 40% to nearly 63% of all avian fatalities at a site. The proportion of water-dependent species found at solar projects has ranged between less than 1% to approximately 45% (Kagan et al. 2014). In general, the proportion of water-dependent bird species found dead at PV facilities was higher than for other solar technologies, suggesting that there may be an attraction of water-dependent birds to PV facilities (e.g., lake effect hypothesis). However, no studies have been conducted to test this hypothesis.

In a study of avian mortality at utility-scale solar energy (USSE) facilities in the United States conducted in 2016, Walston et al. estimated that all USSE facilities currently in operation or under construction (totaling approximately 14 GW) would result in 37,800 to 138,600 bird mortalities per year. This estimate was based on the capacity-weighted average mortality rate, which ranged from 2.7 to 9.9 birds/MW/year, and included mortality from both known and unknown causes (Walston et al. 2016). Applying this to the Columbia Solar Project sites, it is estimated that operation of each 5-MW facility could result in between 13 and 50 avian deaths per year, or a total of 67 to 248 bird mortalities per year for all five Columbia Solar Project sites. For comparison, roadway vehicles are thought to cause 89 to 340 million avian deaths per year, and buildings and windows are thought to cause 365 to 988 million avian deaths per year (Walston et al. 2016).

Because the majority of avian mortalities at USSE facilities are the result of unknown causes, it is unclear how factors such as time of day, time of year, and weather can alter the risks of collision.

Avian Power Line Interaction Committee guidelines would be followed to reduce bird perching and collisions on the generation tie lines. These guidelines are intended to minimize the potential for avian fatalities due to electrocution or power line strikes.

(h) An assessment for the potential of impacts of hazardous or toxic materials spills on habitats and wildlife.

Potential impacts to habitats and wildlife from hazardous or toxic materials spills from the five Columbia Solar Projects are unlikely. The solar projects would have Spill Prevention and Control Plans for both the construction and operation phases (see Sections 2.10, 4.1.8, and 4.1.9 for details). There would be measures in place to prevent and contain any accidental spills resulting from construction fuel storage. Construction of the projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law.

There would not be any long-term fuel storage during operation of the five Columbia Solar Projects. The potential for accidental spills during operations would be minimal, as the sole source of potential spills on-site would be the small amounts of mineral oil contained within the transformers. The transformers would include containment tank welding and corrosion protection specifications.

(3) Mitigation plan. The application shall include a detailed discussion of mitigation measures, including avoidance, minimization of impacts, and mitigation through compensation or preservation and restoration of existing habitats and species, proposed to compensate for the impacts that have been identified. The mitigation plan shall also:

3.4.6 Mitigation for Habitat and Species

Throughout this section, the term “mitigation” refers to avoidance and minimization measures. No compensatory mitigation is proposed for the Columbia Solar Projects, as impacts are not expected to be significant. Mitigation would remain consistent with the WDFW POL-M5002.

(a) Be based on sound science;

The proposed mitigation and BMPs included in this application are typical of the wind energy projects developed to date in Kittitas County, and were developed through coordination with landowners and WDFW. Additional research is required to determine the efficacy of measures intended to reduce avian and bat mortality at utility-scale solar facilities (Multiagency Avian-Solar Collaborative Working Group [CWG] 2016). The mitigation measures in this ASC include the most current and widely-accepted measures referenced by the CWG in their Final Avian-Solar Science Coordination Plan (CWG 2016, Kagan et al. 2014).The USFWS is currently developing programmatic guidance for Bird and Bat Conservation Strategies (BBCS) that will recommend BMPs and minimization and mitigation for utility-scale solar facilities (USFWS 2016a as cited in CWG 2016). When available, this guidance will be reviewed and applicable guidelines will be considered for implementation.

(b) Address all best management practices to be employed and setbacks to be established;

Waterbody setbacks are listed by Columbia Solar Project site in Section 3.4.3.1.

3.4.6.1 Buffers and Seasonal Timing

Migratory Birds and Bald and Golden Eagles

The Columbia Solar Project sites are located within and form a very small portion of the Pacific Flyway. To ensure compliance with MBTA, vegetation clearing for the Columbia Solar Projects would ideally be undertaken from August 1 through the end of February. If construction or vegetation clearing is required between March 1 and August 1, nest surveys would be required in the proposed area of disturbance. If active migratory bird nests are encountered during the surveys, land-disturbing construction activities should be avoided while the birds are allowed to fledge. An appropriate species avoidance buffer, as determined in conjunction with WDFW and local agencies, would apply to all active nests for migratory bird species. As requested by the USFWS, an APP will be developed to encompass all mitigation measures proposed to protect migratory birds.

As discussed in Sections 3.4.1 and 3.4.2, the Columbia Solar Project project-scale analysis areas have the potential to provide nesting habitat to raptors and bald and golden eagles. All raptor species are protected under the MBTA, and bald and golden eagles are additionally protected under the BGEPA. If active raptor nests occur within 0.25 mile of the solar project construction activities, noise and construction activities could disturb nesting and fledgling raptors, potentially causing nest abandonment. Based on WDFW guidance (Appendix C), a nest survey within 0.25 mile of construction activities would be conducted within the same year that construction is scheduled, to determine whether nests could be occupied during construction. The nesting seasons vary by species, as shown in Table 3.4-9. WDFW’s 0.25-mile buffer is inclusive of the distance recommended by the National Bald Eagle Management

Guidelines (USFWS 2007), which specifies a 660-foot (0.125-mile) buffer from active eagle nests. If active raptor nests are observed, then TUUSSO would coordinate with WDFW to determine approaches to minimize disturbance to the nesting raptors. Buffer distances and timing restrictions would collaboratively be developed by WDFW and TUUSSO, dependent upon the sound levels produced by the construction equipment and the sensitivity of the nesting raptors.

Table 3.4-9. Nesting Seasons for Raptor Species Likely to Occur in the Analysis Areas

Species	Nesting Season
Bald eagle	January 1–August 31
Golden eagle	January 1–August 31
Red-tailed hawk	March 15–June 30
Great horned owl	February 1–May 15
Swainson's hawk	April 15–July 31

Source: Personal communication with Scott Downes, WDFW Habitat Biologist, 2017 (Appendix C).

Riparian Corridors

Rivers and streams in Kittitas County are classified according to the Washington State stream typing system, as defined in WAC 222-16-030. Ecology and the Washington Department of Natural Resources (DNR) recognize the WAC stream typing system. Kittitas County has established riparian habitat buffer ranges for each stream type to reflect the impact of certain intense land uses on riparian habitat functions and values. The performance standard buffers are defined in KCC 17A.070.010.

Table 3.4-10 shows the surface waters that were identified in the Columbia Solar Project project-scale analysis areas, their DNR stream type, and the applicable buffers. See also each project site's Critical Areas Report for recommended buffer and setback distances from the wetlands identified within the sites.

Table 3.4-10. Surface Waters in the Project-scale Analysis Areas and Applicable Buffers

Stream ID	Water Type	Flow Type	DNR Stream Type[1]	Kittitas County Buffers (feet)	
				Minimum	Maximum
Yakima River	River	Perennial	S	40	200
Ellensburg Power Canal (TS01)	Canal	Perennial	N/A	–	–
FS01	Ditch	Ephemeral	N/A	–	–
FS02	Ditch	Ephemeral	N/A	–	–
Reecer Creek	Stream	Perennial	F	20	100
Kittitas Reclamation District Canal (FS03)	Canal	Perennial	N/A	–	–
FS04	Stream	Intermittent	Ns	0	15
Town Ditch (FS05)	Canal	Perennial	N/A	–	–
McCarl Creek (US01)	Stream	Intermittent	F	20	100
Little Naneum Creek	Stream	Perennial	F	20	100
Bull Ditch (CS02)	Ditch	Perennial	N/A	–	–
Coleman Creek	Stream	Perennial	F	20	100

1. As defined in WAC 222-16-030: S = shoreline of the state, F = fish-bearing, Ns = non-fish-bearing. N/A = not applicable, due to ditches and canals being excluded from the WAC typing system.

To additionally protect riparian corridors and habitats, peak Columbia Solar Project construction activities would be conducted during the dry season as much as possible, to minimize erosion, sedimentation, and soil compaction. At this time, no in-water work is planned for construction of access roads. If these plans change, then TUUSSO would coordinate and permit their plans with WDFW and construction in fish-bearing streams would occur during agency-approved work windows.

3.4.6.2 Noise

Construction noise is exempt from regulation under the statewide noise standards, WAC 173-60, but most noise generating construction activities would be conducted between the hours of 7 a.m. and 10 p.m., in accordance local noise ordinances, including but not limited to KCC 9.45.010, Public Disturbance noises. These practices would avoid night-time noise disturbances to wildlife species.

3.4.6.3 Other Measures

Additional Columbia Solar Project mitigation measures and BMPs to protect fish and wildlife in the project-scale analysis areas could include the following:

Design and Construction Techniques

- Avoid, when possible, construction in sensitive areas such as riparian zones and wetlands.
- Flag sensitive habitat areas (e.g., raptor nests, wetlands, etc.) near proposed areas of construction activity, and designate such areas as off limits to all construction personnel.
- During the nesting season, monitor raptor nests within 0.25 mile of the sites for nesting activity; coordinate construction timing and activities with WDFW to avoid impacts to nesting raptors.
- Minimize new road construction by improving and using existing roads and trails, instead of constructing new roads.
- Develop and implement a Fire Control Plan, in coordination with local fire districts, to minimize the risk of accidental fires during construction, and respond effectively to any fire that does occur.
- Designate an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.
- Implement a trenching protocol during the installation of underground electrical facilities, to allow for conservation of surface soils.
- Require construction personnel to avoid driving over or otherwise disturbing areas outside of the designated construction areas.
- Properly store and manage all wastes generated during construction.
- Use certified weed-free straw bales during construction to avoid introduction of noxious or invasive weeds.
- There would be one straight row of barbed wire, not circular barbed wire, at the top of the perimeter fence. This would avoid birds becoming trapped in circular barbed wire.
- For poles installed by TUUSSO, when feasible:
  - equip overhead power lines with raptor perch guards to minimize risks to raptors and
  - space overhead power line conductors to minimize potential for raptor electrocution.
- Employ an adaptive management strategy to further minimize avian and bat mortality as new information and technology becomes available.
- Design PV panels with anti-reflective coatings to minimize impacts from the “lake effect” on passing migratory birds.

Erosion and Sediment Control

- Use BMPs to minimize construction-related surface water runoff and soil erosion.
- Implement temporary erosion and sediment control measures, as appropriate, both during and after construction.
- Flag sensitive habitat areas (e.g., riparian zones, wetlands, etc.) near proposed areas of construction activity, and designate such areas as off limits to all construction personnel.
- Limit disturbances to the minimum necessary when working in or near waterbodies and install stakes or flagging to restrict vehicles and equipment to designated routes and areas.
- Delineate construction limits within 200 feet of waterbodies, as specified in the Stormwater Pollution Prevention Plan (SWPPP), with a sediment fence, straw wattles, or similarly approved

methods to eliminate sediment discharge into waterways and wetlands, minimize the size of construction disturbance areas, and minimize removal of vegetation, to the greatest extent possible.

Restoration and Noxious Weed Control

- Quickly revegetate habitats temporarily disturbed during construction with native plant species.
- Reseed all temporarily disturbed areas with an appropriate mix of native plant species as soon as possible after construction is completed, to accelerate the revegetation of these areas and to prevent the spread of noxious weeds.
- Improve riparian areas within the Penstemon and Urtica Solar Project boundaries using native riparian plants where the existing vegetation has been reduced or eliminated due to agricultural practices.
- Consult with WDFW regarding the appropriate native seed mixes to include in the Vegetation Management Plan for revegetation of the solar project sites.
- As further detailed in the Vegetation Management Plan, implement noxious weed control measures.
- Develop a noxious weed control plan prior to construction, and implement the plan over the life of the project as mitigation. Herbicide application could be a noxious weed control method used.

(c) Address how cumulative impacts associated with the energy facility will be avoided or minimized;

Historically, Kittitas County land use has been dominated by agriculture. Renewable energy facilities (i.e., wind and solar) have recently been built and proposed. Currently there are two existing solar farms and four completed wind farms in the county. Two additional solar farms and one wind farm are in the proposal/approval process. These additional proposed solar farms include the 8-acre Osprey Solar Project, and the 48-acre Iron Horse Solar Project. The additional wind farm is the Desert Claim Wind Farm over 5,200 acres, which includes only minimal fencing for security purposes around selected facilities within that larger acreage.

Impacts cumulative with other energy facilities include a landscape-scale pattern of habitat removal and fragmentation. This pattern displaces wildlife into other areas that may be of lesser quality, such as developed areas. Fragmentation can disrupt movement patterns, whether on a migratory or local scale.

Habitat impacted by the Columbia Solar Projects and the foreseeable additional solar and wind projects described above would include the removal of approximately 279 acres comprising the fenced-in areas of the solar project sites for big game and other medium to large species. Currently, 3 of the 5 sites have some form of existing fencing which could restrict travel for large and medium-sized mammals. Following project construction, all sites will be fenced with a minimum of 8-foot high fencing to prevent deer and elk from entering the sites and becoming trapped or injured, based on comments received from WDFW. However, there are 317,997 acres within the landscape-scale analysis area that would still be available to big game, or less than a 0.1% impact to habitat for big game and other medium to large species. Birds and smaller species would continue to be able to use the solar project sites and wind project site after construction, and so the overall habitat removal and fragmentation cumulative impacts are not significant.

Post-construction restoration and noxious weed control for the Columbia Solar Projects would replace a weedy vegetation cover type with native plant species in all temporarily disturbed areas (see Table 3.4-2 for noxious weed prevalence at each site; all sites currently are principally vegetated by noxious and non-native plant species). These areas would be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed, minimizing the amount of habitat that is permanently removed and thereby reducing cumulative habitat removal.

Fragmentation to riparian corridors would be avoided by the designed inclusion of waterbody setback distances, and fragmentation of migration routes will be avoided by completely avoiding known migration routes for species that would be excluded by project fencing. Additional habitat fragmentation would be minimized by constructing as few new access roads as possible for the Columbia Solar Projects. Instead, existing roads and trails would be improved and used.

(d) Demonstrate how the mitigation measures will achieve equivalent or greater habitat quality, value and function for those habitats being impacted, as well as for habitats being enhanced, created or protected through mitigation actions;

Application of the Columbia Solar Project mitigation measures and BMPs described above would avoid and minimize impacts such that equivalent habitat value and function would be maintained in each project-scale analysis area. Habitat would remain accessible to birds, small mammals, and herpetiles that make up the majority of species that currently use the Columbia Solar Project sites. No migratory routes used by medium or large mammals would be affected by the solar projects, and these species are expected to make use of adjacent habitat. All species would benefit from restoration of riparian areas within the Penstemon and Urtica Solar Project sites with native vegetation. Compensatory mitigation is not proposed because the impacts are not expected to be significant.

(e) Identify and quantify level of compensation for impacts to, or losses of, existing species due to project impacts and mitigation measures, including benefits that would occur to existing and new species due to implementation of the mitigation measures;

Losses of existing species are not anticipated from Columbia Solar Project impacts and mitigation measures. Impacts to species would be avoided and minimized to the greatest extent possible through coordination with WDFW and by following the BMPs described above. Currently, noxious weeds are present on each site. Wildlife could benefit from the post-restoration and noxious weed control planned for each project site. Post-construction restoration would reduce the weeds and increase the number of native plant species on each site, with the intent of increasing general habitat quality.

(f) Address how mitigation measures considered have taken into consideration the probability of success of full and adequate implementation of the mitigation plan;

The proposed Columbia Solar Project mitigation and BMPs included in this application are typical of the wind energy projects developed to date in Kittitas County, and were developed through coordination with landowners, Kittitas County, and WDFW. They are standard and typical for the project size and type. The probability of success and full and adequate implementation of these measures would be increased with oversight from WDFW. Additionally, employing an on-site biological monitor would ensure full and adequate implementation of the minimization and avoidance measures and also increase the probability of success.

(g) Identify future use of any manmade ponds or structures created through construction and operation of the facility or associated mitigation measures, and associated beneficial or detrimental impacts to habitats, fish and wildlife;

No manmade ponds or structures would be created by the Columbia Solar Projects or associated mitigation measures.

(h) Discuss the schedule for implementation of the mitigation plan, prior to, during, and post construction and operation;

Application of the Columbia Solar Project mitigation measures and BMPs described above (Section 3.4.6.3) would avoid and minimize impacts at each site's project-scale analysis area. The implementation schedule for these measures has already begun with site design, but most measures would be implemented during the construction phase. The Post-construction Restoration and Noxious Weed Control would continue according to the Vegetation Management Plan (Appendix B). Compensatory mitigation is not proposed because the impacts are not expected to be significant.

(i) Discuss ongoing management practices that will protect habitat and species, including proposed monitoring and maintenance programs;

3.4.6.4 General County

Ecology conducts water quality monitoring in the area. Through the Ecological Interactions Team, WDFW conducts fish monitoring and improves fish passage barriers through the Yakima Tributary Access and Habitat Program. Kittitas County Conservation District (KCCD) works with farmers regarding riparian habitat and stream issues in the Kittitas Valley. TUUSSO contacted KCCD regarding project specifics and received the details included per site below.

3.4.6.5 Solar Project Sites

Camas Solar Project Site

KCCD has no current projects in the Camas Solar Project area. Several years ago the Bull Ditch Project involved adding a siphon under the creek. There is a known fish passage barrier south of the project site.

Fumaria Solar Project Site and Generation Tie Line

There are several known fish passage barriers along Reecer Creek, for the Fumaria Solar Project or associated generation tie line.

Penstemon Solar Project Site

KCCD has a Salmon Recovery Funding Board Grant to install a fish screen on Brunson's Outtake, which is located on the property upstream from the Penstemon Solar Project site. KCCD has already installed a number of screens along Coleman Creek, and this is currently the most southerly fish barrier.

Typha Solar Project Site and Generation Tie Line

KCCD has no current projects in the vicinity of the Typha Solar Project site or associated generation tie line. Ecology has a sediment study further east on the Ellensburg Power Canal. The Bonneville Power Administration and the Confederated Tribes of the Yakama Nation are proposing to construct the Melvin R. Sampson Hatchery upriver from the project site. The Final EIS is expected to be released in Fall 2017 (Yakima Basin Coho Project, DOE/EIS-0522; Bonneville Power Administration 2017).

Urtica Solar Project Site

KCCD has no current projects in the Urtica Solar Project area.

(j) Mitigation plans should give priority to proven mitigation methods. Experimental mitigation techniques and mitigation banking may be considered by the council on a case-by-case basis. Proposals for experimental mitigation techniques and mitigation banking must be supported with analyses demonstrating that compensation will meet or exceed requirements giving consideration to the uncertainty of experimental techniques, and that banking credits meet all applicable state requirements.

All proposed Columbia Solar Project mitigation is proven; no experimental mitigation techniques are proposed.

(4) Guidelines review. The application shall give due consideration to any project-type specific guidelines established by state and federal agencies for assessment of existing habitat, assessment of impacts, and development of mitigation plans. The application shall describe how such guidelines are satisfied. For example, wind generation proposals shall consider Washington state department of fish and wildlife Wind Power Guidelines, August 2003, or as hereafter amended. Other types of energy facilities shall consider department of fish and wildlife Policy M-5002, dated January 18, 1999, or as hereafter amended.

The State of Washington regulates fish and wildlife with Title 77 of the Revised Code of Washington (RCW) and Title 220 of the Washington Administrative Code. State and protected species regulations are defined in WAC 220-610, which includes provisions for endangered, threatened, and sensitive wildlife species, ESA-listed fish, and bald eagle protection rules. Fish and aquatic habitats are protected under RCW 77.55, commonly referred to as the Hydraulic Code. Any environmental impacts that could occur in waters of the state below the OHWM would need to be addressed in a Hydraulic Project Approval process. Sections 3.4.3, 3.4.4, and 3.4.5 evaluate the potential for construction and operation impacts on habitats, fish, and wildlife. No significant impacts would occur from the proposed Columbia Solar Projects, therefore this project would comply with state habitat, fish, and wildlife guidelines.

Washington's *State Wildlife Action Plan* (SWAP) is a comprehensive plan for conserving the state's fish and wildlife and their habitats (WDFW 2015). The purposes of the SWAP are to inform conservation priorities and to guide conservation actions statewide.

(5) Federal approvals. The application shall list any federal approvals required for habitat, vegetation, fish and wildlife impacts and mitigation, status of such approvals, and federal agency contacts responsible for review.

Section 7 of the ESA requires an analysis of the effects of major construction projects on any federally listed or proposed threatened or endangered species that may use the Columbia Solar Project sites, if there is a federal nexus. Consultation with the USFWS and National Oceanic and Atmospheric Administration (NOAA) NMFS is necessary if any threatened or endangered species would be affected by a project. Applicable regulations are found in 50 CFR 17. In cases where a project does not require the approval, funding, or conduct of a federal agency, Section 10 of the ESA provides a parallel process whereby non-federal entities may consult with the USFWS or NMFS and acquire a take statement for incidental adverse effects or take of listed species by the project. Because the project does not have a federal nexus and also would not affect any federally-listed threatened or endangered species, ESA Section 7 and Section 10 consultation were not conducted for the proposed solar projects.

The MBTA (16 USC 703–711) prohibits the taking, killing, or possession of migratory birds, except as allowed by the Secretary of the Interior. The list of migratory birds is found in 50 CFR 10, and permit regulations are found in 50 CFR 21.

The federal BGEPA (16 CFR 668-668c) prohibits the taking, possession, purchase, sale, barter, transport, export, or import of any bald or golden eagle or any part, nest, or egg of a bald or golden eagle, except for certain scientific, exhibition, and religious purposes. Eagle permit regulations are found in 50 CFR 22.

3.5 Wetlands 463-60-333

The application shall include a report for wetlands prepared by a qualified professional wetland scientist. For purposes of this section, the term "project site" refers to the site for which site certification is being requested, and the location of any associated facilities or their right of way corridors if applicable. The report shall include, but not be limited to, the following information:

(1) Assessment of existing wetlands present and their quality. The assessment of the presence and quality of existing wetlands shall include:

(a) A wetland delineation performed by a qualified professional according to the Washington State Wetlands Delineation and Identification Manual, 1997, and associated data sheets, site maps with data plots and delineated wetlands areas, photographs, and topographic and aerial site maps.

3.5.1 Affected Environment for Wetland Delineations

3.5.1.1 General County

Wetlands are defined as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. The methods used to delineate wetlands within the Columbia Solar Project sites conform to guidance in the *Washington State Wetland Identification and Delineation Manual* (Ecology 1997), the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008).

To be considered a wetland by the USACE, an area must express hydrophytic vegetation, hydric soils, and wetland hydrology. During the five Columbia Solar Project site surveys conducted from April 3 through 12, 2017, site conditions were documented for these parameters in areas representative of each project site and in areas most likely to exhibit wetland features. Staff collected additional data in associated uplands, as needed, to confirm wetland boundaries. Wetland boundaries, stream boundaries, and wetland data plot locations within each of the five project sites were recorded with a Trimble Geo XT GPS unit with submeter accuracy. All delineated wetlands and streams were processed and projected onto existing base maps using ArcGIS software.

A total of 16 wetlands were delineated within the Columbia Solar Project sites, one on the Camas Solar Project site, six on the Fumaria Solar Project site (one on the solar project site and five along the generation tie line), one on the Penstemon Solar Project site, five on the Typha Solar Project site (three only on the solar project site, one only on the generation tie line, and one on both), and three on the Urtica Solar Project site. Wetlands were distinguished from adjoining uplands by the presence or absence of indicators for wetland hydrology, hydric soils, and hydrophytic vegetation.

All of the wetlands within the five Columbia Solar Project sites are classified as either Palustrine Emergent (PEM) or Palustrine Scrub-shrub (PSS) wetlands based on the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). The Palustrine system includes all non-tidal wetlands dominated by trees, shrubs, persistent emergent species, and/or emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand (Cowardin et al. 1979). The following two sub-classes occur within the five project sites: 1) Emergent wetlands, which are dominated by species that normally remain standing at least until the beginning of the next growing season and 2) Scrub-shrub wetlands, which are dominated by woody vegetation less than 6 meters tall, which includes true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions (Cowardin et al. 1979).

In addition, wetlands within the five Columbia Solar Project sites were classified as either Riverine, Slope, or Depressional based on *Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service* (NRCS 2008). Definitions for these classifications can be found in Section 3.5.2.

Table 3.5-1 summarizes the size, rating, and classification of wetlands found within each of five Columbia Solar Project sites. All delineated wetlands would fall under the jurisdiction of the USACE, Ecology, and Kittitas County. Detailed descriptions of each wetland within the solar project sites are provided in the Critical Areas Wetland and Waters Delineation Reports for each site, which also include a list of vegetation observed within each project site, wetland delineation data sheets, ground-level site photographs, and wetland rating forms.

Table 3.5-1. Wetland Size, Rating, and Classification for Wetlands within the Study Areas for Each Columbia Solar Project Site

Wetland Name	Delineated Area within the Project (Wetland Rating Unit Size)[1] (acres)	Wetland Rating[2]	Hydrogeomorphic Classification[3]	Cowardin Classification[4]	Dominant Species Observed within Wetland
Camas Solar Project Site					
CW01	0.97 (1.72)	III	Riverine	PEM	Reed canary grass, broad-leaf cat-tail, pale-yellow iris
Fumaria Solar Project Site					
FW01	0.00 (estimated 5.57)	III	Slope	PEM	Reed canary grass, Fuller's teasel, sedge species
Fumaria Solar Project Generation Tie Line					
FW02	0.24 (estimated 2.15)	II	Riverine	PEM	Creeping wild rye, dock-leaf smartweed, yellow nutsedge, curly dock
FW03	0.03 (estimated 0.58)	III	Depressional	PEM	Reed canary grass, broad-leaf cat-tail
FW04	0.03 (estimated 0.23)	III	Riverine	PEM/PSS	Reed canary grass, broad-leaf cat-tail, crack willow
FW05	0.20 (estimated 1.67)	IV	Riverine	PEM	Reed canary grass
FW06	0.005 (0.005)	IV	Depressional	PEM	Broad-leaf cat-tail
Penstemon Solar Project Site					
PW01	0.00 (0.14)	III	Depressional	PEM	Remnant cattail along southern property boundary
Typha Solar Project Site					
TW01	0.07 (estimated 0.33)	II	Riverine	PEM/PSS	Narrow-leaf willow, Nootka rose, red osier dogwood, common panic grass, hairy cat's-ear
TW02	0.42	II	Riverine	PEM	Baltic rush, tall fescue, common

Wetland Name	Delineated Area within the Project (Wetland Rating Unit Size)[1] (acres)	Wetland Rating[2]	Hydrogeomorphic Classification[3]	Cowardin Classification[4]	Dominant Species Observed within Wetland
	(estimated 0.68)				timothy, reed canary grass, Fuller's teasel
TW03	0.80 (estimated 8.45)	II	Riverine	PEM/PSS	Reed canary grass, common duckweed, Rocky Mountain iris, bluegrass
TW04	0.05 (0.05)	III	Depressional	PEM	Broad-leaf cat-tail, reed canary grass, tall fescue
Typha Solar Project Generation Tie Line					
TW03	0.06 (estimated 8.45)	II	Riverine	PEM/PSS	Reed canary grass, common duckweed, Rocky Mountain iris, and bluegrass
TW05	0.03 (estimated 0.47)	III	Riverine	PEM	Broad-leaf cat-tail, reed canary grass, Baltic rush
Urtica Solar Project Site					
UW01	0.05 (0.05)	III	Depressional	PEM	Reed canary grass, broad-leaf cat-tail, common duckweed
UW02	0.13 (0.97)	III	Depressional	PEM	Reed canary grass, curly dock, lamp rush, broad-leaf cat-tail
UW03	0.01 (1.19)	III	Depressional	PEM	Reed canary grass, broad-leaf cat-tail, colonial bent grass, curly dock, lamp rush

1. Wetland rating unit size is the total area of wetland delineated or estimated based on aerial photograph interpretation and field reconnaissance. Area of delineated portions of the wetlands is based on SWCA survey data.
2. Wetland ratings are based on Hruby (2014).
3. NRCS (2008).
4. Cowardin et al. (1979).

3.5.1.2 Solar Project Sites

See Figures 3.5-1 through 3.5-15 for the locations of delineated wetland and water features and data plots throughout each of the five Columbia Solar Project sites.

(b) A description of wetland categories found on the site according to the Washington state wetland rating system found in Western Washington, Ecology Publication #93-74 and Eastern Washington, Ecology Publication 391-58, or as revised by the department of ecology.

3.5.2 Affected Environment for Wetland Categories

3.5.2.1 General County

Wetlands within each of the five Columbia Solar Project sites were rated using the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014). Table 3.5-2 defines criteria for each wetland rating category.

Table 3.5-2. Washington State Department of Ecology Wetland Rating System Categories

Category I	Category II	Category III	Category IV
Category I wetlands: Represent a unique or rare wetland type; are more sensitive to disturbance than most wetlands; are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or provide a high level of functions. Specific wetlands that meet the Category I criteria include: 1. alkali wetlands, characterized by the presence of shallow saline water with a high pH; 2. natural heritage wetlands, specifically, wetlands identified by the Washington Natural Heritage Program/DNR as high quality relatively undisturbed wetlands; and wetlands that support state-listed threatened or endangered plants; 3. bogs and calcareous fens; 4. mature and old-growth forested wetlands with slow growing trees that are over 0.25 acre in size; and 5. wetlands that perform many functions very well, as indicated by a score of 22 or more points out of 27 on the wetland rating form.	Category II wetlands: Wetlands that are difficult, though not impossible, to replace, and provide high levels of some functions. Specific wetlands that meet the Category II criteria include: 1. forested wetlands in the floodplains of rivers; 2. mature and old-growth forested wetlands with fast growing trees that are over 0.25 acre in size; 3. vernal pool that are located in a landscape with other wetlands and that are relatively undisturbed during the early spring; and 4. wetlands scoring between 19 and 21 points, out of 27, on the wetland rating form.	Category III wetlands: Wetlands that provide a moderate level of functions. Specific wetlands that meet the Category III criteria include: 1. wetlands scoring between 16 and 18 points, out of 27, on the wetland rating form.	Category IV wetlands: Wetlands that have the lowest levels of functions and are heavily disturbed. Specific wetlands that meet the Category IV criteria include: 1. wetlands scoring less than 16 points out of 27 on the wetland rating form.

Source: Hruby (2014).

A total of 16 wetlands were delineated within the Columbia Solar Project sites and rated using field observations and desktop analysis to determine the wetland rating category for each wetland area. Refer to Table 3.5-3 for the wetland rating categories, minimum wetland protection buffers (according to guidance in KCC 17A.04.020, and total size for wetlands within each of the solar project sites.

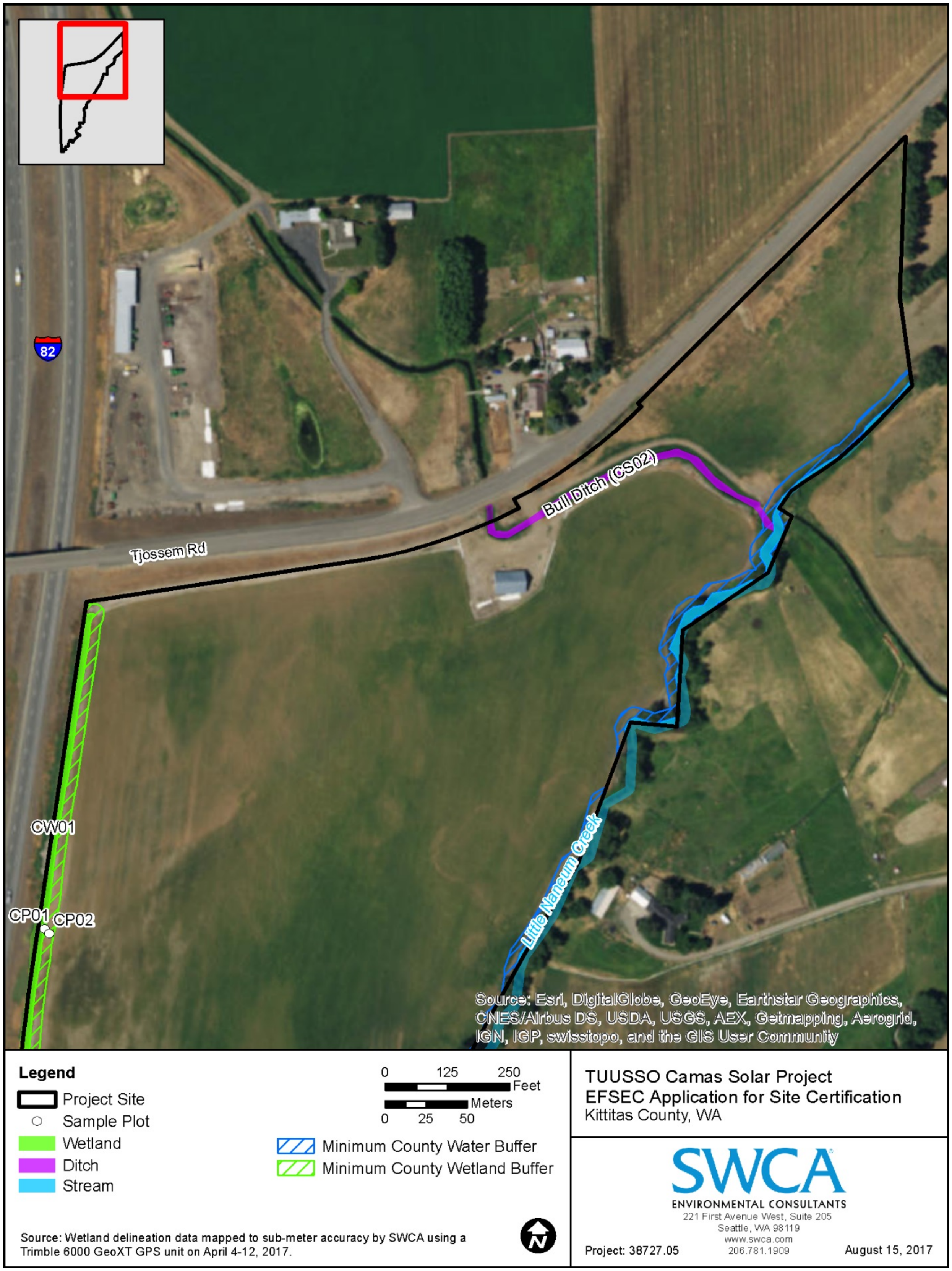


Figure 3.5-1. Camas Solar Project site map showing water resources, north portion.

Figure 3.5-2. Camas Solar Project site map showing water resources, south portion.

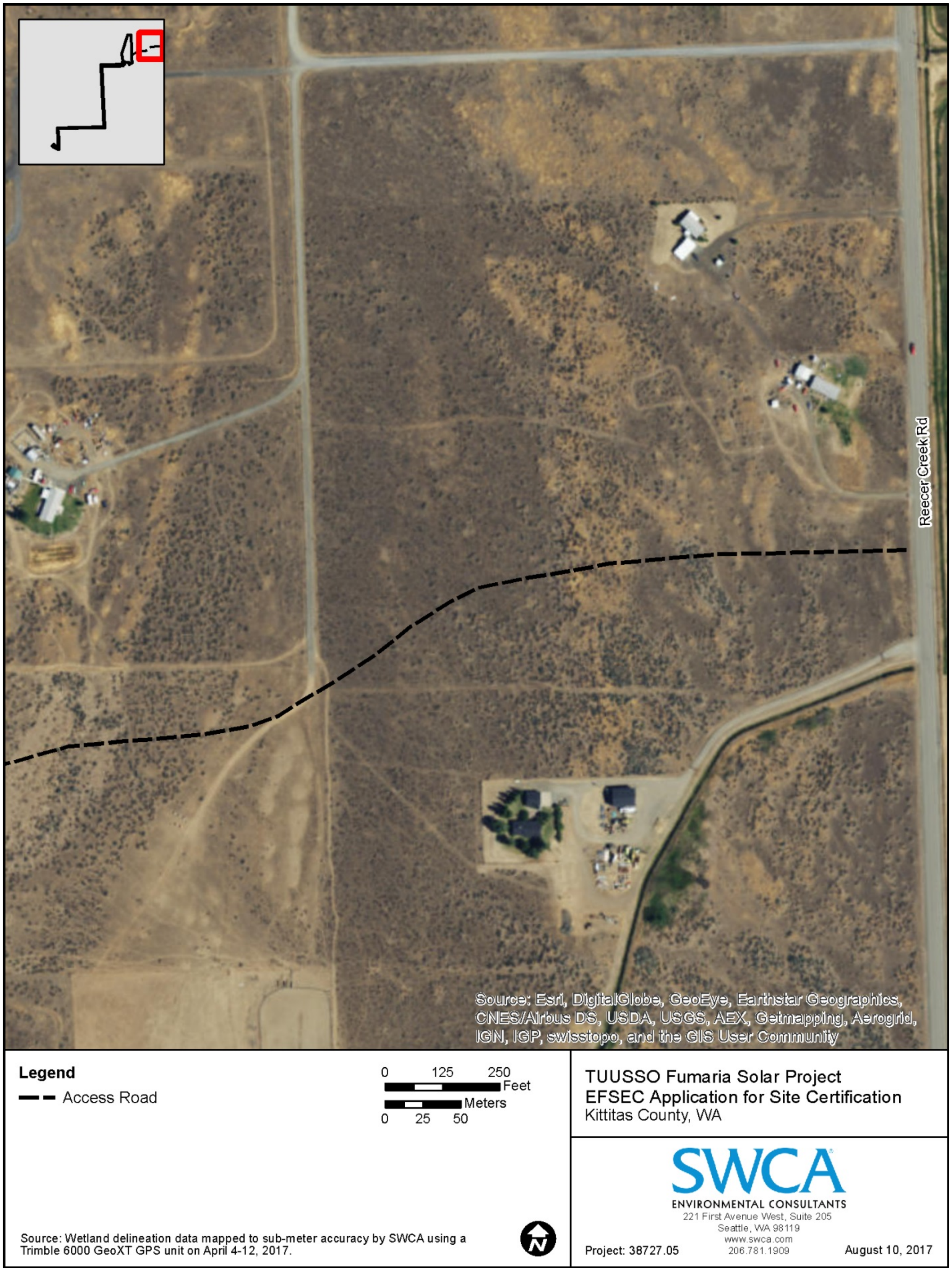


Figure 3.5-3. Fumaria Solar Project site map showing water resources, Map 1 of 8.

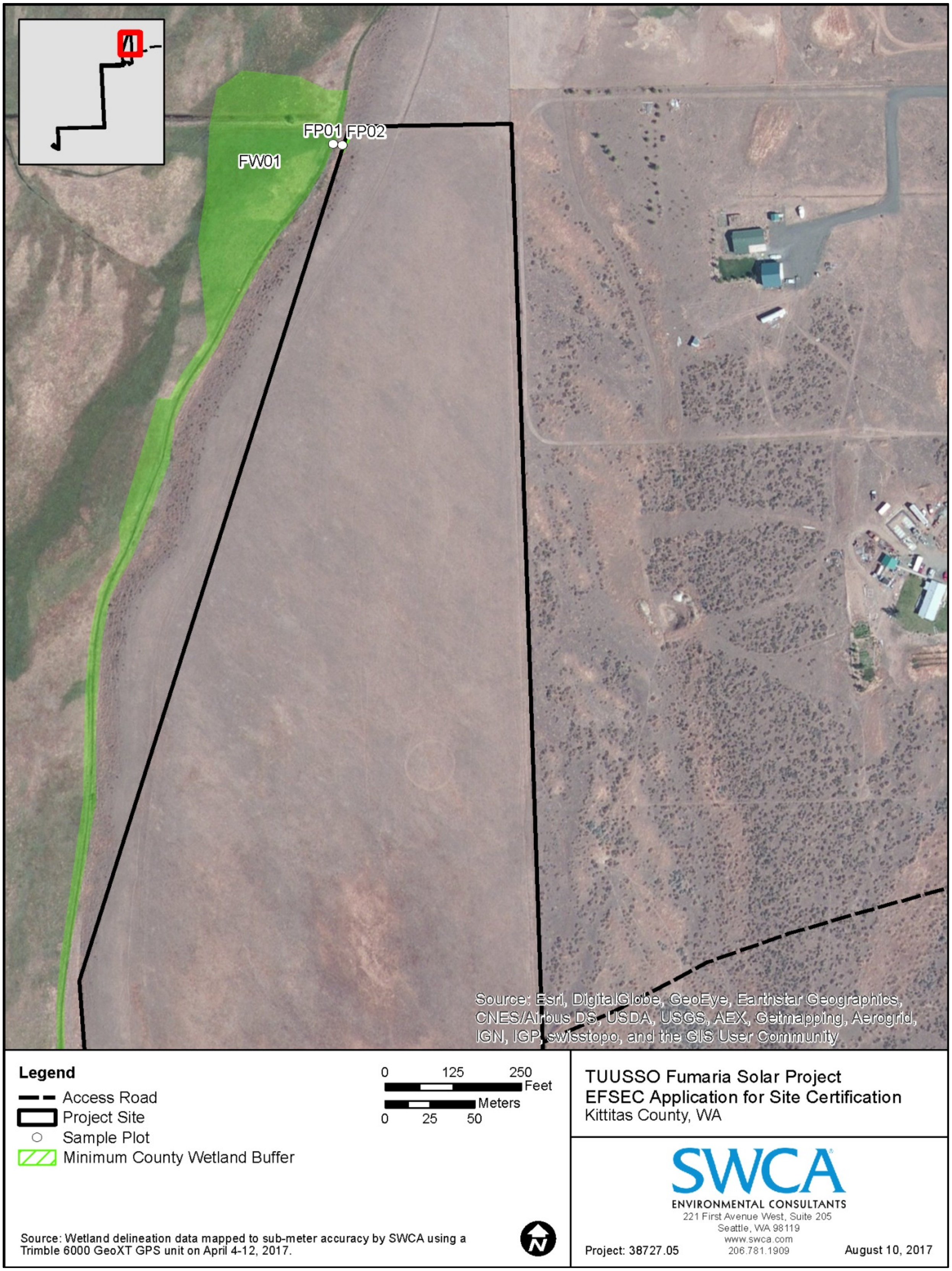


Figure 3.5-4. Fumaria Solar Project site map showing water resources, Map 2 of 8.

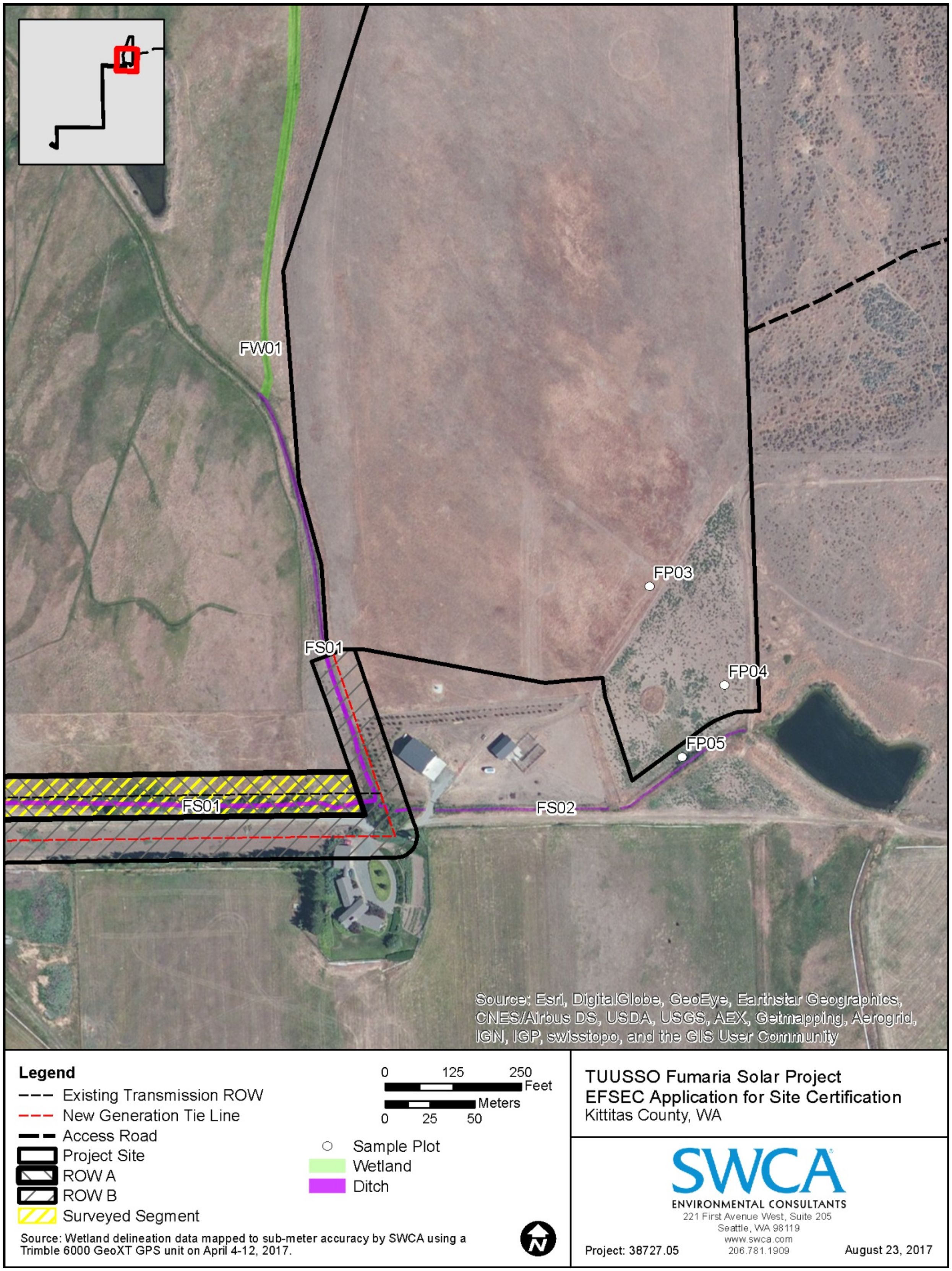


Figure 3.5-5. Fumaria Solar Project site map showing water resources, Map 3 of 8.

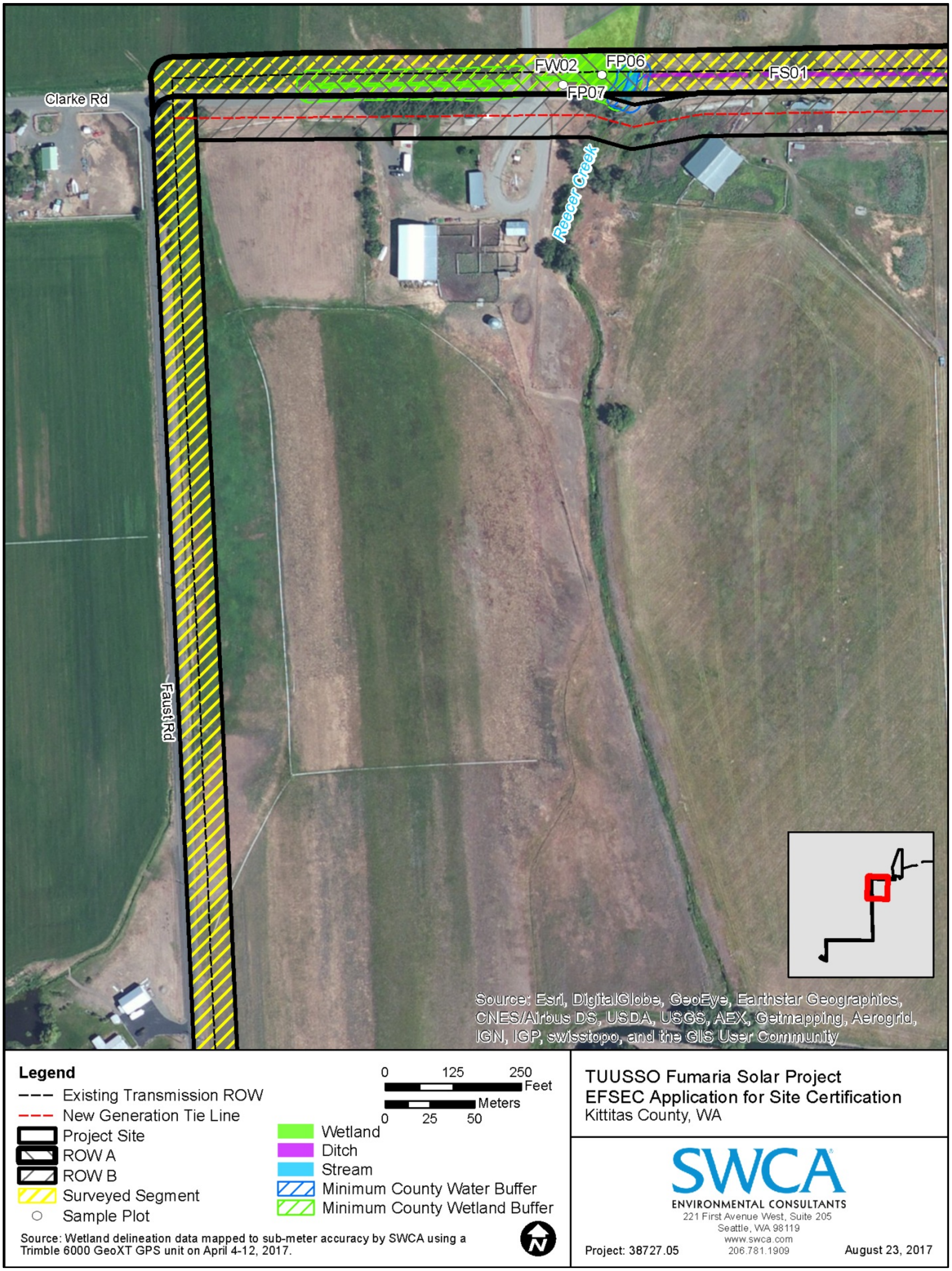


Figure 3.5-6. Fumaria Solar Project site map showing water resources, Map 4 of 8.

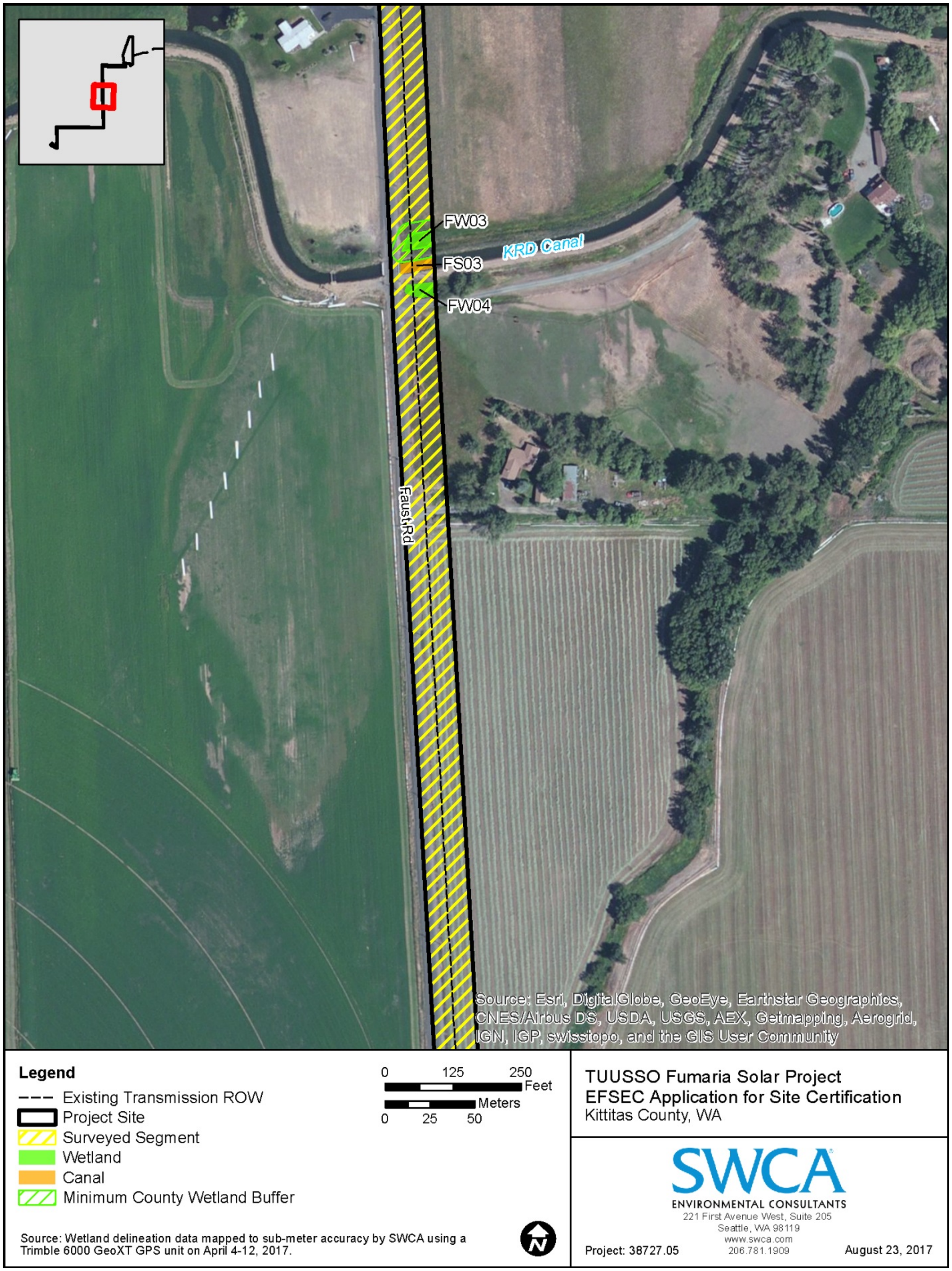


Figure 3.5-7. Fumaria Solar Project site map showing water resources, Map 5 of 8.

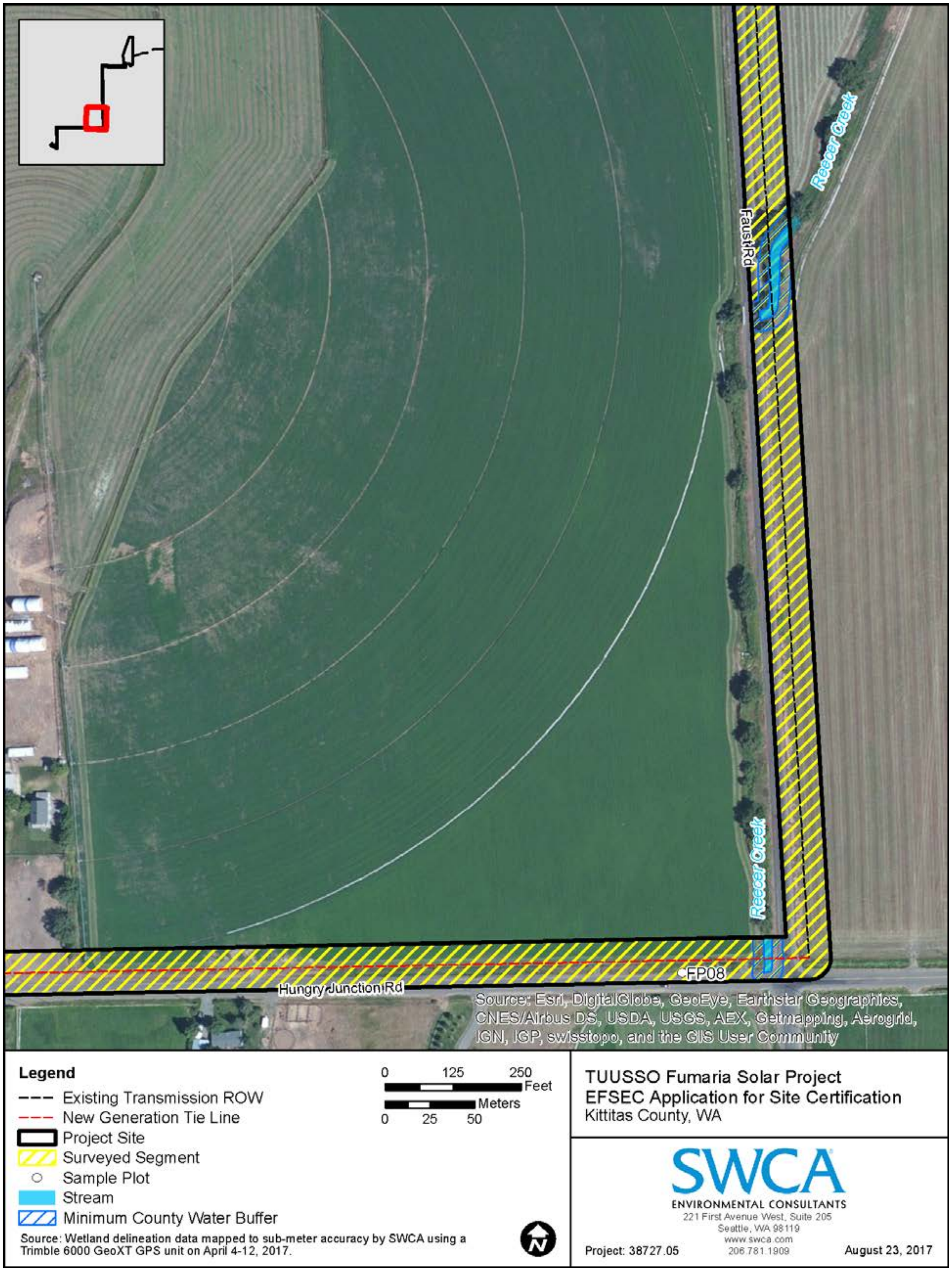


Figure 3.5-8. Fumaria Solar Project site map showing water resources, Map 6 of 8.

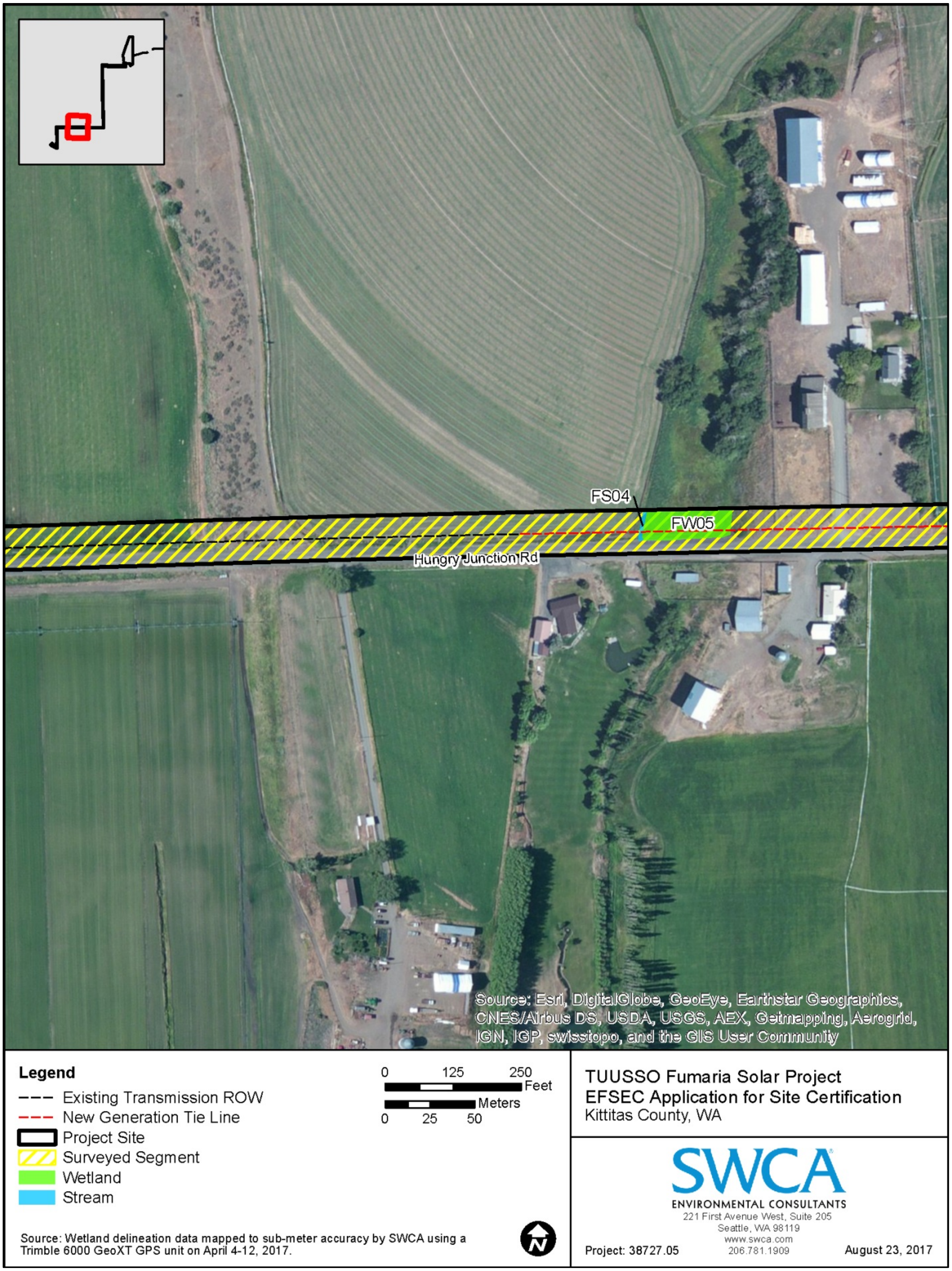


Figure 3.5-9. Fumaria Solar Project site map showing water resources, Map 7 of 8.

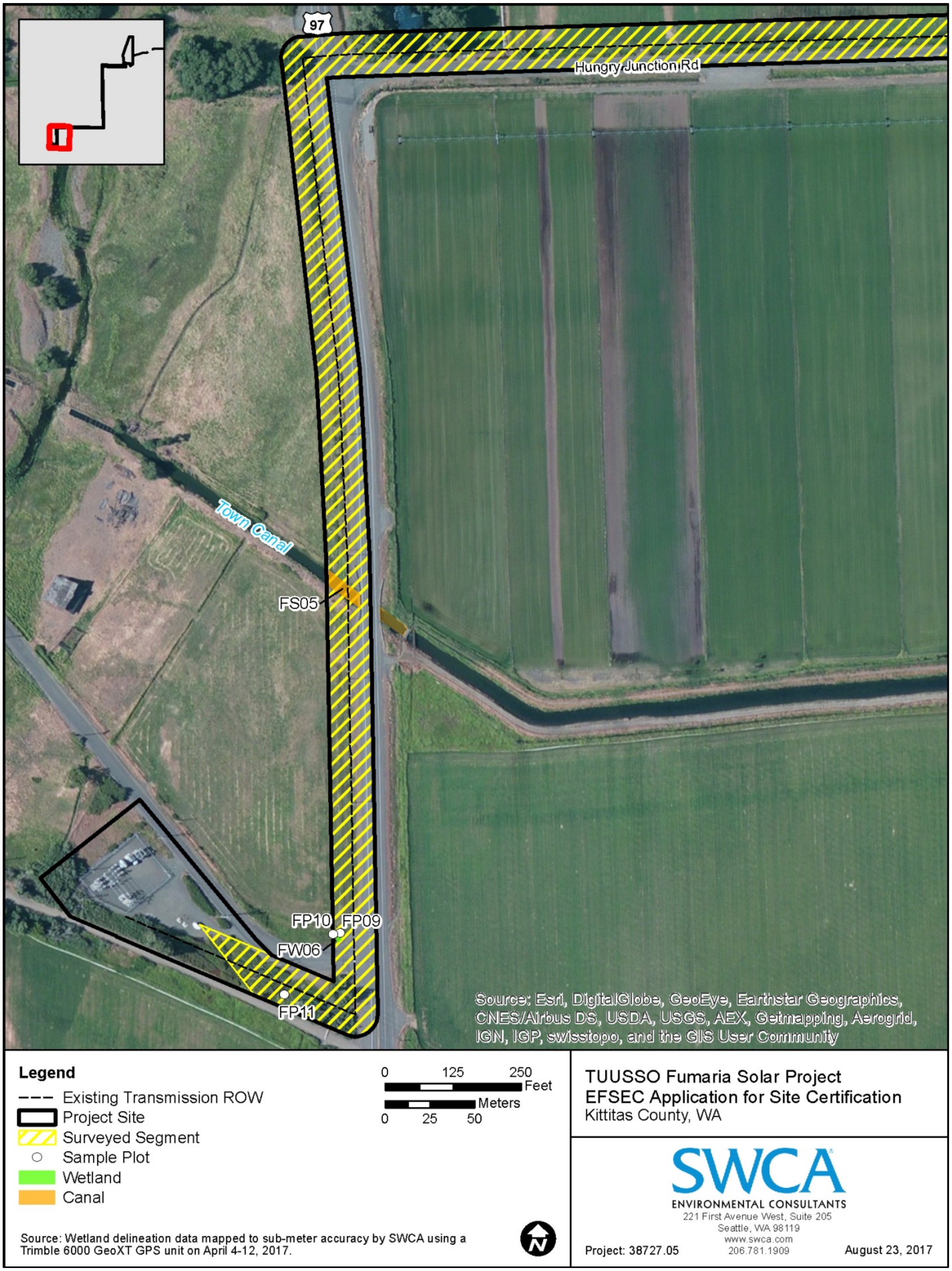


Figure 3.5-10. Fumaria Solar Project site map showing water resources, Map 8 of 8.

Figure 3.5-11. Penstemon Solar Project site map showing water resources.

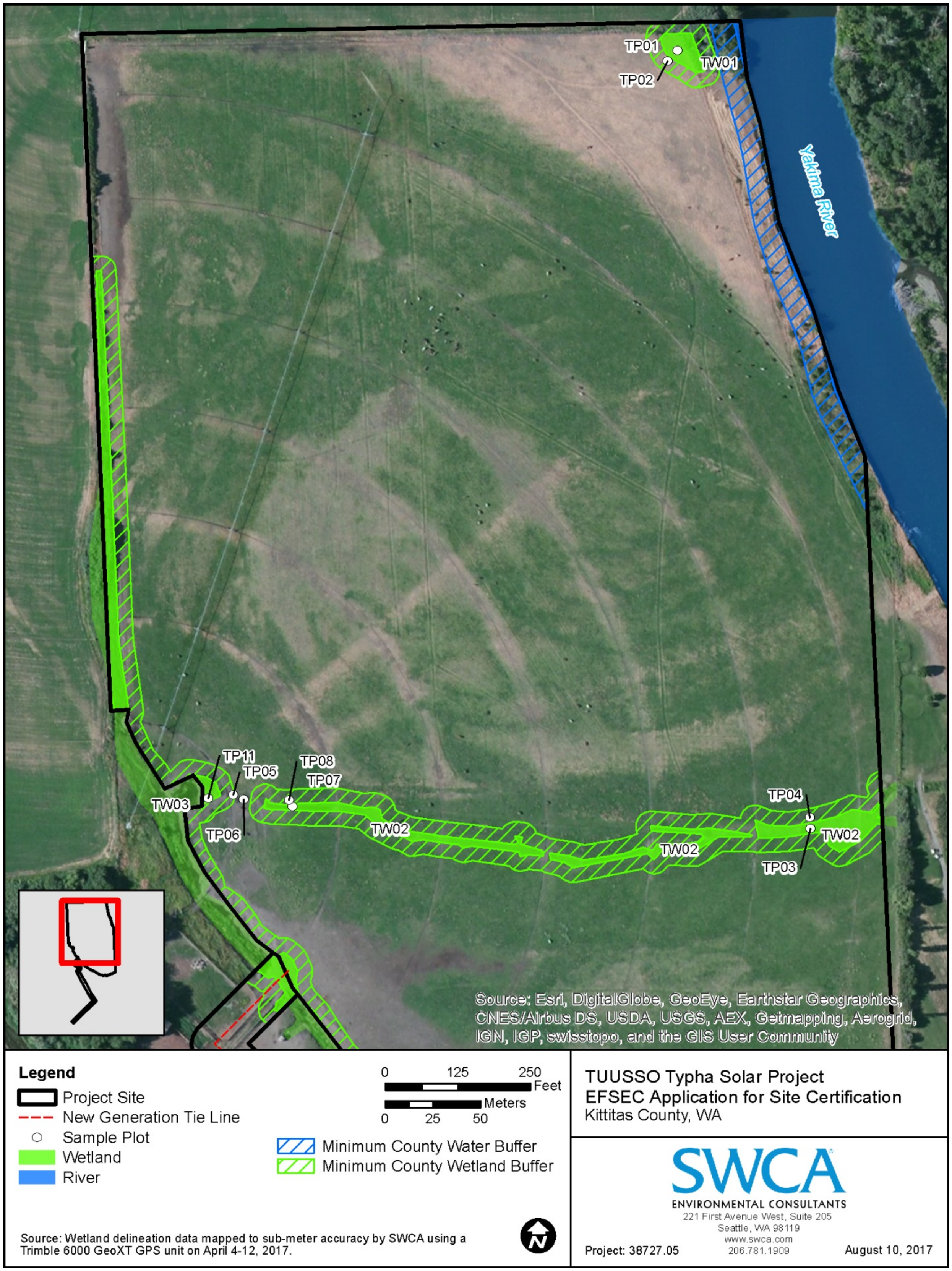


Figure 3.5-12. Typha Solar Project site map showing water resources, north portion.

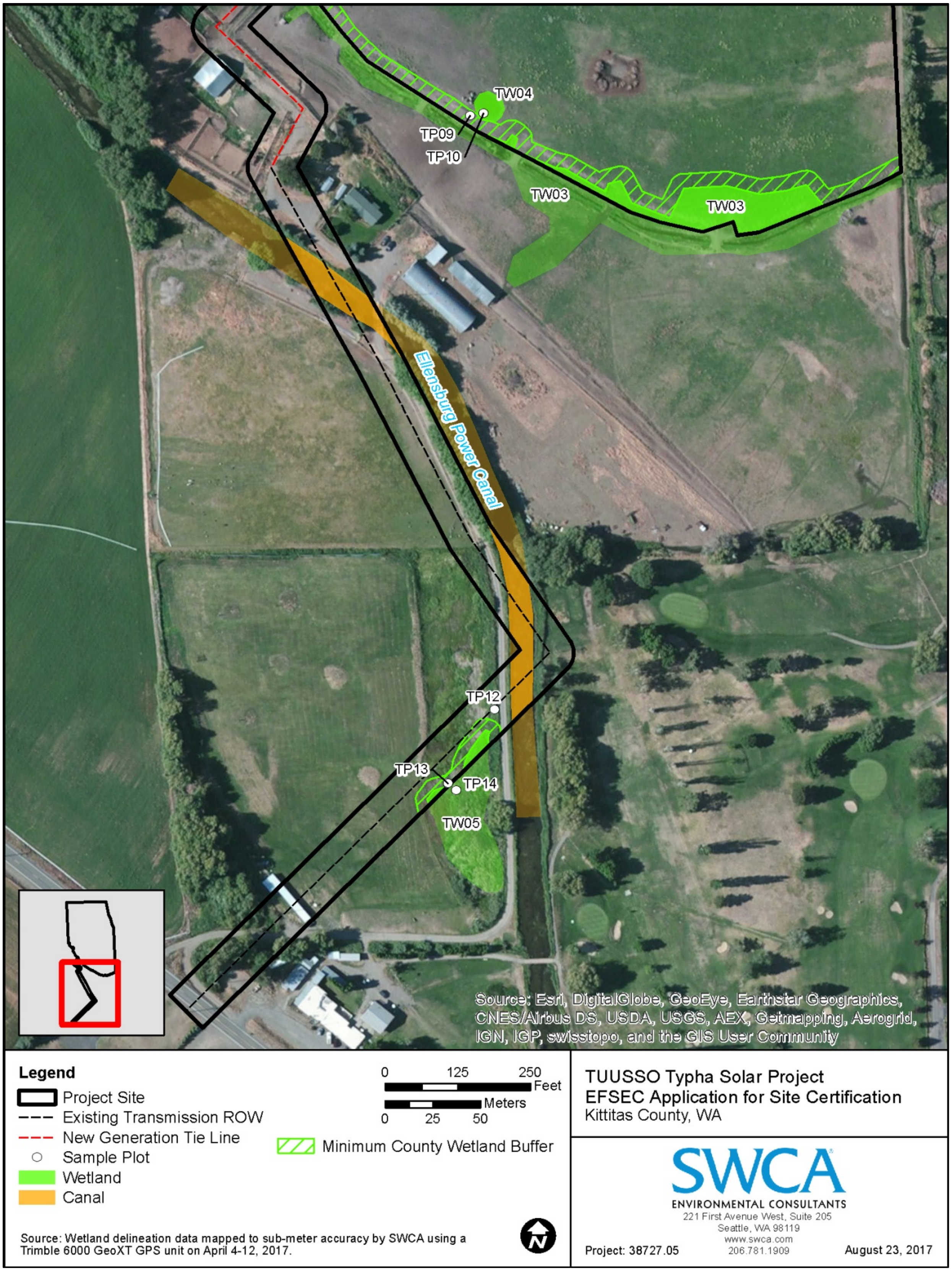


Figure 3.5-13. Typha Solar Project site map showing water resources, south portion.

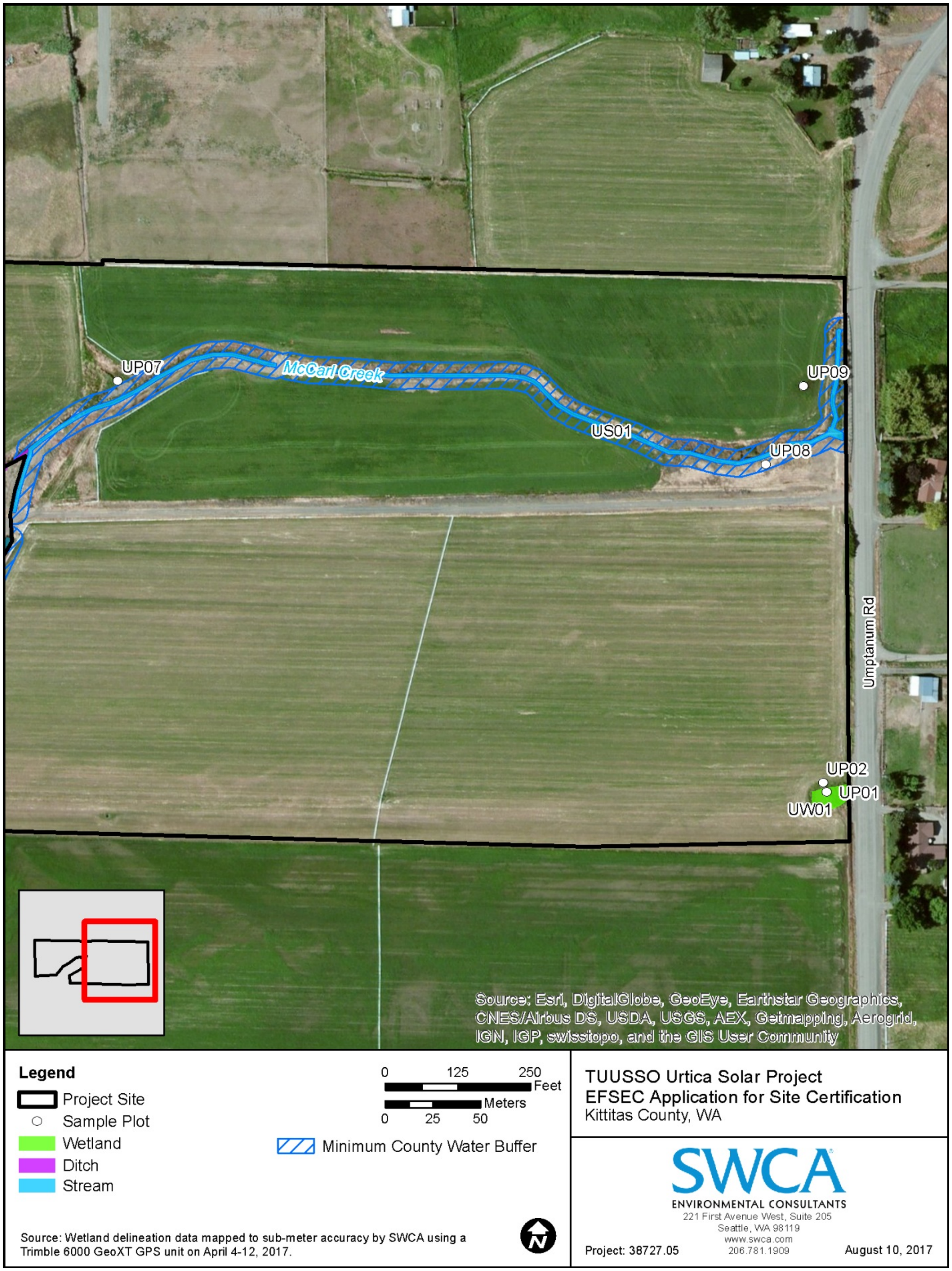


Figure 3.5-14. Urtica Solar Project site map showing water resources, east portion.

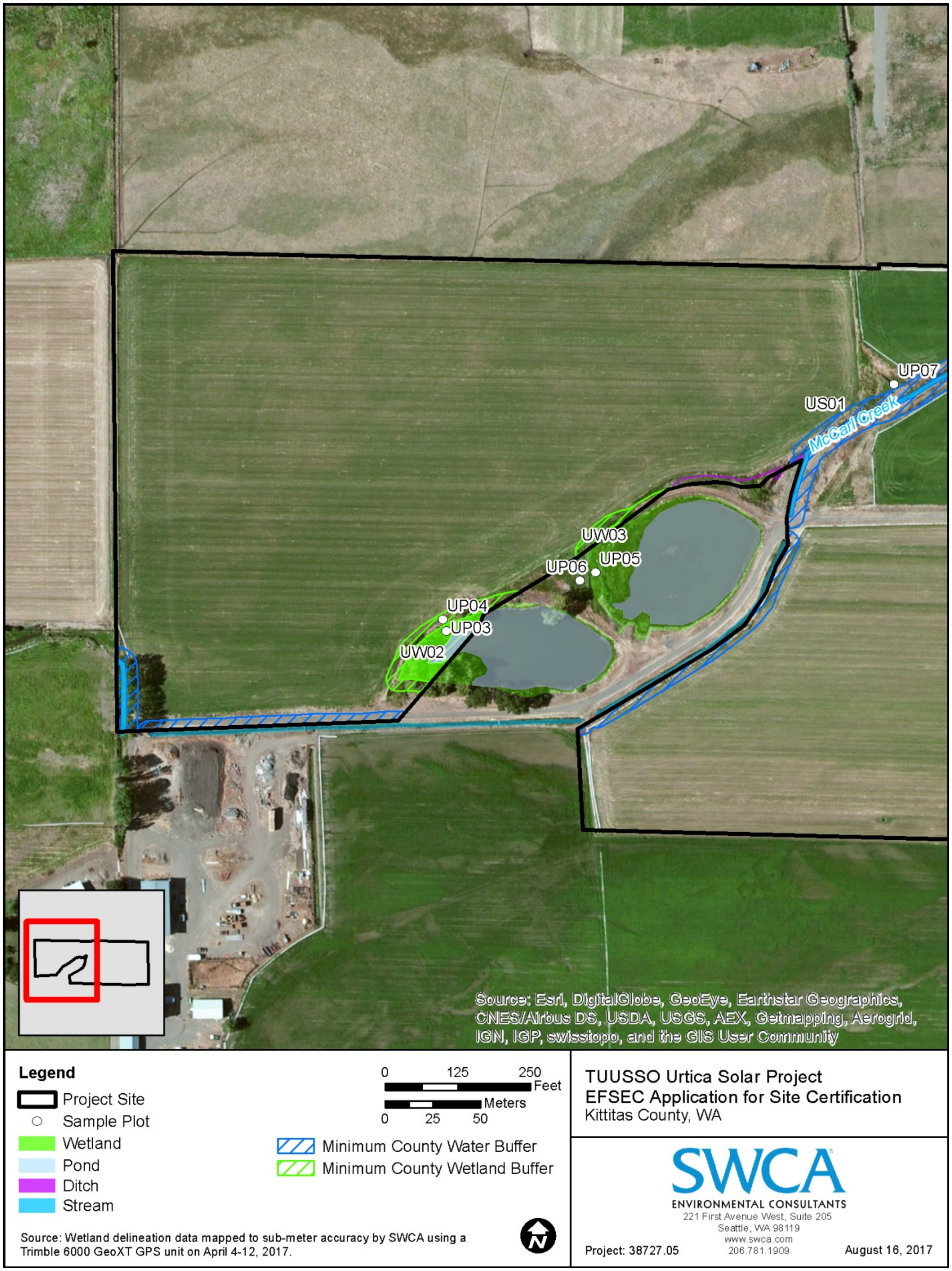


Figure 3.5-15. Urtica Solar Project site map showing water resources, west portion.

Table 3.5-3. Wetland Rating and Minimum Buffer Distance Summary for each Columbia Solar Project Site

Wetlands	Wetland Rating[1]	Kittitas County Minimum Buffer Distance (feet)[2]	Total Size of Wetland Within the Project (acres)[3]
Camas Solar Project Site			
CW01	III	20	0.97
Fumaria Solar Project Site			
FW01	III	20	0.00
Fumaria Solar Project Generation Tie Line			
FW02	II	25	0.24
FW03	III	20	0.03
FW04	III	0[4]	0.03
FW05	IV	0[4]	0.20
FW06	IV	0[4]	0.005
Penstemon Solar Project Site			
PW01	III	0[4]	0.00
Typha Solar Project Site			
TW01	II	25	0.07
TW02	II	25	0.42
TW03	II	25	0.80
TW04	III	0[4]	0.05
Typha Solar Project Generation Tie Line			
TW03	II	25	0.06
TW05	III	20	0.03
Urtica Solar Project Site			
UW01	III	0[4]	0.05
UW02	III	20	0.13
UW03	III	20	0.01

1. II = Category II, III = Category III, IV = Category IV (Hruby 2014).
2. Minimum buffer distances are depicted on maps.
3. Does not include buffer areas.
4. No Kittitas County buffer is defined because the wetland area is below the minimum size threshold for protection or is rated as a Category IV; however, building setbacks may be required based on zoning lot line setbacks, but would not exceed 25 feet.

3.5.2.2 Solar Project Sites

Detailed descriptions of each wetland within the Columbia Solar Project sites and their wetland rating forms are provided in the Critical Areas Wetland and Waters Delineation Reports for each site. Below are descriptions of the wetland rating for wetlands within each solar project site.

Camas Solar Project Site

CW01

Camas Wetland CW01 is rated as a Category III wetland in the Ecology rating system (see Figures 3.5-1 and 3.5-2), with a moderately low score for water quality improvement (5/9 points) and moderate scores for hydrologic function and habitat function (6/9 points). Wetland CW01 has moderate potential to provide water quality function and hydrologic function because it has ungrazed herbaceous vegetation, has a floodplain wider than its channel, is located in an area with intensive land use that generates pollutants, and discharges to a fork of Naneum Creek with water quality and flooding issues. Wetland CW01 has moderate potential to provide habitat function because it contains some vegetation structure diversity and open water, and is adjacent to three priority habitats including biodiversity areas and corridors, riparian, and instream habitat in Little Naneum Creek.

Fumaria Solar Project Site

FW01

Fumaria Wetland FW01 is rated as a Category III wetland in the Ecology rating system (see Figures 3.5-4 and 3.4-5), with moderately low scores for water quality improvement (5/9 points) and habitat function (5/9 points), and a moderate score for hydrologic function (6/9 points). Wetland FW01 has low potential to provide water quality improvement because slope wetlands do not retain water or excess nutrients. Wetland FW01 has moderate hydrologic function because the surrounding landscape is pasture land and is situated in the Reecer Creek basin where flooding problems occur.

Fumaria Solar Project Generation Tie Line

FW02

Fumaria Wetland FW02 is rated as a Category II wetland in the Ecology rating system (see Figure 3.5-6), with a moderate score for water quality improvement (6/9 points), a high score for hydrologic function (8/9 points), and a moderately low score for habitat function (5/9 points). Wetland FW02 has a moderately high potential to provide hydrologic functions because it is more than twice the width of the adjacent Reecer Creek channel and it has the potential to slow down water movement to help reduce flooding issues directly downstream in Reecer Creek.

FW03

Fumaria Wetland FW03 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-7), with a moderately high score for water quality improvement (7/9 points) and moderately low scores for hydrologic and habitat functions (5/9 points). Wetland FW03 has a moderately high potential to provide water quality improvements because it is dominated by ungrazed vegetation, has seasonal ponding over half of the wetland area, and is located in a basin where there are total maximum daily loads (TMDLs) defined (Cascade Irrigation District Canal).

FW04

Fumaria Wetland FW04 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-7), with moderately high scores for water quality improvement and hydrologic function (7/9 points) and a low score for habitat function (4/9 points). Wetland FW04 has moderately high potential to provide water quality improvement and hydrologic function because the majority of it is a depression, all of it is ungrazed, there are TMDLs defined in the same basin (Cascade Irrigation District Canal), the ratio of the wetland width to the adjacent channel width is greater than one, and there are flooding problems in the basin immediately down-gradient (Reecer Creek).

FW05

Fumaria Wetland FW05 is rated as a Category IV wetland in the Ecology rating system (see Figure 3.5-9), with a moderately high score for hydrologic function (7/9 points) and low scores for water quality improvement and habitat function (4/9 points). Wetland FW05 has a moderately high potential to provide hydrologic functions because it has a width greater than two times the width of the stream channel, ungrazed vegetation dominates the wetland, and there are flooding problems down-gradient of the wetland (Yakima River).

FW06

Fumaria Wetland FW06 is rated as a Category IV wetland in the Ecology rating system (see Figure 3.5-10), with a moderately high score for water quality improvement (7/9 points), low score for hydrologic function (4/9 points), and a very low score for habitat function (3/9 points). Wetland FW06 has a moderately high potential to provide water quality improvements because it is dominated by ungrazed vegetation, has a relatively constrained outlet, and eventually discharges into a stream on the Clean Water Act (CWA) 303(d) List that also has defined TMDLs (Dry Creek).

Penstemon Solar Project Site

PW01

Penstemon Wetland PW01 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-11), with moderate scores for hydrologic function and water quality improvement (6/9 points) and a moderately low score for habitat function (5/9 points). Wetland PW01 has a moderate potential to provide water quality function and hydrologic function because it has an intermittently flowing surface water outlet, it is located in an area with intensive land use that generates pollutants, and it discharges to Coleman Creek, which has water quality and flooding issues.

Typha Solar Project Site

TW01

Typha Wetland TW01 is rated as a Category II wetland in the Ecology rating system (see Figure 3.5-12), with a moderately high score for water quality improvement (7/9 points) and moderate scores for hydrologic function (6/9 points) and habitat function (5/9 points). Wetland TW01 has moderately high potential to provide water quality improvements because of its position within the Yakima River floodplain, which is a CWA 303(d) listed water, has TMDL limits, and has flooding problems within its watershed.

TW02

Typha Wetland TW02 is rated as a Category II wetland in the Ecology rating system (see Figure 3.5-12), with a moderately high score for hydrologic function (7/9 points) and moderate scores for habitat function (6/9 points) and water quality improvement (6/9 points). Wetland TW02 has moderately high potential to provide hydrologic functions because of its potential to slow down water movement and help reduce flooding issues directly downstream in the Yakima River.

TW03

Typha Wetland TW03 is rated as a Category II wetland in the Ecology rating system (see Figures 3.5-12 and 3.5-13), with a high score for hydrologic function (8/9 points) and moderate scores for habitat function (6/9 points) and water quality improvement (6/9 points). Wetland TW03 has high potential to provide hydrologic functions because of its large wetland to channel width ratio and its potential to help reduce flooding issues directly downstream in the Yakima River.

TW04

Typha Wetland TW04 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-13), with moderate scores for water quality improvement (6/9 points), hydrologic function (6/9 points), and habitat function (6/9 points). Wetland TW04 has moderate potential to provide water quality improvement and hydrologic function because of its lack of a surface water outlet, and it provides moderate habitat function because it provides amphibian egg laying habitat, as positively observed in the field.

Typha Solar Project Generation Tie Line

TW03

See the description of wetland TW03 under Typha Solar Project site, above.

TW05

Typha Wetland TW05 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-13), with a moderately high score for hydrologic function (7/9 points), a moderately low score for water quality improvement (5/9 points), and a low score for habitat function (4/9 points). Wetland TW05 has moderately high potential to provide hydrologic functions because of its potential to store floodwaters and help reduce flooding issues directly downstream in the Yakima River, and it has a low score for habitat function because it does not provide adequate habitat structure and is isolated from habitat in the surrounding area.

Urtica Solar Project Site

UW01

Urtica Wetland UW01 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-14), with a moderately high score for hydrologic function (8/9 points), a moderate score for water quality improvement (6/9 points), and a low score for habitat function (4/9 points). Wetland UW01 has a moderately high potential to provide hydrologic function because it does not have a surface water outlet, has high storage during seasonal ponding, and receives stormwater from the adjacent roadside ditch.

UW02

Urtica Wetland UW02 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-15), with a moderately high score for hydrologic function (7/9 points) and moderately low scores for water quality improvement and habitat function (5/9 points). Wetland UW02 has a moderately high potential to provide hydrologic functions because of its high storage during seasonal ponding and highly constricted outlet feeding into the eastern pond.

UW03

Urtica Wetland UW03 is rated as a Category III wetland in the Ecology rating system (see Figure 3.5-15), with a moderately high score for hydrologic function (7/9 points) and moderately low scores for water quality improvement and habitat function (5/9 points). Wetland UW02 has a moderately high potential to provide hydrologic functions because of its high storage during seasonal ponding and highly constricted outlet feeding into the McCarl Creek.

(c) A discussion of water sources supplying wetlands and documentation of hydrologic regime encountered.

3.5.3 Affected Environment for Water Sources

3.5.3.1 General County

The Columbia Solar Project sites contain wetlands with a variety of water sources and hydrologic drivers. Refer to Table 3.5-1 for the hydrogeomorphic (HGM) classification based on *Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service* (NRCS 2008) for each wetland within the five project sites. The following HGM classifications were identified within the solar project sites:

Riverine

Riverine wetlands occur in valleys and are associated with active floodplains around stream or river channels. Water in these wetlands is surface-water driven and has an active interchange between stream or river systems (Hruby 2014; NRCS 2008). According to the *Washington State Wetland Rating System for Eastern Washington, 2014 Update*, wetlands of this classification are flooded by overbank flow from a stream or river at least once every 10 years (Hruby 2014).

Slope

Slope wetlands occur on hill or valley slopes where there are breaks in the slope that intercept groundwater. Water in these wetlands is groundwater-fed and becomes surface or subsurface water that flows only in one direction without being impounded. These wetlands are not associated with stream flow and lack a defined streambed with banks (Hruby 2014; NRCS 2008).

Depressional

Depressional wetlands include such landforms as kettles, portholes, vernal pools, Carolina bays, and other wetlands in a topographic depression where the elevation of surface within the wetland is lower than in the surrounding landscape. These wetlands can vary greatly but are typically fed by precipitation and overland flow with movement of surface or shallow subsurface water toward the lowest point in the depression. The depression may or may not have an outlet, but, if present, the outlet must not be the lowest point in the wetland to meet the definition of a depressional wetland (Hruby 2014; NRCS 2008).

3.5.3.2 Solar Project Sites

The five Columbia Solar Project sites contain 16 wetlands, which include eight Riverine, one Slope, and seven Depressional HGM classifications. Further details regarding these wetlands and their water sources can be found in the Critical Areas Wetland and Waters Delineation Reports for each project site.

(d) A function assessment report prepared according to the Washington State Wetland Function Assessment Method to assess wetlands functions for those wetland types covered by the method, and including a description of type and degree of wetland functions that are provided.

The Washington State Wetland Function Assessment Method is no longer supported by Ecology (personal communication with Amy Yahnke at Ecology on May 10, 2017) and is not required by the Washington Energy Facility Site Evaluation Council (EFSEC) (personal communication with Stephen Posner at EFSEC on May 17, 2017). The functional assessment of wetlands is now predominantly based on the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014), referenced in Section 3.5.2, which was used to rate wetlands within the five Columbia Solar Project sites. Refer to the Critical Areas Wetland and Waters Delineation Reports for wetland rating forms for each wetland within each project site.

(2) Identification of energy facility impacts. The application shall include a detailed discussion of temporary, permanent, direct and indirect impacts on wetlands, their functions and values, and associated water quality and hydrologic regime during construction, operation and decommissioning of the energy facility. The discussion of impacts shall also include impacts to wetlands due to proposed mitigation measures.

3.5.4 Impacts to Wetlands

3.5.4.1 General County

TUUSSO has made every effort to avoid impacts to wetlands throughout all of the Columbia Solar Project sites, which would be achieved through avoidance measures in project design and utilization of BMPs. Table 3.5-4 shows the project impacts to each of the wetlands delineated within each of the solar project sites. There are minimal proposed impacts to wetlands within the solar project sites.

Table 3.5-4. Proposed Wetland Impact Summary for each Columbia Solar Project Site

Wetlands	Total Size of Wetland Within the Project (acres)[1]	Total Impacts to Wetland Within the Project (acres)
Camas Solar Project Site		
CW01	0.97	0.00
Fumaria Solar Project Site		
FW01	0.00	0.00
Fumaria Solar Project Generation Tie Line		
FW02	0.24	0.00
FW03	0.03	0.00
FW04	0.03	0.00
FW05	0.20	0.00
FW06	0.005	0.00
Penstemon Solar Project Site		
PW01	0.00	0.00
Typha Solar Project Site		
TW01	0.07	0.00
TW02	0.42	0.00
TW03	0.80	0.01
TW04	0.05	0.00
Typha Solar Project Generation Tie Line		
TW03	0.06	0.00
TW05	0.03	0.00
Urtica Solar Project Site		
UW01	0.05	0.00
UW02	0.13	0.00
UW03	0.01	0.00

1. Does not include buffer areas

Solar Project Sites

Camas Solar Project Site

No impacts are proposed to any wetlands within the Camas Solar Project site. All impacts to wetlands would be avoided through project design.

Fumaria Solar Project Site

No impacts are proposed to any wetlands within the Fumaria Solar Project site. All impacts to wetlands would be avoided through project design.

Fumaria Solar Project Generation Tie Line

No impacts are proposed to any wetlands along the Fumaria Solar Project generation tie line. All impacts to wetlands would be avoided through project design.

Penstemon Solar Project Site

No impacts are proposed to any wetlands within the Penstemon Solar Project site. All impacts to wetlands would be avoided through project design.

Typha Solar Project Site

The Typha Solar Project site includes one proposed road crossing of a wetland (see Figure 3.5-12). An internal access road is proposed to enter the site on the southwestern site boundary where there is an existing farm road crossing with a failing culvert. The crossing is periodically flooded by wetland TW03, due to a clogged or crushed culvert that prevents adequate flow-through. This has resulted in wetland characteristics developing on and adjacent to the road crossing. TUUSSO is proposing to create a ford at the crossing by leaving the damaged culvert in place, excavating 8 to 12 inches of topsoil, placing geotextile fabric in the excavated area, and filling the excavation with quarry spalls. This would result in a minimal impact to TW03 of 0.01 acre (630 square feet). A JARPA for this proposed wetland impact has been completed and submitted to the USACE and Ecology for review (see Appendix J-3). Additional coordination with EFSEC, USACE, Ecology, and Kittitas County would occur as needed to address impact mitigation measures.

Typha Solar Project Generation Tie Line

No impacts are proposed to any wetlands along the Typha Solar Project generation tie line. All impacts to wetlands would be avoided through project design.

Urtica Solar Project Site

No impacts are proposed to any wetlands within the Urtica Solar Project site. All impacts to wetlands would be avoided through project design.

(3) Wetlands mitigation plan. The application shall include a detailed discussion of mitigation measures, including avoidance, minimization of impacts, and mitigation through compensation or preservation and restoration of existing wetlands, proposed to compensate for the direct and indirect impacts that have been identified. The mitigation plan shall be prepared consistent with the Department of Ecology Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals, 1994, as revised. The application shall also include, but not be limited to:

(a) A discussion of how standard buffer widths have been incorporated into the mitigation proposal. Variances from standard buffer widths must be supported with professional analyses demonstrating that smaller or averaged buffer widths protect the wetland functions and values based on site-specific characteristics;

3.5.5 Impacts to Wetland Buffers

3.5.5.1 General County

A total of 16 wetlands were delineated within the Columbia Solar Project sites. KCC 17A.04.020 defines minimum wetland protection buffers based on the wetland ratings determined using the *Washington State Wetland Rating System for Eastern Washington, 2014 Update* (Hruby 2014), referenced in Section 3.5.2. TUUSSO utilized avoidance measures during the project design to avoid, reduce, or eliminate impacts to wetlands. A very minor impact to wetlands (0.01 acre or 630 square feet) would be introduced by the proposed Typha Solar Project. Similarly, minor encroachment into the minimum wetland protection buffers would be unavoidable based on the current project designs and would occur over approximately 0.05 acre of the total of 1.52 acres within the project perimeter fencing for all of the solar project sites. Refer to Table 3.5-5 for the minimum wetland protection buffer distances, total area of buffers within the solar project sites, average distance from the edge of the minimum buffer to the nearest project disturbance, total buffer area within the perimeter fencing, and total buffer area encroachment for wetlands within each of the solar project sites. Impacts to wetland protection buffers along the Fumaria and Typha Solar Project generation tie lines would be avoided by utilizing existing power poles and spanning wetlands and their buffers; therefore, those wetlands are excluded from Table 3.5-5.

Table 3.5-5. Wetland Buffers and Project Encroachment within Each Columbia Solar Project Site

Wetland Name	Kittitas County Minimum Buffer Distance (feet) [2]	Total Area of Buffer within Project (acres)	Average Distance from Buffer Edge to Project Disturbance (feet)	Total Buffer within Perimeter Fencing (acres)	Total Buffer Encroachment (acres)
Camas Solar Project Site					
CW01	20	1.15	10	0.02	0.01
Fumaria Solar Project Site					
FW01	20	0.01	4	0.00	0.00
Fumaria Solar Project Generation Tie Line					
FW02	25	0.69	No power poles would be replaced within the wetland protection buffer		
FW03	20	0.08	No power poles would be replaced within the wetland protection buffer		
Penstemon Solar Project Site					
PW01	0 [3]	–	–	–	–
Typha Solar Project Site					
TW01	25	0.17	23	0.00	0.00
TW02	25	1.42	N/A	1.36	<0.01
TW03	25	1.61	70	0.02	0.04
TW04	0 [3]	–	–	–	–

Wetland Name	Kittitas County Minimum Buffer Distance (feet) [2]	Total Area of Buffer within Project (acres)	Average Distance from Buffer Edge to Project Disturbance (feet)	Total Buffer within Perimeter Fencing (acres)	Total Buffer Encroachment (acres)
Typha Solar Project Generation Tie Line					
TW03	25	0.07	No power poles would be replaced within the wetland protection buffer		
TW05	20	0.11	No power poles would be replaced within the wetland protection buffer		
Urtica Solar Project Site					
UW01	0 [3]	–	–	–	–
UW02	20	0.20	15	0.11	<0.01
UW03	20	0.07	10	0.01	<0.01

1. Wetland ratings are based Hruby (2014).
2. Minimum buffer distances are depicted on maps.
3. No Kittitas County buffer is defined because the wetland area is below the minimum size threshold for protection or is rated as a Category IV; however, building setbacks may be required based on zoning lot line setbacks, but would not exceed 25 feet.

Although avoidance and minimization measures were taken to the extent practicable to reduce impacts to wetlands and wetland protection buffers, further coordination and review by Ecology would be necessary to determine if further mitigation would be required for the proposed buffer encroachment. Buffer averaging, as defined in KCC 17A.04.030, was reviewed, but the project's buffer impacts would not meet the criteria that states "that averaging is necessary to avoid an extraordinary hardship to the applicant caused by circumstances peculiar to the property." Therefore, buffer averaging was not used to avoid the negligible proposed buffer impacts.

See Figures 3.5-1 through 3.5-15 for the locations of delineated wetlands and their buffers for each of the five Columbia Solar Project sites. See Appendix L for site plans for each of the Columbia Solar Project sites.

3.5.5.2 Solar Project Sites

Camas Solar Project Site

The Camas Solar Project site would encompass 0.02 acre of the KCC-defined minimum wetland protection buffer around wetland CW01 within the project perimeter fencing (Figure 3.5-16). However, the perimeter fencing would have a negligible impact to vegetation, and the wetland buffer's functionality would not be significantly altered. Therefore, fencing would only represent an impact along the fence posts, which would be at most 1 foot wide. The total wetland buffer encroachment would be approximately 0.01 acre (398 square feet) within the Camas Solar Project site. The nearest project impact area (the perimeter fence) is 0 to 22 feet from the edge of the minimum protection buffer for the on-site wetland. During fence installation, there would be temporary fence installation surface disturbance within this 0.01 acre of KCC-defined minimum wetland protection buffer. All other impacts to wetland protection buffers would be avoided through project design.

Fumaria Solar Project Site

No impacts are proposed to the KCC-defined minimum wetland protection buffer around wetland FW01 within the Fumaria Solar Project site. The nearest project impact area is 3 to 15 feet from the edge of the minimum protection buffer for the on-site wetland. All impacts to wetland protection buffers would be avoided through project design.

Fumaria Solar Project Generation Tie Line

No impacts are proposed to the KCC-defined minimum wetland protection buffer around wetlands FW02 and FW03 along the Fumaria Solar Project generation tie line. TUUSSO plans on utilizing the existing power poles and would not cause impacts to wetlands or their buffers along the proposed generation tie line. No KCC-defined minimum wetland protection buffer is defined for FW04 because the wetland area is below the minimum size threshold for a Category III wetland, or for FW05 and FW06 because they are Category IV wetlands. All impacts to wetland protection buffers would be avoided through project design.

If new power poles need to be installed, TUUSSO would install them in upland areas outside of the KCC-defined minimum protection buffers for all wetlands along the Fumaria Solar Project generation tie line.

Penstemon Solar Project Site

No KCC-defined minimum wetland protection buffer is defined for PW01 because the wetland area is below the minimum size threshold for a Category III wetland. Therefore, no impacts are proposed to any KCC-defined minimum wetland protection buffers within the Penstemon Solar Project site. All impacts to wetland protection buffers would be avoided through project design.

Typha Solar Project Site

The proposed Typha Solar Project site design would encroach into the KCC-defined minimum wetland protection buffer around wetlands TW02 and TW03. Approximately 1.38 acres of these protection buffers are within the proposed perimeter fence for the site, with less than 0.04 acre (approximately 1,614 square feet) impacted by the proposed access road crossing wetland TW03 and perimeter fencing (Figure 3.5-17). Wetland TW02 is almost entirely within the site; however, no encroachment activities are proposed in the KCC-defined minimum wetland protection buffer (1.36 acres) at this time, except from the proposed eastern perimeter fence. However, the perimeter fencing would have a negligible impact to vegetation, and the wetland buffer's functionality would not be significantly altered. Therefore, fencing would only represent an impact along the fence posts. No impacts are proposed to the KCC-defined minimum wetland protection buffer for wetlands TW01 and TW02 within the site. No KCC-defined minimum wetland protection buffer is defined for TW04 because the wetland area is below the minimum size threshold for a Category III wetland.

Typha Solar Project Generation Tie Line

No impacts are proposed to the KCC-defined minimum wetland protection buffer around wetlands TW03 and TW05 along the Typha Solar Project generation tie line. TUUSSO plans on utilizing the existing power poles as much as possible and would not cause impacts to wetlands or their buffers along the proposed generation tie line. All impacts to wetland protection buffers would be avoided through project design.

If new power poles need to be installed, then TUUSSO would install them in upland areas outside of the KCC-defined minimum protection buffers for all wetlands along the Typha Solar Project generation tie line.

Figure 3.5-16. Camas Solar Project wetland buffer encroachment.

Figure 3.5-17. Typha Solar Project wetland buffer encroachment.

Urtica Solar Project Site

Within the proposed Urtica Solar Project perimeter fencing, 0.12 acre of the KCC-defined minimum wetland protection buffer occurs around wetlands UW02 and UW03 (Figure 3.5-18). There is an existing road within these buffers to the east of UW02 and UW03. Improvements to this road could extend outside of the existing road footprint; however, this is not proposed at this time. If the project design is altered, then coordination with Kittitas County or Ecology would occur for the buffer impacts associated with that design change. During fence installation, there could be temporary fence installation surface disturbance within the KCC-defined minimum wetland protection buffers west and north of wetlands UW02 and UW03. However, the perimeter fencing would have a negligible impact to vegetation, and the wetland protection buffer's functionality would not be significantly altered. Therefore, fencing would only represent an impact along the fence posts, which would be at most 1 foot wide. The total wetland protection buffer encroachment would be less than 0.01 acre (approximately 67 square feet) within the Urtica Solar Project site. No KCC-defined minimum wetland protection buffer is defined for UW01 because the wetland area is below the minimum size threshold for a Category III wetland. Minimal impacts to wetland protection buffers would occur based on the current project design.

(b) A demonstration of how enhancement, restoration or compensatory mitigation actions will achieve equivalent or greater hydrologic and biological functions at the impact site, and whether any existing wetland functions would be reduced by the mitigation measures;

3.5.6 Mitigation Measures for Wetlands

Negligible impacts are proposed to wetlands within the Columbia Solar Project sites. Impacts to wetlands have been avoided to the maximum extent practicable through project design. TUUSSO will coordinate with Ecology to determine whether additional mitigation would be required. It is unlikely that mitigation would be required by Ecology for 0.01 acre (630 square feet) of impact to a Category II wetland on the Typha Solar Project site or the encroachment of 0.05 acre into the wetland protection buffers across all Columbia Solar Project sites.

(c) A discussion of how standard mitigation ratios have been incorporated into the mitigation proposal. Variances from standard mitigation ratios must be supported with professional analyses demonstrating that equivalent or greater hydrologic and biological functions will be achieved;

TUUSSO will coordinate with Ecology to determine whether mitigation would be required for the minor impact to a wetland on the Typha Solar Project site or the negligible encroachment into the wetland protection buffers across all Columbia Solar Project sites.

(d) A demonstration that the mitigation actions are being conducted in an appropriate location, and that consideration was given in order of preference to: On-site opportunities; opportunities within the same subbasin or watershed assessment unit; opportunities within the same Water Resources Inventory Area (WRIA); opportunities in another WRIA;

TUUSSO will coordinate with Ecology to determine whether mitigation would be required for the minor impact to a wetland on the Typha Solar Project site or the negligible encroachment into the wetland protection buffers across all Columbia Solar Project sites.

Figure 3.5-18. Urtica Solar Project wetland buffer encroachment.

(e) A discussion of the timing and schedule for implementation of the mitigation plan;

TUUSSO will coordinate with Ecology to determine whether mitigation would be required for the minor impact to a wetland on the Typha Solar Project site or the negligible encroachment into the wetland protection buffers across all Columbia Solar Project sites.

(f) A discussion of ongoing management practices that will protect wetlands, including proposed monitoring and maintenance programs;

Impacts to wetlands would be avoided to the maximum extent practicable through project design, and wetland mitigation would not likely be required for the Columbia Solar Projects. No ongoing management of wetlands would be required to implement the proposed solar projects. In addition, the wetlands within the five solar project sites would not require any ongoing management or monitoring, nor are there any ongoing management or monitoring activities currently being conducted within the solar project sites by outside parties. Section 3.4.3.3 (b) and Appendix B present vegetation management guidance and describe rehabilitation and restoration activities proposed for temporary ground disturbance that may occur as a result of construction on the site and control of noxious weeds. Aquatic-safe herbicides may be used within wetlands and their buffers to control the spread of noxious weeds. Manual and mechanical methods would be preferred over the use of herbicide, which will only be used when other methods are inadequate. Maintenance would not be conducted outside of the project site perimeter fencing; however, monitoring to track weed spread as described in Section 3.5.1 of Appendix B would be conducted within wetlands areas and their buffers.

(g) Mitigation plans should give priority to proven mitigation methods. Experimental mitigation techniques and mitigation banking may be considered by the council on a case-by-case basis. Proposals for experimental mitigation techniques and mitigation banking must be supported with analyses demonstrating that compensation will meet or exceed requirements giving consideration to the uncertainty of experimental techniques, and that banking credits meet all applicable state requirements.

TUUSSO will coordinate with Ecology to determine whether mitigation would be required. Traditional permittee-responsible mitigation would be proposed if mitigation is required.

(4) Federal approvals. The application shall list any federal approvals required for wetlands impacts and mitigation, status of such approvals, and federal agency contacts responsible for review.

The USACE has indicated that the project's wetland impact would qualify for Nationwide Permit 14 as a linear transportation improvement. Because the 0.01-acre (630-square-foot) impacts would be less than 1,000 square feet, no mitigation would be required by USACE. A JARPA is ready for submittal to USACE and Ecology (Appendix J-3). To TUUSSO's knowledge, a federal regulator has not been assigned to review the application yet.

3.6 Energy and Natural Resources 463-60-342

(1) Amount required/rate of use/efficiency. The application shall describe the rate of use and efficiency of consumption of energy and natural resources during both construction and operation of the proposed facility.

The sources and amounts of energy and natural resources uses, and their potential impacts are described below, in Section 3.6.1 and 3.6.2.

(2) Source/availability. The application shall describe the sources of supply, locations of use, types, amounts, and availability of energy or resources to be used or consumed during construction and operation of the facility.

3.6.1 Affected Environment for Energy and Natural Resources

This section provides a summary of the sources of energy and natural resources available for construction and operation of the five Columbia Solar Projects. The amounts needed and availability of those resources is described in Section 3.6.2, below.

3.6.1.1 Energy

Electricity in the area is available from PSE, Kittitas County Public Utility District (PUD), and the City of Ellensburg (see Section 4.4 for details). Puget Sound Energy provides natural gas in Kittitas County.

Natural gas for residential and commercial uses is available from the City of Ellensburg Natural Gas Utility Division (see Section 4.4 for details). Propane and natural gas are also available from private businesses, including AmeriGas Propane at N Ruby Street, A-1 Petroleum at S Main Street, Midstate Cooperative at W 3rd Avenue, and Northern Energy at S Industrial Way, all in Ellensburg.

3.6.1.2 Natural Resources

Natural resources availability summarized here include concrete, sand, soil, and gravel; lumber and other wood products; and water.

Concrete, Sand, Soil, and Gravel

Ready-mix concrete is available from Carol Ready-dompier, located on Riverbottom Road south of Ellensburg, south of Manastash Road, west of the Yakima River, and southwest of the intersection of I-90 and I-82.

Riverbottom Rock is also located on Riverbottom Road, south of Ellensburg, south of Manastash Road, west of the Yakima River, and southwest of the intersection of I-90 and I-82. They provide sand and gravel.

Ellensburg Cement Products Inc. (ECP) is located on U.S. Route 97, north of I-90 and west of Ellensburg. They provide ready-mix concrete, rock/gravel, fill dirt, sand, and other products (ECP 2017).

Dfm7 Services is located Mcmanamy Road, east of the Yakima River, northwest of Ellensburg, and southeast of Thorp. They also provide sand and gravel.

Lumber/Wood

Several sources of lumber for concrete-form construction and other construction supplies are available in Ellensburg. Knudson Lumber is located at 1791 Vantage Highway in northeast Ellensburg. Matheus Lumber Company is located at 1433 West University Way in northwest Ellensburg also provides lumber and construction supplies.

Water

TUUSSO has considered a number of water supply alternatives for construction purposes. Based on the array of possible water sources, TUUSSO intends to use water trucked in from municipal water sources or from other off-site vendors with a valid water right for all of the projects. In particular, water needs related to construction would be procured by TUUSSO's construction contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks.

3.6.2 Impacts to Energy and Natural Resources

3.6.2.1 General County

The following potential impacts are common to all of the proposed Columbia Solar Projects and to the general surrounding area.

Construction Impacts

Energy

Minimal electricity would be required during the construction period, to operate power tools, welders, and other small equipment. This electricity would be available from existing nearby buildings or temporary extensions from nearby distribution lines.

The minimal quantities of natural gas or propane that might be used during construction would be purchased from local distributors and would be readily available. Similarly, gasoline and diesel fuel used for construction vehicles would be purchased from local gas stations. Lubricating oils, grease, and hydraulic fluids would be purchased from distributors of such materials. In all cases, quantities are not anticipated to be large and would be readily available from existing commercial businesses in the Ellensburg area.

Because minimal amounts of electricity, natural gas or propane, and gasoline or diesel fuel would be used during construction, no impacts are anticipated to the demand on or supplies of those energy sources in the Ellensburg area.

Natural Resources

Little or no soil, sand, or gravel is anticipated to be hauled to or away from the five Columbia Solar Project sites, and thus there would be no impacts on those natural resources in the area. In addition, minimal quantities of lumber and wood products would be required during construction, and could easily be provided by the two lumber yards in Ellensburg. Thus, because minimal quantities would be required and would be readily available in the Ellensburg area, there would be no impacts to the availability of lumber or wood products.

Quantities of concrete and potential impacts to available sources are described in detail for each solar project site, below.

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, soil compaction, and for dust control on access roads. In addition, non-toxic soil binding agents may be employed to help with soil stabilization during construction. Construction activities for the five proposed Columbia Solar Projects are conservatively estimated to generate an average water demand of 100,000 gallons per day. That daily water demand estimate assumes that on an average construction day, 20 acres of the project sites are in active construction, requiring 10 continuous hours of water using five water trucks, assuming 4,000-gallon-capacity trucks. Construction time for the Columbia Solar Projects would require approximately 6 months, or 156 work days (Monday–Saturday), to complete. Based upon these parameters, the construction water demand for the proposed Columbia Solar Projects is very conservatively estimated to total 15.6 million gallons, or 47.87 acre-feet (one acre-foot is equal to 325,851 gallons), or approximately 10 acre-feet per project. This limited-duration water requirement for construction will have a negligible impact on the overall water resources within the county. Additional detail regarding these water needs is provided in Section 2.6.1, above.

Operation Impacts

Energy

None of the solar projects would require electric power during operation, because they would be generating electricity, so there would be no negative impacts on energy use. Each of the five Columbia Solar Projects would have the capacity to generate up to 5 MW of electricity, for a total of up to 25 MW. TUUSSO modeled the design and associated energy output using PVSyst v6.21. The energy output simulated by PVSyst is based on the meteorological data at the project site, models of the system equipment such as the inverters and solar panels, and project design specifications. PVSyst v6.21 was used to simulate the predicted energy output from each of the five Columbia Solar Projects, resulting in a total estimate of approximately 11,500 megawatt hours (MWh) generated in the first full year of project operation. The production of this clean, renewable electricity would have a minimal positive impact on electricity in the Ellensburg and the PSE service areas.

Similar to that used for construction, gasoline and diesel fuel used for operational vehicles would be purchased from local gas stations. Lubricating oils, grease, and hydraulic fluids used for maintenance would be purchased from distributors of such materials. In all cases, quantities would be minimal and readily available from existing commercial businesses in the Ellensburg area so there would be no impacts on the availability of these resources.

Natural Resources

No soil, sand, gravel, lumber, or wood products are anticipated to be hauled to or away from the five Columbia Solar Project sites during operation, and thus there would be no impacts on those natural resources in the Ellensburg area.

On an ongoing basis, water would be used for cleaning PV panels and controlling dust (less than 1 acre-foot per year per project site). Water would also be necessary to establish the tree/shrub visual buffers along portions of the five Columbia Solar Projects, as described above, as well as the native plant species throughout the five project sites. Project landscaping would consist of native and drought tolerant species. Once established, the species would not require ongoing irrigation. The irrigation needs for landscaping establishment are assumed to last for 3 consecutive years following installation.

Based on feedback from farmers familiar with growing conditions in Kittitas Valley (including landowners familiar with the conditions on the five Columbia Solar Project sites), assuming periodic irrigation for establishment purposes over a 3-year period, it is estimated that approximately 400 acre-feet of water per year would be needed over this period to ensure plant establishment on the project sites. These water needs are the same as the current water needs on the actively farmed project sites, and thus there would be no impacts to irrigation water supplies as a result of operation of the five Columbia Solar Project sites. The limited water needs to meet the irrigation requirements of the Fumaria Solar Project, and the O&M water needs of the five Columbia Solar Project sites would have a negligible impact on the overall water resources within the County. Additional detail regarding these water needs is provided in Section 2.6.2, above.

3.6.2.2 Solar Project Sites

Below are descriptions of the potential specific natural resources impacts for each of the proposed solar project sites.

Camas Solar Project Site

Construction Impacts

The inverter pads and switchyard pads may be delivered to the site precast. However, they may also use poured concrete slab foundations. There would be approximately six inverter pads throughout the project site, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one alternating current (AC) transformer. Each inverter pad would be approximately 15 by 30 feet and 1 to 2 feet thick, requiring about 16.75 to 33.50 cubic yards of concrete to construct. Thus, all six inverter pads would require a total of about 100.5 to 201.0 cubic yards of concrete.

There would also be one switchyard pad, measuring roughly 20 by 30 feet and 1 to 2 feet thick, requiring about 22.25 to 44.50 cubic yards of concrete to construct.

In total, the six inverter pads and single switchyard pad would require a total of about 122.75 to 245.5 cubic yards of concrete, or about 12 to 25 truckloads if poured in place (assuming 10 cubic yards/truckload). This ready-mix concrete would be purchased from commercial suppliers in the Ellensburg area and hauled to the site during the primary April to November construction period, would be readily available from those suppliers, and would have no impacts on concrete sources or availability.

If construction of the all-weather access roads calls for aggregate, up to 619 cubic yards could be used to cover the roads with 6 inches of gravel. This would require up to 62 truckloads (assuming 10 cubic yards/truckload). Once final design is completed and a final decision is made about the need for gravel, TUUSSO would work with EFSEC to address any potential impacts, mitigation, and permitting that might be required.

Operation Impacts

No additional gravels, soils, concrete, lumber/wood, or other materials (beyond those mentioned for the general area) would be required during operation of the Camas Solar Project. Thus, no impacts would occur to those natural resources in Kittitas County or the nearby Ellensburg area.

Fumaria Solar Project Site

Construction Impacts

The inverter pads and switchyard pads may be delivered to the site precast. However, they may also use poured concrete slab foundations. There would be approximately five inverter pads throughout the project site, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer. Each inverter pad would be approximately 15 by 30 feet and 1 to 2 feet thick, requiring about 16.75 to 33.50 cubic yards of concrete to construct. Thus, all five inverter pads would require a total of about 83.75 to 167.5 cubic yards of concrete.

There would also be one switchyard pad, measuring roughly 20 by 30 feet and 1 to 2 feet thick, requiring about 22.25 to 44.50 cubic yards of concrete to construct.

In total, the five inverter pads and single switchyard pad would require a total of about 106.0 to 212.0 cubic yards of concrete, or about 11 to 21 truckloads if poured in place (assuming 10 cubic yards/truckload). This ready-mix concrete would be purchased from commercial suppliers in the Ellensburg area and hauled to the site during the primary April to November construction period, would be readily available from those suppliers, and would have no impacts on concrete sources or availability.

If construction of the all-weather access roads calls for aggregate, up to 449 cubic yards could be used to cover the roads with 6 inches of gravel. This would require up to 45 truckloads (assuming 10 cubic yards/truckload). Once final design is completed and a final decision is made about the need for gravel, TUUSSO would work with EFSEC to address any potential impacts, mitigation, and permitting that might be required.

Operation Impacts

No additional gravels, soils, concrete, lumber/wood, or other materials (beyond those mentioned for the general area) would be required during operation of the Fumaria Solar Project. Thus, no impacts would occur to those natural resources in Kittitas County or the nearby Ellensburg area.

Penstemon Solar Project Site

Construction Impacts

The inverter pads and switchyard pads may be delivered to the site precast. However, they may also use poured concrete slab foundations. There would be approximately five inverter pads throughout the project site, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer. Each inverter pad would be approximately 15 by 30 feet and 1 to 2 feet thick, requiring about 16.75 to 33.50 cubic yards of concrete to construct. Thus, all five inverter pads would require a total of about 83.75 to 167.5 cubic yards of concrete.

There would also be one switchyard pad, measuring roughly 20 by 30 feet and 1 to 2 feet thick, requiring about 22.25 to 44.50 cubic yards of concrete to construct.

In total, the five inverter pads and single switchyard pad would require a total of about 106.0 to 212.0 cubic yards of concrete, or about 11 to 21 truckloads if poured in place (assuming 10 cubic yards/truckload). This ready-mix concrete would be purchased from commercial suppliers in the Ellensburg area and hauled to the site during the primary April to November construction period, would be readily available from those suppliers, and would have no impacts on concrete sources or availability.

If construction of the all-weather access roads calls for aggregate, up to 380 cubic yards could be used to cover the roads with 6 inches of gravel. This would require up to 38 truckloads (assuming 10 cubic yards/truckload). Once final design is completed and a final decision is made about the need for gravel, TUUSSO would work with EFSEC to address any potential impacts, mitigation, and permitting that might be required.

Operation Impacts

No additional gravels, soils, concrete, lumber/wood, or other materials (above those mentioned for the General Area) would be required during operation of the Penstemon Solar Project. Thus, no impacts would occur to those natural resources in Kittitas County or the nearby Ellensburg area.

Typha Solar Project Site

Construction Impacts

The inverter pads and switchyard pads may be delivered to the site precast. However, they may also use poured concrete slab foundations. There would be approximately five inverter pads throughout the project site, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer. Each inverter pad would be approximately 15 by 30 feet and 1 to 2 feet thick, requiring about 16.75 to 33.50 cubic yards of concrete to construct. Thus, all five inverter pads would require a total of about 83.75 to 167.5 cubic yards of concrete.

There would also be one switchyard pad, measuring roughly 20 by 30 feet and 1 to 2 feet thick, requiring about 22.25 to 44.50 cubic yards of concrete to construct.

In total, the five inverter pads and single switchyard pad would require a total of about 106.0 to 212.0 cubic yards of concrete, or about 11 to 21 truckloads if poured in place (assuming 10 cubic yards/truckload). This ready-mix concrete would be purchased from commercial suppliers in the Ellensburg area and hauled to the site during the primary April to November construction period, would be readily available from those suppliers, and would have no impacts on concrete sources or availability.

If construction of the all-weather access roads calls for aggregate, up to 401 cubic yards could be used to cover the roads with 6 inches of gravel. This would require up to 40 truckloads (assuming 10 cubic yards/truckload). Once final design is completed and a final decision is made about the need for gravel, TUUSSO would work with EFSEC to address any potential impacts, mitigation, and permitting that might be required.

Operation Impacts

No additional gravels, soils, concrete, lumber/wood, or other materials (above those mentioned for the General Area) would be required during operation of the Typha Solar Project. Thus, no impacts would occur those natural resources in Kittitas County or the nearby Ellensburg area.

Urtica Solar Project Site

Construction Impacts

The inverter pads and switchyard pads may be delivered to the site precast. However, they may also use poured concrete slab foundations. There would be approximately five inverter pads throughout the project site, where the direct current from the arrays would be converted to alternating current and then transmitted by the electric grid. Each inverter pad would include one or two inverter enclosures and one AC transformer. Each inverter pad would be approximately 15 by 30 feet and 1 to 2 feet thick, requiring about 16.75 to 33.50 cubic yards of concrete to construct. Thus, all five inverter pads would require a total of about 83.75 to 167.5 cubic yards of concrete.

There would also be one switchyard pad, measuring roughly 20 by 30 feet and 1 to 2 feet thick, requiring about 22.25 to 44.50 cubic yards of concrete to construct.

In total, the five inverter pads and single switchyard pad would require a total of about 106.0 to 212.0 cubic yards of concrete, or about 11 to 21 truckloads if poured in place (assuming 10 cubic yards/truckload). This ready-mix concrete would be purchased from commercial suppliers in the Ellensburg area and hauled to the site during the primary April to November construction period, would be readily available from those suppliers, and would have no impacts on concrete sources or availability.

If construction of the all-weather access roads calls for aggregate, up to 267 cubic yards could be used to cover the roads with 6 inches of gravel. This would require up to 27 truckloads (assuming 10 cubic yards/truckload). Once final design is completed and a final decision is made about the need for gravel, TUUSSO would work with EFSEC to address any potential impacts, mitigation, and permitting that might be required.

Operation Impacts

No additional gravels, soils, concrete, lumber/wood, or other materials (beyond those mentioned for the general area) would be required during operation of the Urtica Solar Project. Thus, no impacts would occur to those natural resources in Kittitas County or the nearby Ellensburg area.

(3) Nonrenewable resources. The application shall describe all nonrenewable resources that will be used, made inaccessible or unusable by construction and operation of the facility.

Beyond the natural resources listed above, little or no additional nonrenewable resources would be used during construction or operation of the five Columbia Solar Projects.

(4) Conservation and renewable resources. The application shall describe conservation measures and/or renewable resources which will or could be used during construction and operation of the facility.

Beyond the natural resources listed above, little or no additional renewable resources would be used during construction or operation of the five Columbia Solar Projects.

However, during construction, TUUSSO would incorporate water conservation methods wherever possible. For example, water would not be used for concrete hydration on-site because the concrete is expected to be delivered to the site already hydrated. Less water-intensive methods of dust suppression are also under review, including use of soil stabilizers, tightly phasing construction activities, staging grading and other dust-creating activities, and/or compressing the entire construction schedule to reduce the time period over which dust-suppression measures would be required.

TUUSSO has incorporated water conservation methods into its operational water plan as well. Where feasible, TUUSSO would work with the current landowners to incorporate more efficient irrigation systems to water the trees and shrubs forming the visual buffers. TUUSSO has used native and drought tolerant species to ensure that the landscaping can be established quickly with minimal water needs, and once established, would not require any further watering except in extreme drought conditions. TUUSSO would also investigate using sprinkler systems on the Columbia Solar Project sites to irrigate the native ground cover (instead of the current flood irrigation methods used on the project sites).

(5) Scenic resources. The application shall describe any scenic resources which may be affected by the facility or discharges from the facility.

Existing visual and scenic resources, visual simulations, and potential impacts are described in detail in Section 4.2.4.

3.7 References – Chapter 3

Alt, D., and D. W. Hyndman. 1995. *Northwest Exposures: A Geologic Story of the Northwest*. Missoula, Montana: Mountain Press Publishing Company.

Baker, V. R., B. N. Bjornstad, A. J. Busacca, K. R. Fecht, E. P. Kiver, U. L. Moody, J. G. Rigby, D. F. Stradling, and A. M. Tallman. 1991. Quaternary Geology of the Columbia Plateau. In *Quaternary Nonglacial Geology, Conterminous U.S., Decade of North American Geology, Geology of North America*, edited by R. B. Morrison, pp. 215–250. Volume K-2. Boulder, Colorado: Geological Society of America.

Bonneville Power Administration. 2017. Melvin R. Sampson Hatchery, Yakima Basin Coho Project (DOE/EIS-0522). Available at: https://www.bpa.gov/efw/Analysis/NEPADocuments/Pages/MelvinSampsonHatcheryYakimaBasinCohoProject.aspx. Accessed August 14, 2017.

California Department of Fish and Game. 1990. 1989 Annual Report on the Status of California's State Listed Threatened and Endangered Plants and Animals. California Department of Fish and Game, Sacramento, California.

Cornell Lab of Ornithology (Cornell). 2017. All About Birds - Greater Sage-Grouse Available at: https://www.allaboutbirds.org/guide/greater_sage-grouse/lifehistory. Accessed May 19, 2017.

Council on Environmental Quality (CEQ). 2016. *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*. August 5, 2016. Available at: https://www.federalregister.gov/documents/2016/08/05/2016-18620/final-guidance-for-federal-departments-and-agencies-on-consideration-of-greenhouse-gas-emissions-and. Accessed July 5, 2017.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. Washington, D.C.: U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf. Accessed March 10, 2017.

Ellensburg Cement Products Inc. (ECP). 2017. Ellensburg Cement Products. Available at: http://www.ellensburgcement.com/. Accessed June 30.

Encompass Engineering & Surveying. 2017a. *TUUSSO Energy, Camas Solar Project: Drainage Report*. Cle Elum, Washington: Encompass Engineering & Surveying.

———. 2017b. *TUUSSO Energy, Fumaria Solar Project: Drainage Report*. Cle Elum, Washington: Encompass Engineering & Surveying.

———. 2017c. *TUUSSO Energy, Penstemon Solar Project: Drainage Report*. Cle Elum, Washington: Encompass Engineering & Surveying.

———. 2017d. *TUUSSO Energy, Typha Solar Project: Drainage Report*. Cle Elum, Washington: Encompass Engineering & Surveying.

———. 2017e. *TUUSSO Energy, Urtica Solar Project: Drainage Report*. Cle Elum, Washington: Encompass Engineering & Surveying.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Online edition. Vicksburg, Mississippi: U.S. Army Engineer Waterways Experiment Station. Available at: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf. Accessed March 10, 2017.

Federal Emergency Management Agency (FEMA). 1981a. Flood Insurance Rate Maps for Kittitas County, Washington (Unincorporated Areas): 5300950436B, 5300950437B, 5300950438C, 5300950552C, and 5300950558B. Effective Dates: May 5, 1981 or July 5, 1982. Available at: https://msc.fema.gov/portal/advanceSearch. Accessed July 25, 2017.

———. 1981b. Flood Insurance Study; City of Cle Elum, City of South Cle Elum, City of Ellensburg, and Kittitas County, Washington (Unincorporated Areas). Available at: http://map1.msc.fema.gov/data/53/S/PDF/530234V000.pdf?LOC=c84d35e3781d40c0c339ebfaea7fca74. Accessed July 25, 2017.

Fraley, J.J., and B.B. Shepard. 1989. Life history, ecology and population status of migratory bull trout (Salvelinus confluentus) in the Flathead Lake and River system, Montana. *Northwest Science* 63:133–143.

Gentry, Herman R. 2010. *Soil Survey of Kittitas County Area, Washington*. U.S. Department of Agriculture, Natural Resources Conservation Service, in cooperation with U.S. Department of Agriculture, Forest Service; Washington State Department of Natural Resources; and Washington State University, Agricultural Research Center.

Hallock, L. 2009. *Conservation Assessment for the Sharp-tailed Snake in Washington and Oregon*. Prepared for U.S. Forest Service, Region 6 and Bureau of Land Management. Olympia, Washington: Washington Natural Heritage Program, Department of Natural Resources.

Hernandez, R.R., S.B. Easter, M.L. Murphy-Mariscal, F.T. Maestre, M. Tavassoli, E.B. Allen, C.W. Barrows, J. Belnap, R. Ochoa-Hueso, S. Ravi, and M.F. Allen. 2014. Environmental Impacts of Utility-scale Solar Energy. *Renewable and Sustainable Energy Reviews* 29:766–779. Available at: http://escholarship.org/uc/item/62w112cg#page-1. Accessed August 3, 2017.

Hitchcock, C. Leo, and Arthur Cronquist. 1973. *Flora of the Pacific Northwest: An Illustrated Manual*. Seattle: University of Washington Press.

Hruby, T. 2014. *Washington State Wetland Rating System for Eastern Washington – Revised.* Washington State Department of Ecology Publication No. 14-06-030. Olympia, Washington: Department of Ecology. Available at: https://fortress.wa.gov/ecy/publications/SummaryPages/1406030.html. Accessed March 10, 2017.

Intergovernmental Panel on Climate Change (IPCC). 2013. Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Available at: http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf. Accessed July 5, 2017.

———. 2014. *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Table A.III.2. Available at: https://www.ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_annex-iii.pdf#page=5. Accessed July 5, 2017.

Kagan R.A., T.C. Viner, P.W. Trail, E.O. Espinoza. 2014. Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis. Ashland, Oregon: National Fish and Wildlife Forensics Laboratory. Available at: http://alternativeenergy.procon.org/sourcefiles/avian-mortality-solar-energy-ivanpah-apr-2014.pdf. Accessed August 3, 2017.

Kittitas County Code (KCC). 2017. Kittitas County, Washington, Ordinances and Resolutions. Available at: http://co.kittitas.wa.us/boc/countycode/. Accessed March 13, 2017.

Kraemer, Curtis. 1994. *Some observations on the life history and behavior of the native char, Dolly Varden (*Salvelinus malma*) and bull trout (*Salvelinus confluentus*) of the North Puget Sound Region*. Washington Department of Fish and Wildlife.

Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, and R.M. Storm. 1993. *Amphibians of Washington and Oregon*. Seattle, Washington: Seattle Audubon Society.

Licht, L.E. 1974. Survival of embryos, tadpoles, and adults of the frogs *Rana aurora aurora* and *Rana pretiosa pretiosa* sympatric in southwestern British Columbia. *Canadian Journal of Zoology* 52:613–627.

Marco, A. 1997. Effects of Nitrate and Nitrite in the Oregon Spotted Frog and Other Amphibians. *Conference Proceedings: The spotted frogs of Oregon*. Corvallis: Oregon Chapter, Wildlife Society.

McKee, B. 1972. *Cascadia: the Geologic Evolution of the Pacific Northwest*. New York: McGraw-Hill.

Multiagency Avian-Solar Collaborative Working Group. 2016. Avian-Solar Science Coordination Plan. Available at: http://blmsolar.anl.gov/program/avian-solar/docs/Final_Avian-Solar_Science_Coordination_Plan.pdf. Accessed August 10, 2017.

National Interagency Fire Center (NIFC). 2003. Remote Automatic Weather Stations. Available at: http://www.raws.dri.edu/documents/RAWS.pdf. Accessed July 5, 2017.

Natural Resources Conservation Service (NRCS). 2008. *Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service*. Technical Note No. 190-8-79. Available at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs143_010784.pdf. Accessed March 10, 2017.

———. 2017a. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed July 26, 2017.

———. 2017b. Plants Database. Available at: http://plants.usda.gov/. Accessed May 19, 2017.

Norling, Bradley S., Stanley H. Anderson, and Wayne A. Huber. 1992. Roost Sites Used by Sandhill Crane Staging Along the Platte River, Nebraska. *Great Basin Naturalist* 52(3):253–261.

Pacific States Marine Fisheries Commission. 2016 StreamNet Mapper. Portland, Oregon: Pacific States Marine Fisheries Commission. Available at: http://psmfc.maps.arcgis.com/apps/webappviewer/index.html. Accessed August 25, 2016.

Sage Grouse Initiative. 2017. The Habitat. Available at: https://www.sagegrouseinitiative.com/sagebrush-community/the-habitat/. Accessed May 19, 2017.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. *An Ecosystem Approach to Salmonid Conservation*. TR-4501-96-6057. Corvallis, Oregon: ManTech Environmental Research Services Corp,.

Swiftwater Environmental & Geotechnical (Swiftwater). 2017a. *Geotechnical Engineering Study, Phase 1, Camas Solar Array Site, 4561 NE 6 Road, Ellensburg, Washington*. Project No. 170019:GES. Issaquah, Washington: Swiftwater Environmental & Geotechnical.

———. 2017b. *Geotechnical Engineering Study, Phase 1, Fumaria Solar Array Site, 2130 Clarke Road, Ellensburg, Washington*. Project No. 170020:GES. Issaquah, Washington: Swiftwater Environmental & Geotechnical.

———. 2017c. *Geotechnical Engineering Study, Phase 1, Penstemon Solar Array Site, 1585 Tjossem Road, Ellensburg, Washington*. Project No. 170016:GES. Issaquah, Washington: Swiftwater Environmental & Geotechnical.

———. 2017d. *Geotechnical Engineering Study, Phase 1, Typha Solar Array Site, 3401 South Thorpe Highway, Ellensburg, Washington*. Project No. 170017:GES. Issaquah, Washington: Swiftwater Environmental & Geotechnical.

———. 2017e. *Geotechnical Engineering Study, Phase 1, Urtica Solar Array Site, 751 Manashtash Road and Umptanum Road, Ellensburg, Washington*. Project No. 170018:GES. Issaquah, Washington: Swiftwater Environmental & Geotechnical.

University of Washington, Washington Cooperative Fish and Wildlife Research Unit. 1997. Washington Gap Project 1991 Land Cover for Washington State. Available at: ftp://ftp.dfw.wa.gov/pub/gapdata/lcv6. Accessed May 3, 2017.

U.S. Army Corps of Engineers (USACE). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, edited by J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, Mississippi: U.S. Army Engineer Research and Development Center.

U.S. Bureau of Reclamation (Reclamation). 2012. *Yakima River Basin Integrated Water Resource Management Plan, Final Programmatic Environmental Impact Statement*. March 2012. U.S. Bureau of Reclamation, Pacific Northwest Region. Available at: https://www.usbr.gov/pn/programs/yrbwep/reports/FPEIS/fpeis.pdf.

U.S. Environmental Protection Agency (EPA). 2010. General Conformity Training Module. 2010. Available at: https://www.epa.gov/sites/production/files/2016-03/documents/general_conformity_training_manual.pdf. Accessed July 5, 2017.

———. 2014. 2014 National Emissions Inventory: Data & Documentation. Available at: https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data. Accessed July 5, 2017.

———. 2015. Greenhouse Gas Reporting Program 2014: Petroleum and Natural Gas Systems. Available at: https://www.epa.gov/ghgreporting/ghgrp-2014-petroleum-and-natural-gas-systems. Accessed July 5, 2017.

———. 2017. NAAQS Table. Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed July 5, 2017.

———. 2017b. MyWATERS Data Mapper Google Earth kmz file. Available at: https://www.epa.gov/waterdata/viewing-waters-data-using-google-earth. Accessed March 7, 2017.

U.S. Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. May 2007. Available at: https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf. Accessed May 19, 2017.

Waitt, R.B. Jr. 1979. *Late Cenozoic Deposits, Landforms, Stratigraphy, and Tectonism in Kittitas Valley, Washington*. Geological Survey Professional Paper 1127. Available at: https://pubs.usgs.gov/pp/1127/report.pdf. Accessed July 28, 2017.

Walston, L.J. Jr., K.E. Rollins, K.E. LaGory, K.P. Smith, S.A. Meyers. 2016. A Preliminary Assessment of Avian Mortality at Utility-scale Solar Energy Facilities in the United States. *Renewable Energy*

92:40–414. Available at: http://www.sciencedirect.com/science/article/pii/S0960148116301422. Accessed August 3, 2017.

Washington Department of Wildlife (WDFW). 2015. Washington State Wildlife Action Plan. Available at: http://wdfw.wa.gov/publications/01742/. Accessed May 18, 2017.

———. 2017a. Priority Habitats and Species on the Web. Available at: http://wdfw.wa.gov/mapping/phs/. Accessed January 11, 2017.

———. 2017a SalmonScape. Available at: http://apps.wdfw.wa.gov/salmonscape/. Accessed January 11, 2017.

Washington State Department of Ecology (Ecology). 1997. *Washington State Wetland Identification and Delineation Manual*. Publication No. 96-94. Olympia, Washington: Washington State Department of Ecology.

Washington State Noxious Weed Control Board. 2017. Printable Noxious Weed List. Available at: http://www.nwcb.wa.gov/printable-noxious-weed-list. Accessed May 19, 2017.

Western Regional Climate Center (WRCC). 2017a. Climate of Washington. Available at: https://wrcc.dri.edu/narratives/WASHINGTON.htm. Accessed July 5, 2017.

———. 2017b. Ellensburg, Washington - Climate Summary. Station No. 452505, from 2/1/1893 to 6/7/2016. Available at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa2508. Accessed July 5, 2017.

———. 2017c. Peoh Point, Washington Wind Frequency Table. Mean wind speed from July 1, 2000 to July 5, 2017. Available at: https://wrcc.dri.edu/cgi-bin/rawMAIN.pl?waWPEO. Accessed July 6, 2017.

Wydoski, R. S., and R. R. Whitney. 2003. *Inland Fishes of Washington*. University of Washington Press, Seattle, Washington.

4 BUILT ENVIRONMENT AFFECTED ENVIRONMENT AND IMPACTS

4.1 Environmental Health 463-60-352

(1) Noise. The application shall:

(a) Describe and quantify the background noise environment that would be affected by the energy facility. The number of locations used for assessment of the existing noise environment shall be commensurate with the type of energy facility being proposed, the impacts expected, and the presence of high density receptor locations in the vicinity of the proposed site.

4.1.1 Affected Environment for Noise

4.1.1.1 Noise Characteristics and Measurement

Community sound levels are generally presented in terms of A-weighted decibels (dBA). The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving a strong correlation with how people perceive acceptable and unacceptable sound levels.

A-weighted sound levels are typically measured or presented as the equivalent sound pressure level (L_{eq}), which is defined as the average noise level on an equal-energy basis for a stated period of time and commonly is used to measure steady-state sound that is usually dominant. Another metric used in determining the impact of environmental noise is the differences in response that people have to daytime and nighttime noise levels. During the evening and at night, exterior background noises generally are lower than daytime levels. However, most household noise also decreases at night, and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises. The L_{dn} is a noise metric that accounts for the greater annoyance of noise during the nighttime hours (10:00 p.m. to 7:00 a.m.).

Local conditions such as traffic, topography, and winds characteristic of the region can alter background noise conditions. In general, the L_{dn} sound levels for outdoor quiet urban nighttime noise range from 40 to 50 dBA (Environmental Protection Agency [EPA] 1974). The American National Standards Institute (ANSI) has published a standard (ANSI S12.9-1993/Part 3) with estimates of general ambient noise levels (L_{eq} and L_{dn}) based on detailed descriptions of land use categories. The ANSI document organizes the land use based on six categories. The descriptions and estimated daytime and nighttime L_{eq} ambient noise levels for each category are provided in Table 4.1-1.

The five proposed Columbia Solar Project sites are located in largely undeveloped, sparsely populated areas. Interstate 90 (I-90), located in the proximity of the five proposed solar project sites, can be disregarded as a significant noise source for the projects as it is far enough away (0.25 mile at the closest point) that the ambient noise in the vicinity of the project is dominated by community activities and natural sources (i.e., birds, foliage, and trees). Furthermore, the Federal Transit Administration (FTA) recommends the estimation of existing noise levels based on population density for land uses more than 1,000 feet from major roadways (FTA 2006). Based on the 2010 Census, the population density for Kittitas County was 17.8 inhabitants per square mile (U.S. Census Bureau 2010).

Thus, the majority of the analysis area would be expected to conservatively have a background noise L_{dn} of about 45 dBA, corresponding to the ANSI S12.9-1993/Part 3 “Very Quiet, Sparse Suburban or Rural Areas” category. This noise level would occasionally increase due to passing vehicular traffic as well as airplanes traveling to the nearby Bowers Field airport. There are also temporary increases in the existing noise level from farm equipment (e.g., tractors) used to grow and harvest crops and to raise cattle and other farm animals.

Table 4.1-1. Representative Existing Conditions Based on Land Use

Category	Land Use	Description	Estimated Existing Daytime L_{eq}, dBA	Estimated Existing Nighttime L_{eq}, dBA
1	Noisy Commercial and Industrial Areas	Very heavy traffic conditions, such as in busy downtown commercial areas, at intersections of mass transportation and other vehicles, including trains, heavy motor trucks and other heavy traffic, and street corners where motor buses and heavy trucks accelerate.	69	61
2	Moderate Commercial and Industrial Areas, and Noisy Residential Areas	Heavy traffic areas with conditions similar to Category 1 but with somewhat less traffic, routes of relatively heavy or fast automobile traffic but where heavy truck traffic is not extremely dense, and motor bus routes.	64	56
3	Quiet Commercial, Industrial Areas, and Normal Urban and Noisy Residential Areas	Light traffic conditions where no mass transportation vehicles and relatively few automobiles and trucks pass, and where these vehicles generally travel at low speeds. Residential areas and commercial streets and intersections with little traffic comprise this category.	58	52
4	Quiet Urban and Normal Residential Areas	These areas are similar to Category 3 above but, for this group, the background is either distant traffic or is unidentifiable.	53	47
5	Quiet Suburban Residential Areas	Isolated areas, far from significant sources of sound.	48	42
6	Very Quiet, Sparse Suburban or Rural Areas	These areas are similar to Category 5 above but are usually in unincorporated areas and, for this group, there are few if any near neighbors.	43	37

Source: ANSI S12.9-1993/Part 3.

4.1.1.2 Sensitive Receptors

Noise-sensitive receptors generally are defined as locations where people reside or where the presence of unwanted sound may adversely affect the existing land use. Typically, noise-sensitive land uses include residences, hospitals, places of worship, libraries, performance spaces, offices, and schools, as well as nature and wildlife preserves, recreational areas, and parks. The nearest sensitive receptor was located for each of the five solar project sites, and are listed in Table 4.1-2. No high-density receptors were identified within 1 mile of the five proposed solar project sites. The closest high-density receptor was identified 5,551 feet west of the proposed Camas Solar Project site.

Table 4.1-2. Nearest Sensitive Receptor to Each Solar Project

Project Site	Type	Distance from Property Boundary	Direction from Project Site
Camas	Residence	Within 175 feet	East side of property boundary
Camas	Commercial – Better Life for Dogs	Within 155 feet	Northwest side of property boundary
Fumaria	Residence	Adjacent	Southern property boundary
Penstemon	2 Residences	Each within 130 feet	East and north sides of property boundaries
Typha	Commercial – Ellensburg Golf and Country Club	Adjacent	Southeast side of property boundary
Typha	Residence	Within 266 feet	Southwest side of property boundary
Urtica	Residence	Within 160 feet	Northern property boundary

(b) Identify and quantify the impact of noise emissions resulting from construction and operation of the energy facility, using appropriate state-of-the-art modeling techniques, and including impacts resulting from low frequency noise;

4.1.2 Impacts to Noise

4.1.2.1 Calculation Methodologies and Sources of Noise Generation

Construction noise levels were estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) (the noise calculations are provided in Appendix N). The RCNM is FHWA's national model for the prediction of construction noise. This software is based on actual sound level measurements from various equipment types taken during the Central Artery/Tunnel Project conducted in Boston, Massachusetts, during the early 1990s.

Estimates of noise from the construction of the access roads and improvements to the access roads are based on a roster of the maximum amount of construction equipment used at each of the five solar project sites on a given day. Table 4.1-3 shows a list of typical construction equipment and the noise level at 10 feet and 50 feet. The RCNM has noise levels for various types of equipment pre-programmed into the software; therefore, the noise level associated with the equipment is typical for the equipment type and not based on any specific make or model.

Construction Noise Calculations

The approximate noise generated by the construction equipment used at each of the five proposed Columbia Solar Project sites has been conservatively calculated based on the maximum amount of construction equipment that would be used at the project site at one time, and not taking into account further attenuation due to atmospheric interference or intervening structures. Results of the RCNM construction noise calculations are given for each solar project site, below.

Table 4.1-3. Maximum Noise Levels for Common Construction Equipment

Equipment Type	Typical Maximum Noise Levels at 10 Feet (dBA)	Typical Maximum Noise Levels at 50 Feet (dBA)
Backhoes	92	78
Bulldozers	96	82
Crane	95	81
Concrete Mixer Truck	93	79

Equipment Type	Typical Maximum Noise Levels at 10 Feet (dBA)	Typical Maximum Noise Levels at 50 Feet (dBA)
Drill Rig	98	84
Drum Rollers	94	80
Dump Trucks	91	77
Graders	99	85
Excavators	95	81
Construction Pickup/Water/Fuel Truck	89	75
Delivery Truck	88	74
Tractor	98	84
Vibratory Pile Driver	115	101

Operational Noise Calculations

For noise generated by the operation of the Columbia Solar Projects, standard acoustical engineering methods were used and were based on vendor-supplied equipment noise levels. For simplicity, these noise levels were based on the loudest equipment: the SGI 500XTM inverters. Predicted levels at the closest sensitive receptor were calculated based on geometric spreading attenuation using International Organization for Standardization (ISO) 9613-2, Acoustics – Sound Attenuation during Propagation Outdoors (ISO 1996). Additional attenuation factors, such as noise-reducing intervening terrain, structures, and barriers cannot be considered with this methodology. Thus, this methodology is conservative. In addition, because solar panels produce electricity only when the sun is shining, the inverters would be completely silent at night. Furthermore, central inverters are usually surrounded on all sides by the solar panel arrays whose electricity they manage, which further distances them from anyone who might happen to be nearby, and would potentially act as a noise buffer.

4.1.2.2 Solar Project Sites

The loudest noise-generating operational equipment on the solar project sites would consist of approximately 10 SGI 500XTM inverters per project site. The proposed SGI 500XTM inverters are rated at a noise level of 67 dBA at a distance of 10 meters without controls, as indicated in the manufacturer's specification sheets.

No operational components of the Columbia Solar Projects would include significant ground-borne noise or vibration sources, and no significant vibrations sources currently exist, or are planned, in the area. Thus, no significant ground-borne vibration impacts would occur with operation of the solar projects. The solar projects would not emit any noise at night, because they would not be generating electricity then. In addition, blasting would not be required as part of the projects, as all components would be installed as described in Chapter 2.

Construction and operational-related noise generation levels and impacts are described below for each of the five proposed Columbia Solar Project sites.

Camas Solar Project Site

Construction Impacts

As shown in Table 4.1-4, construction of the Camas Solar Project would result in increased noise levels for a limited period of time. Per Washington Administrative Code (WAC) 173-60-050 and Kittitas County Code (KCC) 9.45.040, the state and county exempt construction noise from local noise standards, provided that such activities take place within the hours of 7:00 a.m. to 10:00 p.m. Construction of the Camas Solar Project would take place within those hours.

Table 4.1-4. Calculated Noise Levels at Nearest Receptor Due to Construction of the Camas Solar Project Site

	Calculated L_{max} (dBA)[1]	Calculated L_{eq} Total (dBA)[2]	Community Noise Level (dBA)[3]	
			L_{day}	L_{night}
Estimated Ambient Noise Level[4]	–	–	43.0	37.0
Noise Level at Nearest Receptor	86.4	77.3	76.6	37.0

1. For the estimation of L_{MAX} it is assumed that the construction equipment would be operating at the property boundary closest to the considered receptor. The nearest sensitive receptor is located 155 feet from the property boundary.
2. For the estimation of L_{eq} and community parameters, it is assumed that the construction equipment would be operating at the center of property. The nearest sensitive receptor is located 445 feet from the property center.
3. Community noise levels at the nearest receptor include background noise.
4. ANSI S12.9-1993/Part 3.

Operation Impacts

Table 4.1-5 shows the sound level at the property boundary and nearest sensitive receptor from the Camas Solar Project site. At the nearest property boundary, the noise level was estimated to exceed the Washington State Maximum Permissible Noise Levels by 0.6 dBA. The basis for the screening level noise attenuation calculation assumed continuous operation of the inverters. This is a conservative estimate. The noise levels estimated at the nearest sensitive receptor (a commercial facility), were all below the Washington State Maximum Permissible Noise Levels (65 dBA). Furthermore, there is a public road between the nearest sensitive receptor and the Camas Solar Project property boundary. Traffic noise from these roads could be a significant source of noise as part of the existing soundscape and potentially louder than the noise from the inverters located at the Camas Solar Project site. Therefore, exceedance of the Washington State Maximum Permissible Noise Levels is unlikely. Any exceedance from the Camas Solar Project would be within the permissible noise level exceedance time allowance of WAC 173-60-040 (see Section 4.1.4). Furthermore, TUUSSO has committed to post-construction monitoring, and working out any mitigation necessary with EFSEC. If necessary, a noise-mitigating barrier with a minimum 3-dBA reduction would be installed to comply with the applicable noise standard.

Table 4.1-5. Calculated Noise Levels at Property Boundary Due to Operation of the Camas Solar Project Site

	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)		
		L_{day}	L_{night}	L_{dn}
Estimated Ambient Noise Level[1]	–	43.0	37.0	45.0
Noise Level at Property Boundary [2]	65.6	67.6	37.0	65.6
Noise Level at Nearest Commercial Receiving Property Boundary [2]	50.5	52.5	37.0	51.1
Noise Level at Nearest Residential Receiving Property Boundary [2]	48.7	50.6	37.0	49.6

1. ANSI S12.9-1993/Part 3.
2. Combined ambient noise and calculated noise level.

Fumaria Solar Project Site

Construction Impacts

As shown in Table 4.1-6, construction of the Fumaria Solar Project would result in increased noise levels for a limited period of time. Per WAC 173-60-050 and KCC 9.45.040, the state and county exempt construction noise from local noise standards, provided that such activities take place within the hours of 7:00 a.m. to 10:00 p.m. Construction of the Fumaria Solar Project would take place within those hours.

Table 4.1-6. Calculated Noise Levels at Nearest Receptor Due to Construction of the Fumaria Solar Project Site

	Calculated L_{max} (dBA)[1]	Calculated L_{eq} Total (dBA)[2]	Community Noise Level (dBA)[3]	
			L_{day}	L_{night}
Estimated Ambient Noise Level[4]	–	–	43.0	37.0
Noise Level at Nearest Receptor	78.7	68.1	67.4	37.0

1. For the estimation of L_{MAX} it is assumed that the construction equipment would be operating at the property boundary closest to the considered receptor. The nearest sensitive receptor is located 378 feet from the property boundary.
2. For the estimation of L_{eq} and community parameters, it is assumed that the construction equipment would be operating at the center of property. The nearest sensitive receptor is located 1,283 feet from the property center.
3. Community noise levels at the nearest receptor include background noise.
4. ANSI S12.9-1993/Part 3.

Operation Impacts

Table 4.1-7 shows the sound level at the property boundary and nearest sensitive receptor from the Fumaria Solar Project site. The estimated operational noise level at the Fumaria Solar Project property boundary is below the 60 dBA Washington State Maximum allowed at a residential property (60 dBA). There would be no impact due to noise from operation of the Fumaria Solar Project.

Table 4.1-7. Calculated Noise Levels at Property Boundary Due to Operation of the Fumaria Solar Project Site

	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)		
		L_{day}	L_{night}	L_{dn}
Estimated Ambient Noise Level[1]	–	43.0	37.0	45.0
Noise Level at Property Boundary [2]	52.0	54.0	37.0	52.4
Noise Level at Nearest Residential Receiving Property Boundary [2]	49.4	51.4	37.0	50.2

1. ANSI S12.9-1993/Part 3.
2. Combined ambient noise and calculated noise level.

Penstemon Solar Project Site

Construction Impacts

As shown in Table 4.1-8, construction of the Penstemon Solar Project would result in increased noise levels for a limited period of time. Per WAC 173-60-050 and KCC 9.45.040, the state and county exempt construction noise from local noise standards, provided that such activities take place within the hours of 7:00 a.m. to 10:00 p.m. Construction of the Penstemon Solar Project would take place within those hours.

Table 4.1-8. Calculated Noise Levels at Nearest Receptor Due to Construction of the Penstemon Solar Project Site

	Calculated L_{max} (dBA)[1]	Calculated L_{eq} Total (dBA)[2]	Community Noise Level (dBA)[3]	
			L_{day}	L_{night}
Estimated Ambient Noise Level[4]	–	–	43.0	37.0
Noise Level at Nearest Receptor	85.0	71.9	71.3	37.0

1. For the estimation of L_{MAX} it is assumed that the construction equipment would be operating at the property boundary closest to the considered receptor. The nearest sensitive receptor is located 156 feet from the property boundary.
2. For the estimation of L_{eq} and community parameters, it is assumed that the construction equipment would be operating at the center of property. The nearest sensitive receptor is located 822 feet from the property center.
3. Community noise levels at the nearest receptor include background noise.
4. ANSI S12.9-1993/Part 3.

Operation Impacts

Table 4.1-9 shows the sound level at the property boundary and nearest sensitive receptor from the Penstemon Solar Project site. The estimated operational noise level at the Penstemon Solar Project property boundary is below the 60 dBA Washington State Maximum allowed at a residential property. There would be no impact due to noise from operation of the Penstemon Solar Project.

Table 4.1-9. Calculated Noise Levels at Property Boundary Due to Operation of the Penstemon Solar Project Site

	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)		
		L_{day}	L_{night}	L_{dn}
Estimated Ambient Noise Level[1]	–	43.0	37.0	45.0
Noise Level at Property Boundary [2]	51.4	53.4	37.0	51.9
Noise Level at Nearest Residential Receiving Property Boundary [2]	49.3	51.3	37.0	50.1

1. ANSI S12.9-1993/Part 3.
2. Combined ambient noise and calculated noise level.

Typha Solar Project Site

Construction Impacts

As shown in Table 4.1-10, construction of the Typha Solar Project would result in increased noise levels for a limited period of time. Per WAC 173-60-050 and KCC 9.45.040, the state and county exempt construction noise from local noise standards, provided that such activities take place within the hours of 7:00 a.m. to 10:00 p.m. Construction of the Typha Solar Project would take place within those hours.

Table 4.1-10. Calculated Noise Levels at Nearest Receptor Due to Construction of the Typha Solar Project Site

	Calculated L_{max} (dBA)[1]	Calculated L_{eq} Total (dBA)[2]	Community Noise Level (dBA)[3]	
			L_{day}	L_{night}
Estimated Ambient Noise Level[4]	–	–	43.0	37.0
Noise Level at Nearest Receptor	81.7	70.3	69.7	37.0

1. For the estimation of L_{MAX} it is assumed that the construction equipment would be operating at the property boundary closest to the considered receptor. The nearest sensitive receptor is located 266 feet from the property boundary.
2. For the estimation of L_{eq} and community parameters, it is assumed that the construction equipment would be operating at the center of property. The nearest sensitive receptor is located 989 feet from the property center.
3. Community noise levels at the nearest receptor include background noise.
4. ANSI S12.9-1993/Part 3.

Operation Impacts

Table 4.1-11 shows the sound level at the property boundary and nearest sensitive receptor from the Typha Solar Project site. The estimated operational noise level at the Typha Solar Project property boundary is below the 60 dBA Washington State Maximum allowed at a residential property. There would be no impact due to noise from operation of the Typha Solar Project.

Table 4.1-11. Calculated Noise Levels at Property Boundary Due to Operation of the Typha Solar Project Site

	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)		
		L_{day}	L_{night}	L_{dn}
Estimated Ambient Noise Level[1]	–	43.0	37.0	45.0
Noise Level at Property Boundary [2]	57.5	59.5	37.0	57.6
Noise Level at Nearest Residential Receiving Property Boundary [2]	52.3	54.3	37.0	52.7

1. ANSI S12.9-1993/Part 3.
2. Combined ambient noise and calculated noise level.

Urtica Solar Project Site

Construction Impacts

As shown in Table 4.1-12, construction of the Urtica Solar Project would result in increased noise levels for a limited period of time. Per WAC 173-60-050 and KCC 9.45.040, the state and county exempt construction noise from local noise standards, provided that such activities take place within the hours of 7:00 a.m. to 10:00 p.m. Construction of the Urtica Solar Project would take place within those hours.

Table 4.1-12. Calculated Noise Levels at Nearest Receptor Due to Construction of the Urtica Solar Project Site

	Calculated L_{max} (dBA)[1]	Calculated L_{eq} Total (dBA)[2]	Community Noise Level (dBA)[3]	
			L_{day}	L_{night}
Estimated Ambient Noise Level[4]	–	–	43.0	37.0
Noise Level at Nearest Receptor	85.7	73.3	72.7	37.0

1. For the estimation of L_{MAX} it is assumed that the construction equipment would be operating at the property boundary closest to the considered receptor. The nearest sensitive receptor is located 168 feet from the property boundary.
2. For the estimation of L_{eq} and community parameters, it is assumed that the construction equipment would be operating at the center of property. The nearest sensitive receptor is located 701 feet from the property center.
3. Community noise levels at the nearest receptor include background noise.
4. ANSI S12.9-1993/Part 3

Operation Impacts

Table 4.1-13 shows the sound level at the property boundary and nearest sensitive receptor from the Urtica Solar Project site. The estimated operational noise level at the Urtica Solar Project property boundary is below the 60 dBA Washington State Maximum allowed at a residential property. There would be no impact due to noise from operation of the Urtica Solar Project site.

Table 4.1-13. Calculated Noise Levels at Property Boundary Due to Operation of the Urtica Solar Project Site

	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)		
		L_{day}	L_{night}	L_{dn}
Estimated Ambient Noise Level[1]	–	43.0	37.0	45.0
Noise Level at Property Boundary [2]	50.4	52.4	37.0	51.0
Noise Level at Nearest Residential Receiving Property Boundary [2]	49.8	51.7	37.0	50.5

1. ANSI S12.9-1993/Part 3.
2. Combined ambient noise and calculated noise level.

4.1.2.3 Low-Frequency Impacts

Not all sound pressures are perceived as being equally loud by the human ear because the human ear does not respond equally to all frequencies. Low-frequency sound is generally sound at frequencies between 20 and 200 Hz. To account for sensitivity of human hearing to sound, the raw sound pressure level is adjusted with an A-weighting scheme based on the frequency that is stated in units of decibels (dBA). The A-weighting scale is appropriate because it is a close approximation of the human response to different frequencies of sound. The A-weighting scale attenuates low-frequency noises in a manner that simulates how human ears attenuate low-frequency noise at low levels. Therefore, the above presented construction and operational noise impacts already account for the low frequency portion of the noise produced by the solar projects, as all the results are presented in an A-weighting scale.

Furthermore, the proposed solar projects include inverters, which have a slight capability to produce low-frequency noise. However, unlike sources such as large wind turbines, solar facilities are largely passive in nature and the sources that do generate noise such as the inverters, transformers, and motors are relatively small in scale. The amount of sound power generated by the inverters is low. As a result, the sound energy (including the low frequency portion of the sound) does not propagate very far from the source. Additionally, there are no low-frequency sound level limits or thresholds adopted by Kittitas County or the state that apply to the proposed solar projects.

(c) Identify local, state, and federal environmental noise impact guidelines;

4.1.3 Kittitas County Noise Regulations/Guidelines

KCC Title 9: Public Peace, Safety and Morals, Chapter 9.45 Noise Control, regulates noise generation in the county. That chapter states (9.45.030 Public Disturbance – Noise Unlawful When) that it is unlawful to:

1. It is unlawful for any person to make, continue, or cause to be made or continued or any person owning or in possession of property to make, continue, or cause to be made or continued or allow to originate from the property any sound which:
    a. Is plainly audible within any dwelling unit which is not the source of the sound or is generated within two hundred feet of any dwelling unit, and;
    b. Either reasonably annoys, disturbs, injures or endangers the comfort, repose, health, peace or safety of others.
2. Sound which is “plainly audible” is sound that can be understood or identified.

3. It shall be a rebuttable presumption that sounds created between 8:00 a.m. and 10:00 p.m. do not unreasonably annoy, disturb, injure, or endanger.

Chapter 9.45.040 provides 21 exemptions to these rules, including the following that might be applicable to the TUUSSO Energy, LLC (TUUSSO), solar projects:

2. Sounds created by safety and protective devices, such as relief valves, where noise suppression would defeat the safety release intent of the device;

10. Sounds created by warning devices not operated continuously for more than thirty minutes per incident;

12. Sounds created by construction between 6:00 a.m. and 10:00 p.m.;

13. Sounds created by refuse removal equipment or personal snow removal equipment;

15. Sounds created by motor vehicles while being driven upon public highways. Such motor vehicles are nevertheless subject to the provisions of WAC Chapter 173-62;

17. Sounds created by unamplified human voices from 6:00 a.m. to 10:00 p.m.;

19. Sounds created by lawfully established commercial and industrial uses;

The county sheriff and other law enforcement officers are authorized to enforce the provisions of this chapter. Upon a finding that a civil infraction has occurred, a civil penalty of $100 can be levied for the first offense, $250 for the second offense, and $500 for each offense thereafter (Ord. 2016-009, 2016).

4.1.4 Washington Noise Regulations/Guidelines

The Washington Department of Ecology (Ecology) regulations governing noise generation in the state include:

- Revised Code of Washington (RCW) 70.107 – Noise Control
- RCW 46.09– Off-road and Highway Vehicles
- WAC 173-58– Sound Level Measurement Procedures
- WAC 173-60– Maximum Environmental Noise Levels
- WAC 173-62– Motor Vehicle Noise Performance Standards

State regulations set the amount of noise residential, commercial, and industrial noise sources can generate for similar categories of receiving properties. WAC 173-60-040, as shown in Table 4.1-14, stipulates the maximum allowed noise that can be received at a property, from a noise source.

Table 4.1-14. Washington State Maximum Allowed Amount of Noise Coming into a Property

Noise Source	Receiving Property (dBA)		
	Residential	**Commercial**	**Industrial**
Residential	55	57	60
Commercial	57	60	65
Industrial	60	65	70

Source: WAC 173-60-040.

As shown, industrial facilities are allowed to generate a maximum of 60 dBA for neighboring residential properties, 65 dBA for commercial properties, and 70 dBA for other industrial properties.

At any hour of the day or night the applicable state noise limitations may be exceeded for any receiving property by no more than:

(i) 5 dBA for a total of 15 minutes in any 1-hour period; or

(ii) 10 dBA for a total of 5 minutes in any 1-hour period; or

(iii) 15 dBA for a total of 1.5 minutes in any 1-hour period.

Furthermore, WAC 173-60-050 provides two exemptions to WAC 173-60-040, except insofar as such provisions relate to the reception of noise within Class A Environmental Designation for Noise Abatements (EDNAs) between the hours of 10:00 p.m. and 7:00 a.m.:

(a) Sounds originating from temporary construction sites as a result of construction activity.

(b) Sounds originating from forest harvesting and silvicultural activity.

4.1.5 Federal Noise Regulations/Guidelines

No federal regulations limit overall environmental noise levels; however, federal guidance documents exist that address environmental noise and regulations for specific noise sources. For example, the Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), Federal Aviation Administration (FAA), and Federal Interagency Committee on Urban Noise (FICUN) provide regulations and guidelines for noise impacts resulting from federal highways, aircraft usage, railroads, and other development, as described in the following paragraphs. While these standards are not directly applicable to utility construction projects, they provide some context for the impact analysis.

4.1.5.1 Federal Highway Administration

The FHWA noise abatement criteria establish absolute exterior noise levels for varying land use categories where an impact is triggered. The noise abatement criteria require maintenance of L_{eq} for noise levels emitted in lands classified as categories “A” (lands for which serenity and quietness are significant), “B” (lands near sensitive receptors, defined as picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals) as 67 dBA, and “C” (developed lands, properties, or activities not included in categories “A” or “B”) as 72 dBA.

Federal Transit Administration

The FTA has established guidelines for construction vibration to avoid harmful effects from excessive ground-borne vibration. The damage criteria developed by FTA are in the range of 0.12 to 0.5 peak particle velocity (PPV) for structural damage depending on the fragility of the structure of concern. The project is not subject to FTA regulations; however, these guidelines serve as a useful tool to evaluate vibration impacts on structures.

Federal Aviation Administration and Federal Interagency Committee on Urban Noise

Finally, FAA and FICUN have issued land-use compatibility guidelines indicating that a yearly L_{dn} of less than 65 dBA (59 dBA L_{eq}) is compatible with residential land uses and that, if a community determines it is necessary, levels up to 75 dBA (69 dBA L_{eq}) may be compatible with residential uses and transient lodgings that incorporate noise-reduction features (Code of Federal Regulations [CFR] Title 14, Part 150).

(d) Describe the mitigation measures to be implemented to satisfy WAC 463-62-030;

The Columbia Solar Projects would limit construction to the hours of 7:00 a.m. to 10:00 p.m. The solar projects would also incorporate various measures to reduce construction-related noise where feasible using the following methods:

- Construction equipment would use noise reduction devices that are no less effective than those originally installed by the manufacturer.
- Stationary equipment used during construction would be located as far as practical from sensitive noise receptors.
- “Quiet” equipment (i.e., equipment that incorporates noise control elements into the design—compressors have “quiet” models) would be used during construction when reasonably available.

(e) Describe the means the applicant proposes to employ to assure continued compliance with WAC 463-62-030.

Per WAC 463-62-030, EFSEC requires that energy facilities meet the noise standards established in 173-60 WAC. The Columbia Solar Projects construction schedule would be limited to the hours of 7:00 a.m. to 10:00 p.m. to ensure compliance via exemption per WAC 463-62-030.

The estimated operational noise level at most of the project sites would be below the Maximum Permissible Noise Levels and thus would be in compliance. The estimated operational noise levels at the Camas Solar Project site were above the Maximum Permissible Noise Levels at the property boundary, but below the Maximum Permissible Noise Levels when calculated at the nearest sensitive receptor. The site conservatively assumed that the inverters would be operating continuously at 100% and also does not account for any offsets due to traffic on the roads separating the sensitive receptors from the project site. Additionally, the noise level does not take into account further attenuation due to atmospheric interference, intervening structures, or seasonal noises common to the area, such as farm machinery and crop dusters. The Columbia Solar Projects would be designed to be within the Maximum Permissible Noise Levels and thus comply with WAC 463-62-030.

(2) Risk of fire or explosion. The application shall describe any potential for fire or explosion during construction, operation, standby or nonuse, dismantling, or restoration of the facility and what measures will be made to mitigate any risk of fire or explosion.

Because there would be minimal amounts of fossil fuels transported, stored, or used to operate equipment during construction, there would be no potential impacts from explosions.

Unlike thermal power plants, solar power projects pose a much smaller risk of accidental fires or explosions because there is no need to transport, store, or combust fossil fuels to generate electricity. The Columbia Solar Projects also would be designed comply with the National Electric Code (NEC) and the National Fire Protection Agency (NFPA) requirements, to avoid potential electrical fire risks. A strict Fire Prevention and Safety Plan would be developed and enforced during project construction and operation, to reduce and address potential fire risks.

As with any major developments, construction of the Columbia Solar Projects presents some minimal fire risks. Each of the project sites is currently farmed agricultural land, mostly for hay production or grazing.

Fumaria is the only fallow agricultural field (not recently grazed) at this time. Thus the predominant groundcover is non-native grasses and weeds, with the greatest fire risks being associated with grass fires during the hot, dry summer season. TUUSSO would maintain the vegetation at or below 12 inches in height to mitigate the risk of fire. TUUSSO has also initiated discussions with the Kittitas County Fire Marshal about potential fire issues, locations and dimensions of access gates and internal access roads, and other issues. A Fire Protection and Safety Plan would be developed and implemented prior to construction, in coordination with the Kittitas County Fire Marshal and other appropriate agencies.

4.1.5.2 Construction Impacts to Fire Suppression and Safety

Construction equipment would have spark-arresting mufflers, heat shields, and other protection measures to avoid starting fires. Fire extinguishers would be available in vehicles and on equipment, to quickly address any accidental fire issues. Work crews also would be trained about fire avoidance and response measures.

If a fire were to occur, the Fire Protection and Safety Plan would be followed in responding to that fire.

As a result of the above fire avoidance measures and close coordination with local fire departments to arrive at a final Fire Protection and Safety Plan for responding on-site to potential fires, the risks of and potential impacts from on-site fires during construction of the five Columbia Solar Projects would be minimal.

4.1.5.3 Operation Impacts to Fire Suppression and Safety

Combustible vegetation on and around each of the five Columbia Solar Project boundaries would be maintained by TUUSSO and the landowner. Each solar project site would include fire breaks around the project boundary, in accordance with State and/or County standards, as applicable. TUUSSO would maintain the on-site vegetation at or below 12 inches in height to mitigate the risk of fire. TUUSSO would also coordinate with the Kittitas County Fire and Rescue to provide PV training to fire responders, construction, operational, and maintenance staff on a recurring basis during the life of the solar projects based on the training requirements of those fire departments. The intent of this training would be to familiarize both responders and workers with the codes, regulations, associated hazards, and mitigation processes related to solar electricity. This training would include techniques for fire suppression of PV systems.

As a result of the above fire avoidance measures and ability to respond on-site to potential fires, the risks of and potential impacts from on-site fires during operation of the five Columbia Solar Projects would be minimal.

(3) Releases or potential releases to the environment affecting public health, such as toxic or hazardous materials. The application shall describe any potential for release of toxic or hazardous materials to the environment and shall identify plans for complying with the federal Resource Conservation and Recovery Act and the state Dangerous waste regulations (chapter 173-303 WAC). The application shall describe the treatment or disposition of all solid or semisolid construction and operation wastes including spent fuel, ash, sludge, and bottoms, and show compliance with applicable state and local solid waste regulations.

4.1.6 Construction Phase Spill Prevention, Control, and Countermeasure Plan

A detailed construction Spill Prevention, Control, and Countermeasure (SPCC) Plan would be developed by TUUSSO's engineering, procurement, and construction (EPC) contractor and submitted to EFSEC for review prior to construction. EFSEC, as well as pertinent local emergency response organizations, where appropriate, would review and approve all plans before they are implemented. The plan would address prevention and clean-up of any potential spills from construction activities.

Petroleum fuels are the only potentially hazardous materials that would be used in any significant quantity during construction of the Columbia Solar Projects. Construction of the projects would require the use of diesel fuel for operating construction equipment and vehicles. Measures to prevent and contain any accidental spills resulting from this fuel storage and use are described in detail below in Section 4.1.6.2. Construction of the projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law.

4.1.6.1 Construction Spill Prevention

Fuel and lubricating oils from construction vehicles and equipment and, if the transformers used are not dry-type, then the mineral oil used to fill the transformers are the only potential sources for a spill. The EPC contractor would be responsible for training its personnel in spill prevention and control and, if an incident occurs, would be responsible for containment and cleanup.

4.1.6.2 Fuel Spill Prevention

During construction, the EPC contractor would utilize fuel trucks for refueling of construction vehicles, fuel storage tanks, and equipment on-site. The fuel trucks would be properly licensed and would incorporate features in equipment and operation, such as automatic shut-off devices, to prevent accidental spills. Some construction vehicles, such as pickup trucks, would be fueled in town at gas stations. Any spills would be addressed in accordance with the Construction Spill Prevention Plan.

Potential risks would be additionally mitigated by using dedicated fuel-delivery trucks driven by professional, appropriately licensed drivers and by ensuring adherence to the site speed-limits. No other equipment fueling plan is anticipated. A fuel tanker accident would trigger activation of the SPCC Plan. The SPCC plan would include a description of procedures that would be followed in the event of a fuel tanker spill and would contain a list of equipment that would be on-site for spill response emergencies.

4.1.6.3 Lubricating Oils

Lubricating oils used during construction would mostly be contained in the vehicles and equipment for which they are used. Small quantities of lubricating oils may also be stored in appropriate containers at the construction staging area. The details of storage and containment of lubricating oils and other materials at the construction staging area would be addressed in the construction-phase SPCC. Appropriate measures would be taken to ensure these materials are not spilled and that if a spill does occur, it is promptly cleaned up and reported to the proper agencies.

4.1.6.4 Transformer Mineral Oil

The pad-mounted transformers found throughout each of the five Columbia Solar Project sites would likely be filled with mineral oil at the factory and not at the site during construction. Appropriate measures would be taken to ensure these materials are not spilled and that if a spill does occur, it is promptly cleaned up and reported to the proper agencies.

Because fuel and lubricating oils from construction vehicles and equipment are the only potential sources for a spill, equipment and operational features such as automatic shut-off devices would be used to prevent accidental spills, fuel-delivery trucks would be driven by licensed drivers who would ensure adherence to the site speed limits, the solar projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law, and an approved SPCC Plan would be followed, no impacts would occur from the potential releases of toxic or hazardous materials during construction.

4.1.7 Operational Phase Spill Prevention, Control, and Countermeasure Plan

An operational-phase SPCC Plan would be developed and submitted to EFSEC prior to the commencement of Columbia Solar Project operations. Operation of the projects would not require the storage or use of significant quantities of fuel or other materials that could cause a spill or other accidental release.

Columbia Solar Project operations would not require the use of a permanent fuel storage tank, as fuel use during operations is limited to maintenance vehicle fueling, which would be done at existing licensed gas stations in nearby communities. The potential for accidental spills during operations is minimal, as the sole source of potential spills on-site would be the small amounts of mineral oil contained within the pad-mounted transformers. The transformers are designed to meet stringent electrical industry standards, including containment tank welding and corrosion protection specifications.

Thus, as with construction, because fuel and lubricating oils from construction vehicles and equipment are the only potential sources for a spill, equipment and operational features such as automatic shut-off devices would be used to prevent accidental spills, fuel-delivery trucks would be driven by licensed drivers who would ensure adherence to the site speed limits, the solar projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law, and an approved SPCC Plan would be followed, no impacts would occur from the potential releases of toxic or hazardous materials during operation.

4.1.8 Environmental Protection and Compliance Program

An Environmental Protection and Compliance Program would be developed by the EPC contractors to ensure that all construction activities meet the conditions, limits, and specifications set in environmental standards established in the Site Certification Agreement and all other federal, state, and local environmental regulations. The Environmental Compliance Program would cover avoidance of wetlands and any other sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by state and county regulation. Copies of the plan and all applicable construction permits would be kept on-site. The project manager would be responsible for ensuring that all the requirements in the Environmental Protection and Compliance Plan and the construction permits are adhered to, and that any deficiencies are promptly corrected.

4.1.9 Solid or Semi-solid Wastes

Unlike thermal power plants, construction and operation of solar projects would not generate spent fuel, ash, sludge, or “bottoms,” and thus there would be no impacts from these materials. The five Columbia Solar Projects would comply with all applicable state and local solid waste regulations during all phases of the projects.

A Decommissioning Plan has been developed outlining how each of the Columbia Solar Project sites would be cleared and returned to usable agricultural production. At the time of decommissioning, a detailed Removal Work Plan and Schedule and a Site Restoration Plan would also be developed. The Removal Work Plan and Schedule would describe the proposed equipment that would be removed and an associated schedule for such removal based on expected future uses of the project site. The currently envisaged plan involves completion of the decommissioning, excluding establishment of revegetation, in a 6-month period. TUUSSO also would file a Discretionary Site Plan Review for review and approval by EFSEC.

In general, TUUSSO would attempt to maximize the recycling of facility components during decommissioning. PV solar panels, metals, and other materials would be recycled to the extent possible, including:

- tracker motors and any tracker control equipment, as per state e-waste recycling requirements;
- support piers/posts;
- underground 12.47-kV cables and conduits that form the AC and direct current(DC) collection systems;
- above ground DC electrical conductors;
- generation tie line conductors; and
- all other steel, copper, and aluminum, to the maximum extent possible.

Any insulating and cooling mineral oil and fluids from the transformers would be drained and recycled or disposed of at an appropriately licensed disposal facility. If recycling could not occur with any remaining materials (e.g., broken asphalt from access driveways), they would be transported to the nearest landfill for disposal.

Because materials and equipment would be recycled to the maximum extent possible, and there would be adequate capacity to landfill the remaining materials, no impacts would occur from solid wastes during construction or operation of the solar projects.

(4) Safety standards compliance. The application shall identify all federal, state, and local health and safety standards which would normally be applicable to the construction and operation of a project of this nature and shall describe methods of compliance therewith.

TUUSSO and its contractors would comply with all applicable local, state, and federal safety, health, and environmental laws, ordinances, regulations, and standards. Some of the main laws, ordinances, regulations, and standards (LORS) that would be reflected in the design, construction, and operation of the Columbia Solar Projects include:

- American Concrete Institute Standards
- American Institute of Steel Construction Standards

- American National Standards Institute, which provides plant design standards
- American Society of Mechanical Engineers, which provides plant design standards
- American Society for Testing and Materials
- Americans with Disabilities Act
- Institute of Electrical and Electronic and Installation Engineers
- National Electric Safety Code;
- National Fire Protection Association, which provides design standards for the requirements of fire protection systems
- National Institute for Occupational Safety and Health (NIOSH), which requires that safety equipment carry markings, numbers, or certificates of approval for stated standards
- Occupational Safety and Health Act of 1970 (29 U.S.C. 651, et seq.) and 29 CFR 1910, Occupational Safety and Health Standards
- Uniform Building Code
- Uniform Fire Code Standards

(5) Radiation levels. For facilities which propose to release any radioactive materials, the application shall set forth information relating to radioactivity. Such information shall include background radiation levels of appropriate receptor media pertinent to the site. The application shall also describe the proposed radioactive waste treatment process, the anticipated release of radionuclides, their expected distribution and retention in the environment, the pathways which may become sources of radiation exposure, and projected resulting radiation doses to human populations. Other sources of radiation which may be associated with the project shall be described in all applications.

The TUUSSO solar facilities do not have radiation, generate radiation, or release any radioactive materials and this section is thus not applicable.

(6) Emergency plans. The application shall describe emergency plans which will be required to assure the public safety and environmental protection on and off the site in the event of a natural disaster or other major incident relating to or affecting the project as well as identifying the specific responsibilities that will be assumed by the applicant.

As described above, TUUSSO would prepare and submit to EFSEC for approval the following plans:

- Fire Protection and Safety Plan
- Construction Spill Prevention, Control, and Countermeasure Plan
- Operation Spill Prevention, Control, and Countermeasure Plan
- Stormwater Pollution Prevention Plan
- Environmental Protection and Compliance Plan
- Vegetation Management Plan
- Incidental Avian Monitoring Plan

TUUSSO's EPC contractor would be responsible for implementing the applicable plans during construction, and their operational contractor would similarly do so during operation of the five Columbia Solar Projects.

4.2 Land and Shoreline Use 463-60-362

(1) The application shall identify land use plans and zoning ordinances applicable to the project site.

4.2.1 Affected Environment for Land Use and Zoning

4.2.1.1 General County

All of the proposed solar project sites would be located in unincorporated Kittitas County, Washington (Figure 4.2-1). Land use in Kittitas County is guided by the Kittitas County Comprehensive Plan. The 20-year plan is currently being revised and is the subject of public review. The plan is scheduled to be adopted in April 2018 and will be the guiding document for land use for the county through 2037.

Kittitas County includes 1,449,568 acres. According to the current draft of the Kittitas County Comprehensive Plan, seven overall land use designations are identified to guide land use decisions: commercial agriculture, commercial forest, mineral, rural residential, rural working, rural recreation, limited area of more intense rural development (LAMIRD), and urban. As shown in Table 4.2-1, commercial forest mineral land uses comprise over 800,500 acres and 55% of the entire county, rural working comprises almost 330,000 acres and 23%, and commercial agriculture comprises almost 292,000 acres and 20% of the total county land uses (Kittitas County 2016).

Table 4.2-1. Kittitas County Comprehensive Plan Land Use Designations and Acreages

Land Use Designation	Land Area (acres)	Percent of County
Commercial Agriculture	291,614	20.1
Commercial Forest Mineral	800,511	55.2
Mineral	5,745	0.3
Rural Residential	30,013	2.1
Rural Working	329,982	22.8
Rural Recreation	10,535	7.3
Limited Areas of More Intensive Rural Development	1,168	>0.1
Urban	7,000	0.5
Total	**1,449,568**	**100**

Source: Kittitas County (2016).

4.2.1.2 Solar Project Sites

The Kittitas County Comprehensive Plan established the policy framework for Kittitas County's legislative actions designating the land use zones for the five proposed Columbia Solar Project sites. The five sites would be located on lands zoned as either Commercial Agriculture or Rural Working – Agriculture 20. Within these zones, Kittitas County allows many non-agricultural land uses, including solar PV facilities, as permitted, conditional uses of the land, subject to criteria that are intended to identify local, site-specific impacts that can be addressed through conditioned permits. These zones are described below.

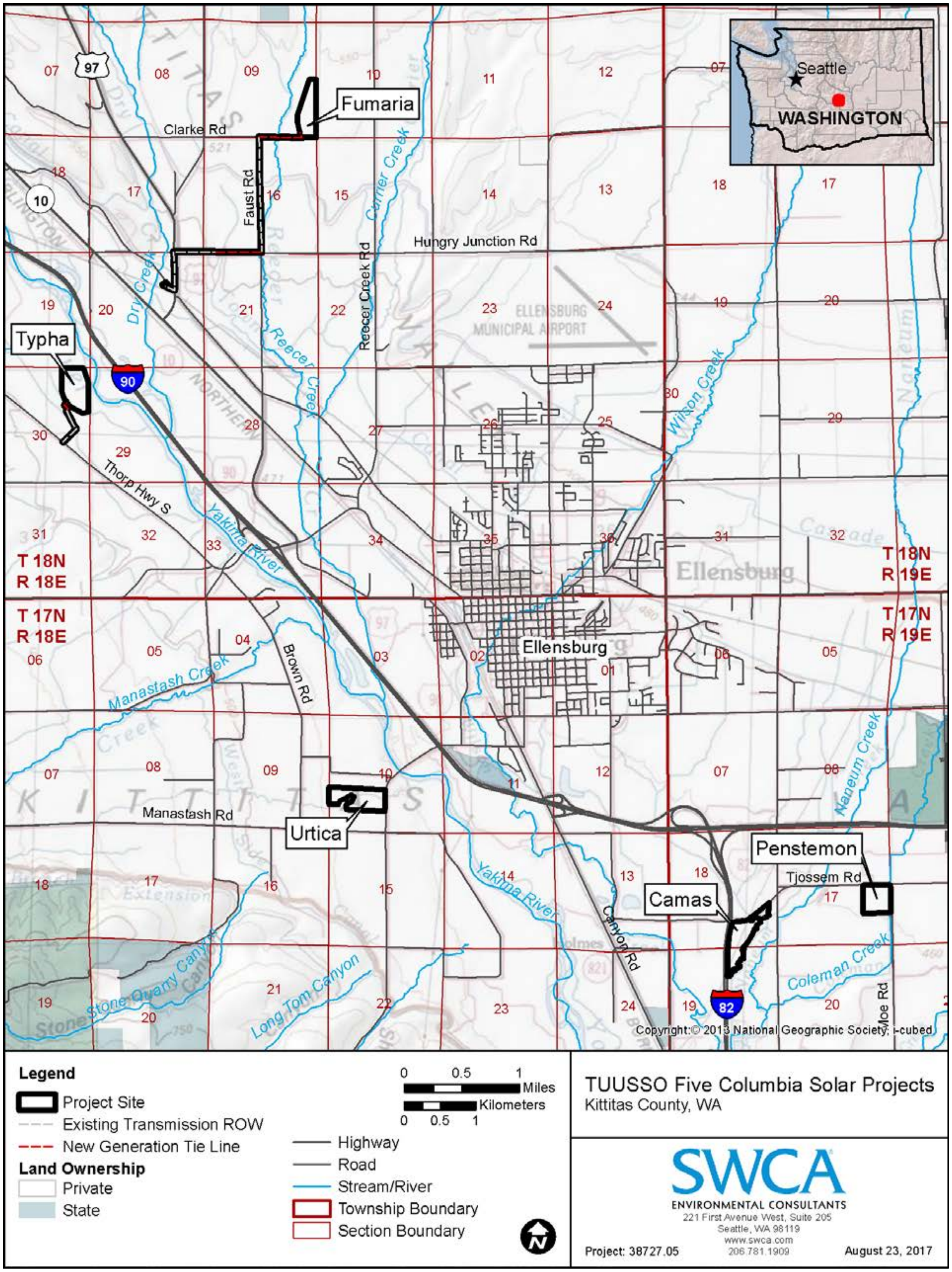


Figure 4.2-1. Columbia Solar Project site locations.

Commercial Agriculture Land Use Zone

Per the Kittitas County Comprehensive Plan, the Commercial Agriculture land use zone "is an area wherein farming and ranching are the priority." The purpose of this zoning classification "is to preserve fertile farmland from encroachment by nonagricultural land uses and protect the rights of those engaged in agriculture." The Commercial Agriculture zone only allows for agricultural land use with no more than two residential dwellings per 20 acres. According to KCC 17.15.050.01, utilities, including "solar farms" as defined by KCC 17.61, are a permitted conditional use of a Commercial Agriculture zone.

Rural Working – Agriculture 20 Land Use Zone

Per the Kittitas County Comprehensive Plan, the Rural Working general land use designation "generally encourages farming, ranching and storage of agriculture products, and some commercial and industrial uses compatible with rural environment and supporting agriculture and/or forest activities." The purposes of the Rural Working designation are to:

- Provide preservation of agriculture activities where producers can live and work on their own lands separate from resource lands.
- Support the continuation, whenever possible, of agriculture, timber and mineral uses on lands not designated for long-term commercial significance.
- Provide some buffer between rural residential lands and resource lands.
- Provide areas of low intensity land use activities within the agriculture and forest activities.

Within the Rural Working general land use designation, the project sites are zoned Agriculture 20 (A-20). According to KCC 17.29.10, the A-20 zone "is an area wherein farming, ranching and rural life styles are dominant characteristics. The intent of this zoning classification is to preserve fertile farmland from encroachment by nonagricultural land uses; and protect the rights and traditions of those engaged in agriculture." According to KCC 17.15.060.1, utilities, including "solar farms" as defined by KCC 17.61, are a permitted conditional use within an A-20 zone.

Camas Solar Project Site

The Camas Solar Project site would be located on land with a Commercial Agriculture land use designation, also zoned as Commercial Agriculture, and would be an allowed conditional use in that zone. Table 4.2-2 provides a summary of the surrounding land uses within 0.25 mile of each solar project site. The Camas Solar Project site is generally surrounded by Interstate 82, elevated Tjossem Road, one commercial business, Little Naneum Creek, agricultural lands, and associated residences and outbuildings.

Table 4.2-2. Surrounding Land Uses within 0.25 Mile, Radiating out from the Cardinal Directions

Sites and Direction	Surrounding Land Uses
Camas Solar Project Site	
North	Bordered by elevated Tjossem Road (the over-ramp going over Interstate 82). Then agricultural fields, one associated residence, and various outbuildings are to the northwest, north of Tjossem Road. A commercial business (Better Life for Dogs) is to the north, north of Tjossem Road. Then agricultural fields, one associated residence, and various outbuildings are to the north and northeast, north of Tjossem Road.
East	Little Naneum Creek and natural vegetation; agricultural fields, roughly nine associated residences, and various outbuildings; and Number 6 Road.
South	Agricultural fields.
West	Bordered by Interstate 82. Then agricultural fields, one associated residence, and an outbuilding.
Fumaria Solar Project Site	
North	Agricultural fields, two associated residences to the northeast, and various outbuildings.
East	Agricultural fields, three associated residences, and various outbuildings.

Sites and Direction	Surrounding Land Uses
South	Adjacent/near one residence, outbuildings, and Clarke Road; and south of Clark Road are agricultural fields and various outbuildings.
West	Pasture fields, Reecer Creek, one associated residence, and various outbuildings.
Penstemon Solar Project Site	
North	Bordered by Tjossem Road. Then agricultural fields, five associated residences, and various outbuildings from northwest through northeast, are north of Tjossem Road.
East	Bordered by Coleman Creek and then Moe Road. Then agricultural fields, one associated residence, and various outbuildings, are east of Moe Road.
South	Agricultural fields.
West	Agricultural fields, one associated residence, and various outbuildings.
Typha Solar Project Site	
North	Agricultural fields, Yakima River and natural vegetation, and Interstate 90.
East	Adjacent/near Yakima River and natural vegetation, and Ellensburg Golf and Country Club to the southeast.
South	Adjacent/near one residence and various outbuildings, Ellensburg Power Canal, Ellensburg Golf and Country Club, and one residence southeast.
West	Agricultural fields, Ellensburg Power Canal, and one residence to the southwest.
Urtica Solar Project Site	
North	Agricultural and pasture fields, roughly 16 residences, and various outbuildings from northwest through northeast; and Brown Road.
East	Bordered by Umptanum Road. Then agricultural and pasture fields, roughly 12 residences, and various outbuildings are from northeast through southeast. Then the Yakima River to the northeast.
South	Agricultural fields, three residences, Damman Elementary School, various outbuildings from southeast through southwest; and Manastash Road.
West	Agricultural fields, five residences, and various outbuildings southwest; and Brondt Road.

Fumaria Solar Project Site

The Fumaria Solar Project site would be located on land with a Rural Working land use designation, zoned as Agriculture 20 (i.e., Rural Working – Agriculture 20), and would be an allowed conditional use in that zone. As shown in Table 4.2-2, the project site is generally surrounded by Clark Road, Reecer Creek, agricultural lands, and associated residences and outbuildings.

Penstemon Solar Project Site

The Penstemon Solar Project site would be located on land with a Commercial Agriculture land use designation, also zoned as Commercial Agriculture, and would be an allowed conditional use in that zone. As shown in Table 4.2-2, the project site is generally surrounded by Tjossem and Moe Roads, Coleman Creek, agricultural lands, and associated residences and outbuildings.

Typha Solar Project Site

The Typha Solar Project site would be located on land with a Commercial Agriculture land use designation, also zoned as Commercial Agriculture, and would be an allowed conditional use in that zone. As shown in Table 4.2-2, the project site is generally surrounded by I-90, the Yakima River, the Ellensburg Power Canal, Ellensburg Golf and Country Club, agricultural lands, and associated residences and outbuildings.

Urtica Solar Project Site

The Urtica Solar Project site would be located on land with a Rural Working land use designation, zoned as Agriculture 20 (i.e., zoned as Rural Working – Agriculture 20), and would be an allowed conditional use in that zone. As shown in Table 4.2-2, the project site is generally surrounded by Umptanum, Brown, Manastash, and Brondt Roads; Damman Elementary School; agricultural lands; and associated residences and outbuildings.

4.2.2 Impacts to Land Use and Zoning

4.2.2.1 General County

Construction Impacts

As indicated above, development of all five of the Columbia Solar Projects would be allowed conditional uses under Kittitas County land use planning and zoning regulations. Construction of the solar projects would represent a conversion of the roughly 232 acres of leased properties currently used for agricultural hay production and grazing, to use as solar electricity generation facilities for the approximately 30-year lives of the solar projects. Of that total, 144.9 acres are designated as Commercial Agricultural land uses and 87.2 acres are designated as Rural Working land uses (Kittitas County 2016). Conversion of those lands to solar facilities would represent only:

- 0.05% of the 291,614 acres of lands specifically designated as Commercial Agricultural land uses in the county's comprehensive plan (Kittitas County 2016);
- 0.03% of the 329,982 acres of lands specifically designated as Rural Working land uses in the county's comprehensive plan (Kittitas County 2016);
- 0.13% of the total 183,124 acres of farmlands in Kittitas County (U.S. Department of Agriculture [USDA] 2012); and
- 0.34% of the 68,314 acres of total croplands in Kittitas County (USDA 2012).

By choosing agricultural lands, TUUSSO has intentionally avoided areas of significant habitat, such as shrub steppe and other areas that are important wildlife habitat. The Columbia Solar Projects are not anticipated to affect areas beyond the solar project sites' footprints and the associated generation tie lines, encompassed within the described 232 acres. Because of the minimal percentages of effects and the fact that they would be allowed conditional uses, the five Columbia Solar Projects would have minimal impacts to land uses in the county.

Operation Impacts

Mounting of the panels on post-and-frame systems on the five Columbia Solar Project sites and the continued growth of low vegetation below and between the panels would result in minimal land disturbances. Once the solar projects are decommissioned, all equipment and materials would be removed. Because of the minimal disturbances to the top soils, the lands could be readily converted back to their former or new agricultural uses. Thus, there would be no operational or post-operational impacts to land uses in the county.

4.2.2.2 Solar Project Sites

Camas Solar Project Site

The Camas Solar Project site is 51.21 acres of active agricultural land, growing alfalfa, and representing 0.02% of the 291,614 acres of lands specifically designated as Commercial Agricultural land uses in the county's comprehensive plan.

Fumaria Solar Project Site

The Fumaria Solar Project site is 35.24 acres of fallow agricultural land, representing 0.01% of the 329,982 acres of lands specifically designated as Rural Working land uses in the county's comprehensive plan.

Penstemon Solar Project Site

The Penstemon Solar Project site is 39.38 acres of active agricultural land, growing Sudangrass, and representing 0.01% of the 291,614 acres of lands specifically designated as Commercial Agricultural land uses in the county's comprehensive plan.

Typha Solar Project Site

The Typha Solar Project site is 54.29 acres, primarily consisting of irrigated agricultural land being used for grazing pasture, and representing 0.02% of the 291,614 acres of lands specifically designated as Commercial Agricultural land uses in the county's comprehensive plan.

Urtica Solar Project Site

The Urtica Solar Project site is 51.94 acres, primarily consisting of active agricultural land growing common timothy hay, and representing 0.02% of the 329,982 acres of lands specifically designated as Rural Working land uses in the county's comprehensive plan.

The proposed Columbia Solar Projects represent changes from the sites' current agricultural uses, but the projects' impacts would be minimal and isolated, and the projects are an allowable use under the current zoning and land use. Solar project development is a permitted conditional use in these areas under their designated zoning of Commercial Agriculture or Rural Working – Agriculture 20. Moreover, as noted above, the combined 232 acres represent only 0.13% of the total 183,124 acres of farmlands in Kittitas County and 0.34% of the 68,314 acres of total croplands.

4.2.2.3 Impacts to Natural and Human Environment

The environmental impacts from the proposed five Columbia Solar Projects and two associated generation tie lines would not be significant enough to warrant full environmental impact statement (EIS) review. Below is a discussion of the minor impacts from the construction and operation of the solar projects. Additional discussion of WAC 463-60 and 463-62 criteria are provided in Chapters 3 and 4.

The Earth components would not experience significant impacts from construction or operation of the Columbia Solar Projects. The geology, soils, and topography could see minor impacts from installation of the solar projects' support beams and the minimal grading associated with the construction. Because the sites are relatively flat, erosion risk is low. The only unique physical feature, the Yakima River, would not be impacted by the projects.

Air resources would experience minimal impacts from construction of the Columbia Solar Projects. Anticipated emissions of carbon dioxide equivalent (CO_2e), nitrogen oxides (NO_X), carbon monoxide (CO), and PM_{10} would result in at most 0.12% of Kittitas County's emissions inventory for each pollutant during construction. Once construction is complete, the air impacts would stop, as operating the solar projects would not cause air emissions.

Impacts to water resources would also be limited to isolated impacts. Construction would not cause any impacts to water resources that the Columbia Solar Projects must cross because TUUSSO plans to span water resources rather than constructing in them. Two water resource buffers would experience minor permanent impacts through encroachment of 7 square feet on the Penstemon Solar Project and 0.39 acres on the Urtica Solar Project. All other buffers would be avoided and experience no impacts. Similarly, wetlands, streams, and the Yakima River would also be buffered with at least 20-foot setbacks. Since no stormwater discharges are proposed and less than 5% of impervious surfaces would be added, any increased runoff would be negligible compared to the reduction in current flood irrigation. In addition, the Columbia Solar Projects can meet their stormwater discharge obligations through coverage under the

Construction Stormwater General Permit. The 100-year floodplain would experience minor permanent impacts from fill at only two locations: 0.19 acre on the Camas Solar Project site and 0.38 acre on the Urtica Solar Project site. Finally, groundwater might see impacts through seepage if construction occurs in rainy winter months, but control measures would be readily available and groundwater otherwise would not be impacted. The TUUSSO is submitting a Kittitas County Shoreline Management Act permit application and supporting narrative for informational purposes (Appendix J-3) for two distinct and minor activities within the 200-foot shoreline jurisdictional area of the Yakama River (and well away from the river's ordinary high water mark). However, pursuant to RCW 90.58.140(9), WAC 173-27-045, and WAC 173-27-030(7), the Columbia Solar Projects are exempt from Shoreline Management Act permits.

The impacts to habitat, vegetation, fish, and wildlife would not be significant. Within the Columbia Solar Projects' 232 acres, the most prevalent wildlife habitats are designated as fallow (native vegetation), fallow (recently grazed), and willow-rose shrub thicket. The solar projects would result in modification or removal of less than 1% of the total available habitat in the landscape analysis area. No sensitive or special-status plants occur on the project sites. Fish and wildlife might experience low levels of impacts during construction through temporary displacement to adjacent habitat or temporary habitat alteration, with some species (e.g., small rodents, snakes, and insects) also suffering minor levels of mortality from direct contact with construction equipment, which would not adversely impact those populations. In addition, 11.86 acres (approximately 5% of the project sites) would be converted to impervious surfaces, almost 8 acres of which would have been under agricultural production. These impervious surfaces account for 1% of the spotted skunk's habitat on the project sites and less than 1% for other species. Finally, no long-term operational impacts to special-status animal species are anticipated beyond the fencing of 2 acres and removal of 0.07 acre of bald eagle habitat and the fencing of 3 acres and removal of 0.11 acre of spotted frog habitat. The impacts to habitat, vegetation, fish, and wildlife are not significant.

One wetland on the Columbia Solar Projects would experience a minor permanent impact, and wetland protection buffers would experience minor permanent and temporary impacts. To provide access to the Typha Solar Project, approximately 0.01 acre of wetland fill would be placed in wetland TW03 to improve an existing access road compromised by a collapsed or blocked culvert. This minor fill would require a Joint Aquatic Resource Application and a shoreline development permit. All other wetlands would be avoided and see no impacts. Approximately 0.04 acre of wetland protection buffers at the Typha Solar Project would experience minor permanent impacts from road construction, while wetland protection buffers at the Camas, Typha, and Urtica Solar Projects would experience minor temporary impacts. These minor impacts to wetlands and wetland protection buffers are not significant.

The Columbia Solar Projects would cause no impacts to energy sources, as the projects are not anticipated to place a demand on energy supplies. Similarly, the solar projects would cause no impacts to soil, sand, gravel, or wood products or other natural resources in the Ellensburg area, as the resources needed for the solar projects are readily available. Water demand would also not impact water sources because the projects' limited water demands would be met by on-site existing water allocations or water trucked in from municipal sources.

Environmental health, including noise, fire risk, spills, and solid waste, would experience only minimal impacts. One project, the Camas Solar Project, might cause minimal, daytime-only impacts from noise at the property boundary with a commercial facility. While this noise level would occur during the time allowance provided by regulation, TUUSSO is committed to ongoing monitoring and mitigation, as needed to ensure the impacts are not significant.

Fire and explosion impacts would be minimal. Potential fire risks and impacts from the Columbia Solar Projects would be minimal because the projects' equipment has fire protection and prevention measures and project water can be diverted for firefighting. Moreover, the risk of explosion is low because fossil fuels would be transported, stored, or used on the solar projects in small quantities.

Like fossil fuels, toxic, hazardous, or solid waste materials are unlikely to pose impacts because they would be generated in such small quantities. To the maximum extent possible, these materials would be recycled and the remainder would be landfilled.

Construction and operation of the Columbia Solar Projects would cause minor visual changes but would not substantially degrade the existing visual character or quality of the vicinity of the projects. While the solar projects would be visible from key observation points (KOPs), none of the KOPs would experience a major or significant change to the characteristic view. The solar projects would create a minor visual contrast in the viewshed, but they would be less likely to be visible as the viewer moves further away. The projects' mitigation measures are intended to decrease the aesthetic impacts of construction of the Columbia Solar Projects.

While some land uses and resources, like recreation facilities and parking, would see no impacts from the Columbia Solar Projects, some land uses and resources could experience some non-significant impacts. Isolated cultural resources that are not eligible for the National Register of Historic Places would be minimally to moderately impacted by the solar projects, but such impacts are not expected to be significant. The majority of the roads in the area would see no impacts from the solar projects, but the three county roads that access the Fumaria Solar Project would experience temporary minor to moderate impacts from increased traffic. Similarly, during construction, traffic from slow-moving construction vehicles could cause minor, temporary impacts. None of these impacts are expected to be significant.

The Columbia Solar Projects would have minimal beneficial to no impacts on socioeconomics and employment, with the likely minimal benefit to employment coming from temporary construction hiring. Similarly, no impacts are expected on housing and potentially beneficial impacts are expected on tax revenues, with an estimated $4,880,000 in property tax revenue for Kittitas County over the 30-year project life. Because of the solar projects' on-site fire prevention and protection measures, the risk and impacts of potential fires are minimal. Impacts on police and law enforcement would be limited to minimal impacts from responding to traffic issues, emergency medical calls, and coordination in the unlikely event of a fire. Finally, no impacts would occur for other city services, such as schools, communications, utilities, maintenance, and sewer and solid waste, since no permanent relocations or in-migration is anticipated and no toilet, septic, or sewer system connections would be made at the solar project sites.

Each of the five proposed Columbia Solar Projects is estimated to cost $8 to 10 million, for a total estimated cost of $40 to $50 million for all five projects. As to magnitude, the solar projects would generate approximately 5 MWac each, approximately 25 MWac in total. Please refer to the responses in Sections 2.1 and 2.2 for more detailed information about the magnitude of the five proposed Columbia Solar Projects.

The Columbia Solar Projects' impacts to the natural and human environment are, in many cases, minor and/or temporary. In fact, a number of resources would not be impacted at all by the solar projects. Based on the discussion above, the environmental impacts should be viewed as not significant enough to warrant a full review of this application.

(2) Light and glare. The application shall describe the impact of light and glare from construction and operation and shall describe the measures to be taken in order to eliminate or lessen this impact.

4.2.3 Light and Glare

4.2.3.1 General

PV flat plate solar panels are designed to absorb sunlight, with an anti-reflective layer to maximize solar absorption and minimize glare. In practice, from satellite view and airplanes, large arrays of solar modules resemble a dark blue body of water and are not a significant contributor of glare in most conditions.

A mono-crystalline silicon solar cell absorbs two-thirds of the sunlight reaching the panel's surface. Therefore, only one-third or 30% of the sunlight reaching the surface of the solar panel has the opportunity to be reflected. This reflected light from the panels is referred to as glare, a continuous source of bright light, and is considered a nuisance concept of light. Other comparable levels of glare are listed below to help put this into context:

- Dry sand – 45%
- Mono-crystalline silicon solar cell – 30%
- Grass-type vegetation – 25%
- Needle-leaf coniferous trees – 20%
- Broad-leaf deciduous trees – 10%

The U.S. Air Force has studied glare impact from flat-panel solar projects to airports, and determined that such glare is similar to "weathered white concrete" and poses minimal risk (for more detail see U.S. Air Force [2011]).

Glare would only impact a particular receptor nearby for a brief period throughout the day, as the panels would constantly track the angle of the sun. Any existing vegetation surrounding the properties, plus any additional vegetative screening planted as part of the five proposed Columbia Solar Projects, could mitigate additional glare from the projects.

4.2.3.2 Solar Project Sites

The Solar Glare Hazard Analysis Tool (SGHAT), created by Sandia National Laboratories, was used to conduct the glare analyses for the five Columbia Solar Projects. In 2017, the Solar Glare Hazard Analysis Tool was licensed to the private company Forge Solar, run by one of the original engineers who designed the popular glare modeling tool, which now appears on the reports and have a new, simpler format for presenting ocular impacts. Representative models of the five proposed PV system were constructed in the SGHAT application for each of the projects' three KOPs relative to the solar module arrays. Potential glare hazards were evaluated against the current FAA guidelines and industry standards for acceptable glare.

Figure 4.2-2 shows how the SGHAT tool results are displayed.

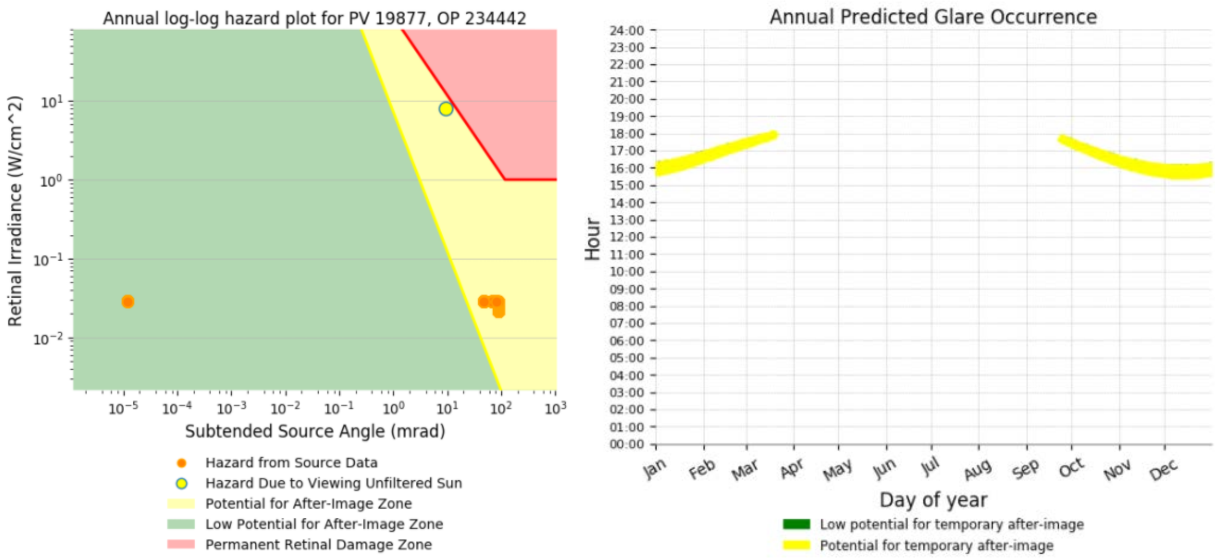


Figure 4.2-2. SGHAT tool results example.

In the above case, yellow glare potential is indicated for temporary after-image during sunset hours in winter months. However, the source data intensity is two orders of magnitude below the direct sun intensity and within normal driving conditions during sunset hours as indicated in the plot to the top left.

Based on the SGHAT analysis for all five Columbia Solar Projects, the ocular impact or glare intensity is below 2×10^2 W/cm^2 in the “Hazard plot for PV” and, therefore, the projects would have no dangerous or detrimental visual impact to the KOPs and would not poise a visual nuisance.

Camas Solar Project Site

Camas KOPs 2 and 3 indicate, as expected, that the elevated approach above the lower-lying Camas Solar Project would result in some longer periods of green and yellow potential indicators during morning hours.

Fumaria Solar Project Site

All KOPs are a significant distance and at similar elevation to the Fumaria Solar Project. As such there is practically no glare component contributing to the KOPs.

Penstemon Solar Project Site

KOPs 1 and 2 for the Penstemon Solar Project site indicate a reasonable amount of yellow potential glare indications. However, all are low intensity and acceptable. It is also noted that between both observations showing more potential glare minutes per month, both would have visual obstructions between them not reflected in this model. KOP 1 would have a future fence and landscaping, and KOP 2 an existing vegetative screen. Both are within acceptable glare intensity levels for observers in motion as shown.

Typha Solar Project Site

Similar to Fumaria, all KOPs for the Typha Solar Project are a significant distance from the project site. Given this, there is practically no glare component from the solar project contributing to the KOPs.

Urtica Solar Project Site

All KOPs for Urtica are green and yellow indicators and within acceptable intensities for KOPs in motion.

(3) Aesthetics. The application shall describe the aesthetic impact of the proposed energy facility and associated facilities and any alteration of surrounding terrain. The presentation will show the location and design of the facilities relative to the physical features of the site in a way that will show how the installation will appear relative to its surroundings. The applicant shall describe the procedures to be utilized to restore or enhance the landscape disturbed during construction (to include temporary roads).

4.2.4 Affected Environment for Aesthetics

4.2.4.1 Visual Resource Assessment Methodology

For the purposes of analyzing the environmental effects from the development of the five proposed Columbia Solar Projects on the visual resources of the area, the U.S. Bureau of Land Management's (BLM's) Visual Resource System was applied. The BLM manages landscapes for varying levels of protection and modification, giving consideration to other resource values and uses and the scenic quality of the landscape. While each of the five solar project sites is located on private agricultural lands, the BLM's Visual Resource Management (VRM) analysis approach provides a useful tool for providing data that help to identify potential impacts to visual resources.

Four steps were followed to assess the impacts to the landscape using the BLM VRM system: 1) create viewshed delineations from each project location to determine areas from where each solar project can be seen and to select key observation points (KOPs); 2) use the viewshed delineations and points of interest to the public to select KOPs; 3) collect field data including photos at each KOP and a description of the affected environment; 4) create visual simulations for each solar project using the KOP photos and complete contrast rating forms to assess impacts. These four steps are outlined in detail in the Visual Resources Report in Appendix D.

4.2.4.2 General County Setting

The five proposed Columbia Solar Project sites are located in the Columbia Basin physiographic province, just east of the Northern and Southern Cascades provinces in Washington State. The area consists of scattered houses and farm buildings, flat agricultural fields, irrigation ditches, county roads, and major highways. The agricultural flatlands give way to rolling hills, and to the north to the high peaks of the Cascade Range. The topography of each of the five project areas can be characterized as flat. Elements of line, form, color and texture common to all project sites in the existing environment are shown in Table 4.2-2. Additional elements for each KOP site can be found in the descriptions for each KOP below and in the Contrast Rating Forms in Appendix D. Note that the photographs for the KOPs were taken in April, before all of the vegetation had fully developed and during a time that there was no snow on the ground.

Table 4.2-3. Elements of Line, Form, Color, and Texture Common to all Five Columbia Solar Project Sites

Element	Land/water	Vegetation	Structures
Form	Flat, rolling, tall, steep, and triangular	Oval, circular, and lanceolate	Houses/Buildings: Triangular, square, and rectangular Fences/Roads: Bold, simple, horizontal, and directional Signs/Utility Poles: Circular, square, hexagonal, and rectangular
Line	Straight, horizontal, and parallel	Vertical, parallel, and converging	Houses/Buildings: Straight, vertical, horizontal, and semi-circular Fences/Roads: Straight, bold, horizontal, vertical, parallel, and perpendicular Signs/Utility Poles: Geometric and bold
Color	Land: Brown, gray, and white Water: Dark olive green	Various shades of green, tan, gray, and brown	Houses/Buildings: Gray, white, red, and tan Fences/Roads: Gray, silver, white, and brown
Texture	Fine, medium, and smooth	Fine, medium, and coarse	Smooth, fine, directional, and matte

4.2.4.3 Solar Project Sites

The overall visual character of each of the five Columbia Solar Project sites, as well as views KOPs for each site, are described below.

Camas Solar Project Site

The Camas Solar Project site is comprised of actively farmed alfalfa agricultural land, associated irrigation lines and ditches, an underground natural gas pipeline in the northwest portion of the site crossing from northeast to southwest, and Little Naneum Creek forming the eastern property boundary. The project site is located southeast of the city of Ellensburg. It is in Sections 18 and 19, Township (T) 17 North (N), Range (R) 19 East (E), Willamette Meridian, and in the southeast corner of where the Tjossem Road overpass crosses Interstate 82 (I-82). The project site is divided by an irrigation ditch.

Camas KOP 1

Camas KOP 1 is located on U.S. Highway 82 at the southernmost tip of the Camas Solar Project site. The view is to the northeast, where the project would be constructed. The foreground and middle ground topography includes the highway and flat agricultural fields, a tan grassy area surrounding a ditch, a few white and gray houses, and fences with straight smooth lines. The background view, while initially flat, eventually gives rise to the blue-gray Ellensburg Hills and then to the Cascade Range with snowy white peaks. Dominant colors for the landscape are brown, green, and tan while the structures (e.g., houses, highway, and fencing) are white and gray. The grasses, deciduous trees, and shrubs have varying textures of fine, medium, and coarse (Appendix D, KOP Photograph Log). Table 4.2-3 summarizes the location, direction of view, and elements not common to each KOP.

Table 4.2-4. Summary of Five Columbia Solar Project KOP Locations, Directions of View, and Viewsheds

KOP	Location	Direction of the View from the KOP	Viewshed
Camas Solar Project Site			
Camas KOP 1	U.S. Highway 82 at the southernmost tip of the Camas Solar Project site	Northeast	*Foreground*: Highway, fields, houses, and fences *Middle ground*: Same as the foreground *Background*: Rolling hills and snow-capped peaks
Camas KOP 2	Northeast tip of the Camas Solar Project site on Tjossem Road	Southwest to Southeast	*Foreground:* Open fields, roads, houses, farm buildings, fencing, road signs, and rows of trees *Middle ground:* Same as the foreground *Background*: Distant structures, flat agricultural lands, and trees
Camas KOP 3	Northwest intersection of U.S. Highway 82 and Tjossem Road.	Northeast to Southeast	*Foreground:* Same as Camas KOP 2 *Middle ground:* Same as Camas KOP 2, with more prominent road views *Background*: Same as Camas KOP 2
Fumaria Solar Project Site			
Fumaria KOP 1	Reecer Creek Road at the intersection of a private house driveway and an irrigation canal	Southwest to Northwest	*Foreground:* Buildings, driveway, cattle guard, ditch, shrubs, and utility poles *Middle ground:* Shrubs, trees, house and barn, and industrial and farm buildings *Background*: Ridges and distant peaks
Fumaria KOP 2	Northwest of the Fumaria Solar Project site, approximately 2.0 miles from the western boundary and generation tie line corridor on U.S. Route 97	Southeast	*Foreground:* County road, fencing, trees, houses, and utility poles *Middle ground:* Pond, agricultural field, and farm buildings *Background*: Flat-topped mountain and distant peaks
Fumaria KOP 3	Southwest of the Fumaria Solar Project site, on Hungry Junction Road, 200 feet east of its intersection with Faust Road	West to Northeast	*Foreground:* Roads, ditch, fencing, and agricultural field *Middle ground:* Agricultural fields, sparse trees, and houses *Background*: Rolling hills and distant peaks
Penstemon Solar Project Site			
Penstemon KOP 1	Along Tjossem Road, approximately 140 feet from the intersection of Moe Road, and a few feet from the northeast boundary of the Penstemon Solar Project site	Southwest	*Foreground:* Agricultural field and no trespass sign *Middle ground:* Trees and sporadic houses *Background*: Agricultural fields, houses, rolling hills, and distant peaks
Penstemon KOP 2	Approximately 1,500 feet south of the Penstemon Solar Project southeast site boundary, on Moe Road	Northwest	*Foreground:* Coleman Creek, grass, and agricultural field *Middle ground:* Trees of varying shapes, houses, and farm buildings with red roofs *Background*: Agricultural fields, houses, hills, and distant peaks

KOP	Location	Direction of the View from the KOP	Viewshed
Penstemon KOP 3	Approximately 840 feet west of the Penstemon Solar Project northwest site boundary, on Tjossem Road	Southeast	*Foreground:* Concrete-lined irrigation ditch, white water line, and grassy field *Middle ground:* Grassy field, trees of varying shapes, and houses *Background*: Fields, houses, farm buildings, rolling hills, and distant peaks
Typha Solar Project Site			
Typha KOP 1	Approximately 2.0 miles northwest of the Typha Solar Project site, on U.S. Route 97 and southwest of Thorp Highway South	Southeast	*Foreground:* I-90 freeway, green road sign, grassy area, agricultural field, and overhead irrigation sprinklers *Middle ground:* Same as the foreground *Background*: Rolling hills and distant peaks
Typha KOP 2	1.4 miles northwest from the Typha Solar Project site, on Thorp Highway South and the intersection of a county road	Southeast	*Foreground:* Road with gravel edge, utility poles, mailboxes, and agricultural field *Middle ground:* Farm buildings, trees, and agricultural fields *Background*: Boylston and Saddle Mountains
Typha KOP 3	1.0 mile to the southwest of the Typha Solar Project site, at the intersection of Cove Road and Robinson Canyon Road	Northeast	*Foreground:* Overhead irrigation sprinklers, agricultural field, houses, and trees *Middle ground:* Rolling agricultural fields and houses *Background*: Mountain ridges of Wenatchee National Forest
Urtica Solar Project Site			
Urtica KOP 1	On Umptanum Road, approximately 65 feet north of where it diverges from Brown Road	Southwest	*Foreground:* Umptanum Road, agricultural field, wire fence, and metal gate *Middle ground:* Houses, fences, and trees *Background*: Manastash and Umptanum Ridges, and the distant peaks of Snoqualmie National Forest
Urtica KOP 2	On Umptanum Road, approximately 800 feet from the Urtica Solar Project site southern boundary	Northwest	*Foreground:* Shallow ditch, wire and wood fencing, and road signs *Middle ground:* Trees, road, houses, fences *Background*: Rolling hills and peaks of Wenatchee National Forest
Urtica KOP 3	On Brondt Road, approximately 2,000 feet (0.4 mile) from the northeast boundary of the Urtica Solar Project site	Southeast	*Foreground:* Irrigation pipe and agricultural field *Middle ground:* Barn, houses, and trees *Background*: Manastash and Umptanum Ridges, and the peaks of Snoqualmie National Forest

Camas KOP 2

Camas KOP 2 is located at the northeast tip of the Camas Solar Project site on Tjossem Road. The view from the KOP is southwest to south-southeast, where the project would be constructed. The foreground and middle ground at Camas KOP 2 consist of strong vertical and diagonal lines of demarcated agricultural fields, roads, houses, farm buildings, fencing, utility poles, and a road sign along with straight rows of trees and randomly placed trees with oval, lanceolate, and circular canopies. The background consists of distant buildings, flat agricultural lands, and green trees, which all give way to Manastash Ridge in the distant background (Appendix D, KOP Photograph Log).

Camas KOP 3

Camas KOP 3 is located at the northwest intersection of U.S. Highway 82 and Tjossem Road. KOP 3 is located at a superior position, elevated approximately 25 feet higher than the Camas Solar Project site. The view from Camas KOP 3 is a panorama looking east to southeast, where the Camas Solar Project would be constructed. The foreground, middle ground, and background are all similar to Camas KOP 2, except there are long curving lines from the gray and white-striped four-lane freeway and overpass that dominate the foreground. The freeway curves in the middle ground as it retreats into the blue-gray undulating Manastash Ridge in the background. To the southeast there is a flat grassy field where the project would be constructed (Appendix D, KOP Photograph Log).

Fumaria Solar Project Site

The Fumaria Solar Project site consists of fallow agricultural land and a ditch along the western boundary. It is located northwest of the city of Ellensburg. It is in the southeast portion of Section 9, T18N, R18E, north of Hungry Junction Road and east of Lower Green Canyon Road. An 80-foot-wide by 2.6-mile-long generation tie line corridor with wooden poles along much of it would be included as part of the project site. This generation tie line would run along existing roads from the southwest corner of the project site: approximately 0.4 mile east to west along Clarke Road, turning due south for 1.0 mile along Faust Road, and turning west again for 0.75 mile on Hungry Junction Road. From Hungry Junction Road, the final segment would continue south along U.S. Route 97 before turning northwest into an electrical substation near the John Wayne Pioneer Trail. As described above, portions of the generation tie line would comprise new poles and lines, while other portions would share existing transmission right-of-ways and infrastructure.

Fumaria KOP 1

Fumaria KOP 1 is located on Reecer Creek Road at the intersection of a private house driveway and an irrigation canal, approximately 2,650 feet (0.5 mile) from the eastern boundary of the Fumaria Solar Project site. The view from Fumaria KOP 1 is westerly, from southwest to west. The foreground topography includes gray and white buildings next to a lot full of scrap metal and industrial vehicles including dump trucks, backhoes, and trailers. There is also a grey-brown dirt/gravel road with a cattle guard, utility poles, a brown earthen ditch bordered by tall tan grasses on one side and bright green short clump grass on the other, and a slightly inclining hill covered with low lying dense shrubs in the foreground (e.g., bitter-brush [*Purshia tridentate*] and big sagebrush [*Artemisia tridentate*]). The middle ground topography contains shrubs giving way to a line of trees of various shapes, a large brown and tan house, a red barn, and other industrial and farm buildings. The background consists of blue-gray ridges and the distant snowy peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Fumaria KOP 2

Fumaria KOP 2 is located to the northwest of the Fumaria Solar Project site, approximately 2.0 miles from the western boundary and the generation tie line corridor on U.S. Route 97. The view from Fumaria KOP

2 is east to southeast toward the project site. The foreground topography is dominated by the gray U.S. Route 97, straight wire fencing, a few roundish trees shielding a house, a mailbox, white irrigation pipes, and brown wooden utility poles. The middle ground has an agricultural field surrounded by patches of shrubs and trees, with a sparse distant buildings and houses. The background consists of blue-gray flat topped Table Mountain and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Fumaria KOP 3

Fumaria KOP 3 is located to the southwest of the Fumaria Solar Project site, on Hungry Junction Road, 200 feet east of its intersection with Faust Road. The view from Fumaria KOP 3 is a panorama from west to north toward the project site and the generation tie line that would travel along Hungry Junction and Faust Roads. The foreground consists of gray roads with yellow striping, a ditch blackened by fire and surrounded by grasses, brown smooth wire fencing, and a green agricultural field. The middle ground consists of agricultural fields, sparse trees, and gray and white houses and storage buildings. The background consists of blue-gray rolling hills and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Penstemon Solar Project Site

The Penstemon Solar Project site consists of actively farmed Sudangrass or hay agricultural land, associated irrigation lines and ditches, and Coleman Creek forming the eastern property boundary. The project site is located southeast of the city of Ellensburg. It is in Section 17, T17N, R19E, at the corner of the intersection of Tjossem Road and Moe Road.

Penstemon KOP 1

Penstemon KOP 1 is located on Tjossem Road, approximately 140 feet from its intersection with Moe Road, and is a few feet from northeast boundary of the Penstemon Solar Project site. The view from the Penstemon KOP 1 is a panorama from southeast to southwest. A row of trees borders Coleman Creek on the east boundary of the project site, providing cover for a blue houses located 145 feet away. The foreground topography is a flat brown, tilled agricultural field with a black, orange, and brown "private property no trespass" sign, and a short section of a guardrail. The middle ground consists of various shapes (e.g., round, lanceolate, and circular) and heights (e.g., short, medium, and tall) of trees and wood utility poles. Sporadic houses are mostly white and gray. The background has more fields and houses, and the distant background consists of blue-gray rolling hills and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Penstemon KOP 2

Penstemon KOP 2 is located approximately 1,500 feet south of the Penstemon Solar Project site southeast boundary, on Moe Road. Moe Road runs parallel to the eastern project site boundary. The view from Penstemon KOP 2 is to the northwest where the project site would be located. The foreground topography consists of Coleman Creek, which is surrounded by tall grasses trees and shrubs edging up to Moe Road, a flat agricultural field, and wood utility poles and lines. The middle ground topography consists of various shaped trees, as noted in Penstemon KOP 1. Several houses and farm buildings are present, many with red roofs or sides. The background consists of smooth green and brown fields, gray and white houses, and the distant background consists of blue-gray rolling hills and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Penstemon KOP 3

Penstemon KOP 3 is located approximately 840 feet west of the Penstemon Solar Project site northwest boundary, on Tjossem Road. Tjossem Road runs parallel to the northern project site boundary. The view from Penstemon KOP 3 is east to southeast, where the project site would be located. The foreground topography consists of a gray, concrete-lined irrigation ditch; a smooth, white, tubular water line; and a flat, medium-textured grassy field. The middle ground topography also has a flat grassy field, along with a line of trees of varying shapes and a few white and gray houses and farm buildings to the southeast. The background has more fields and houses, and the distant background consists of blue-gray rolling hills and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Typha Solar Project Site

The Typha Solar Project site consists of irrigated agricultural land being used for a grazing pasture, associated irrigation ditches and a circular irrigator, and small wetlands. The project site is located northwest of Ellensburg. It is in Section 30, T18N, R18E, with the Yakima River running near the northeast border of the site, a wetland along the southern border, I-90 to the northeast, and Thorp Highway South to the southwest.

Typha KOP 1

Typha KOP 1 is located approximately 2.0 miles northwest of the Typha Solar Project site on I-90/U.S. Route 97, southwest of Thorp Highway South. The view from Typha KOP 1 is to the southeast, where the project site would be located. The foreground consists of an agricultural field that at the time of the photograph had a long, metal overhead irrigation system present and a white pipeline. There are grasses and shrubs in the foreground bordering the agricultural field. The middle ground consists of trees, houses, and more agricultural fields. The background consists of dark blue-gray rolling hills and the distant peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Typha KOP 2

Typha KOP 2 is located 1.4 miles northwest from the Typha Solar Project site at the intersection of Thorp Highway South and Miller Road, a county road. The view from Typha KOP 2 is to the east-northeast and to the east-southeast. The foreground topography consists of a short, brown utility pole and a creosote log that appears to be part of an old fence that lies in front of a bright green grassy agricultural field. The middle ground consists of farm buildings, trees of varying shapes, and smooth brown and green agricultural fields. The background consists of the blue-gray Boylston and Saddle Mountains (Appendix D, KOP Photograph Log).

Typha KOP 3

Typha KOP 3 is located 1.0 mile to the southwest of the Typha Solar Project site, at the intersection of Cove Road and Robinson Canyon Road. The view from Typha KOP 3 is north to the east-northeast, where the project would be constructed. The foreground consists of smooth, silver, overhead irrigation sprinklers; a finely textured grassy agricultural field; red, tan, and gray houses with flat and triangular roofs; and a few roughly textured, dark green sparse trees. The middle ground consists of rolling agricultural fields and houses. The background consists of the curving line of the blue-gray mountains of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Urtica Solar Project Site

The Urtica Solar Project site consists of actively farmed timothy hay agricultural land, associated irrigation lines and ditches, and McCarl Creek running through the center of the site. The project site is located southwest of Ellensburg. It is in Section 10, T17N, R18E, bordered on the west side by Umptanum Road and located north of Manastash Road.

Urtica KOP 1

Urtica KOP 1 is located on Umptanum Road, approximately 65 feet north of where it diverges from Brown Road. The Urtica Solar Project site northeast boundary is approximately 350 feet from Urtica KOP 1. The view is south to west-southwest, where the project would be constructed. The foreground topography includes the gray- and white-striped, curving Umptanum Road; a flat, grassy, green agricultural field; bunched medium-height trees near a wood and metal brown wire fence; a gray, smooth, metal gate; road signs; wire fencing; and wooden utility poles. The middle ground consists of more houses and farm buildings, agricultural fields, and medium and tall trees. The background consists of Manastash and Umptanum Ridges and the distant snowy peaks of the Snoqualmie National Forest (Appendix D, KOP Photograph Log).

Urtica KOP 2

Urtica KOP 2 is located on Umptanum Road, approximately 800 feet from the Urtica Solar Project site southern boundary. The view from Urtica KOP 2 is to the west and the northwest. The foreground topography includes a chain-link fence that divides a parking lot from an agricultural field, a wire fence with metal and wood poles, the backside of a road sign, and a brown and green agricultural field. The middle ground appears as a line of trees of varying heights and shapes, houses, and farm buildings. The background consists of curving blue-gray rolling hills and the distant snowy peaks of the Wenatchee National Forest (Appendix D, KOP Photograph Log).

Urtica KOP 3

Urtica KOP 3 is located on Brondt Road, approximately 2,000 feet (0.4 mile) from the northeast boundary of the Urtica Solar Project site. The view from Urtica KOP 3 is east-southeast to southeast. The foreground topography includes a silver irrigation pipe with circular wheels and a medium-textured, green, grassy field. The middle ground topography includes a red barn with a diagonal gray roof, several white and brown houses, and a line of trees of various shapes and different heights. The background consists of the blue-gray Manastash and Umptanum Ridges and the distant snowy peaks of the Snoqualmie National Forest (Appendix D, KOP Photograph Log).

4.2.5 Impacts to Aesthetics

Sections 4.2.5.1 and 4.2.5.2 provide an overview of the impacts to Aesthetics from all five proposed Columbia Solar Project sites. Appendix D presents detailed impact analysis for each site, for each KOP.

4.2.5.1 Construction Impacts

Construction impacts (visual contrasts) with the characteristic landscape of the Columbia Solar Project sites would result from activities associated with construction of the five solar sites. Removal of existing vegetation, grading for the all-weather access roads, and trenching would result in visual contrasts to the color and irregular texture and lines of the characteristic landscape over the 6 to 9-month construction period. In addition, construction equipment, vehicles, supplies, and associated project activities would be clearly visible from the KOPs during construction activities. During the initial phases of construction, these changes to the views may seem uncharacteristic or appear out of place, discordant, or distracting. However, as construction progresses and much of the equipment is no longer needed, equipment is removed from the site, and the views would appear more normal, less discordant, and less distracting. Construction activities would be transient and of short duration as construction progresses, and given the other activities in the area (e.g., commercial agriculture), construction would not substantially degrade the existing visual character or quality.

Construction of the proposed Columbia Solar Projects would be visible from 10 of the 15 project sites' KOPs and contrast to a minor to moderate degree with the surrounding landscape. The level of change to the landscape apparent from the construction of any of the five sites would be minor to moderate based on the visual resource contrast analysis. Minor to moderate contrasts in the elements of the environment would generally be consistent with the characteristic landscape. Although primarily agricultural in setting, there are numerous transmission lines, pipelines, metal buildings, and fence lines visible from each of the KOPs. There are existing visible contrasts apparent from each of the KOPs. None of the KOPs would experience a major or significant change to the characteristic views.

The proposed Columbia Solar Projects would generally repeat the basic elements of line, texture, color, and form found in the predominant natural features of the characteristic landscape. Contrast from construction would be less apparent the further the view is from each site, and would be more apparent the closer the view is to each site. Adjacent viewers (e.g., farmers, private landowners, and motorists) would experience the greatest change in views since the contrast is most noticeable when viewing up close (i.e., 25 feet or closer); However, as these views are not representative of public views, they were therefore not considered for KOP selection.

Viewers accustomed to the typical rural, agrarian landscape would be affected by the minor contrast created from construction impacts. The construction of the Columbia Solar Project sites would cause a long-term change to scenery (see Operational Impacts, below), while the actual construction of the sites and facilities would be short-term changes. During construction, the motion associated with construction equipment, movement, panel placement, alteration of topography, earthwork, vegetation clearing, short-term impacts from dust generation, and landform modification would be noticeable to all viewers (e.g., residents, motorists, and tourists) and create visual contrast within the viewshed.

The minor contrast would occur along routes of various travel speeds (e.g., trail, unpaved routes, and high-speed interstate) and would generally be visible in the foreground for only a few hundred feet and for a brief duration. As described below in detail, contrasts are less likely to be visible the further away the viewer is from the Columbia Solar Project sites, eventually becoming indiscernible as the viewer moves further away. When considering the minor to moderate contrast cumulatively, construction of the solar projects would attract attention and be seen, but would not dominate the view of the casual observer from the KOPs. In most cases, the views from the KOPs would be altered to a minor degree from existing conditions.

Simulations demonstrate that the construction of the Columbia Solar Projects would result in changes to the visual and aesthetic conditions, but these changes would be moderate and weak when considering the surrounding landscapes. In addition, TUUSSO's proposed mitigation measures (provided in Appendix D) are intended to decrease the contrasts of constructing the solar projects.

4.2.5.2 Operation Impacts

During operation of the five Columbia Solar Project sites, the regular geometric forms and strong horizontal and vertical lines associated with the solar arrays and associated infrastructure would result in a visual contrast with the irregular, organic forms and colors of the existing landform and vegetation. However, the existing fence lines, transmission/distribution lines, metal buildings, and roads also possess horizontal and vertical lines and, therefore, the introduction of the solar project sites would not dominate the landscape. TUUSSO-proposed mitigation, such as vegetation screening, would decrease the contrast more each year as the vegetation matures and covers larger areas.

In addition, color contrast associated with the solar panels would vary throughout the day as the panels rotate to track the sun from east to west. Although concentrated light would not be directly reflected toward any of the KOPs, the solar panels, when viewed from distant elevated viewing positions at certain times of the day, would reflect the sky, resembling a dark blue body of water, resulting in a contrast with the dull hues of the surrounding green/tan agricultural fields and grey-green vegetation. The contrast would be dull due to the flat plate and anti-reflective design.

Once operational, the contrast would remain unchanged from construction. As vegetative screening (see mitigation measures) matures and grows, the contrast of the Columbia Solar Project sites would become less visible and the contrast of each site to the surrounding areas would be decreased.

Operation of the Columbia Solar Project sites would require routine and periodic equipment testing, panel cleaning, and other ongoing maintenance tasks. However, these activities would not increase in duration or intensity in such a way as to alter or adversely affect the existing landscape (i.e., the aesthetics) beyond what occurred during construction.

TUUSSO has proposed numerous mitigation measures intended to decrease the contrasts that may result from construction (Appendix D).

(4) Recreation. The application shall list all recreational sites within the area affected by construction and operation of the facility and shall then describe how each will be impacted by construction and operation.

4.2.6 Affected Environment for Recreation

This section describes the recreational parks and facilities, trails, and dispersed uses in the North Cascades Region, the general Kittitas County area, and Ellensburg.

4.2.6.1 Recreation in the North Cascades Region

The Washington Recreation and Conservation Office regularly prepares a Washington State Comprehensive Outdoor Recreation Plan (SCORP) to characterize recreational use at the statewide and regional analysis levels. The latest SCORP was prepared in 2012 using information obtained with a recreational use telephone survey conducted from August to October 2012 (Responsive Management 2012).

Kittitas County is located at the southernmost border of the North Cascades Region (which also includes Chelan, Snohomish, Okanogan, Skagit, and Whatcom Counties). The highest participation rates for general recreational categories (Table 4.2-4) in the North Cascades Region included those for walking, hiking, climbing, and mountaineering (90.7% of North Cascades Region residents); other outdoor recreational activities (84.2%); picnicking, barbecuing, or cooking out (83.3%); nature activities (81.1%); and water-related activities (79.8%). Notable individual recreational activities included walking without a pet (68%), observing or photographing wildlife (62%), hiking (59%), gardening (58%), walking with a pet (56%), and camping (50%). Overall, residents of the SCORP North Cascades Region participated in the same recreational activities at very similar rates to other Washington residents (Responsive Management 2012).

4.2.6.2 General County

Tourism is an important sector of the Kittitas County economy. Local recreational opportunities include cross-country skiing, snowmobiling, hiking, camping, fishing, river rafting, and hunting (Pless et al. 2015). Two major rivers provide a number of dispersed recreational opportunities. The Columbia River flows from north to south in central Washington and forms the eastern border of the county. It provides significant fishing, boating, water skiing, and other recreational opportunities. The Yakima River flows out of the Cascade Mountains, east through the center of the county, and just south of Ellensburg. It provides opportunities for rafting and fly-fishing for trout (City of Ellensburg 2015).

Table 4.2-5. Recreational Use Rates in the SCORP North Cascades Region and Washington

Recreational Activity	Use by Residents (%)	
	North Cascades Region	Washington
Walking, Hiking, Climbing, Mountaineering	90.7	90.0
Other Outdoor Recreational Activities	84.2	82.7
Picnicking, BBQing, or Cooking Out	83.3	80.9
Nature Activities	81.1	81.4
Water-Related Activities	79.8	75.2
Sightseeing	61.8	56.8
Camping	50.0	42.4
Bicycle Riding	43.5	36.9
Snow and Ice Activities	37.9	31.3
Fishing or Shellfishing	33.9	34.1
Indoor Community Facilities	27.9	28.4
Hunting or Shooting	22.8	21.4
Off-Roading for Recreation	15.7	15.3
Frisbee Activities	14.8	16.8
Horseback Riding	9.8	7.7
Air Activities	3.5	3.8

Note: The recreational telephone survey was conducted from August to October 2012.
Source: Responsive Management (2012).

Kittitas County also has significant downhill and cross-country skiing and snowshoeing opportunities. The county extends west to Snoqualmie Pass in the Cascade Mountains, which is one of the most popular ski areas in the state. There are three major ski facilities at Snoqualmie Pass that collectively attract more than 500,000 ski visitors annually and employ about 750 people during the ski season. The Washington State Department of Transportation (WSDOT) is currently constructing Phase 1 of I-90 improvements. This $45-million, multi-year project would reduce congestion and, thus, benefit Kittitas County tourism as well as provide heavy construction sales tax revenues to the county. Kittitas County also recently partnered with WSDOT and others to submit a $14-million request for federal funds to design Phase 2A of the I-90 project in the area of Exit 62 (Pless et al. 2015).

Recreational Parks and Facilities

Major recreational facilities within Kittitas County (Figure 4.2-3) include parks and campgrounds, river-access parks, trails, other facilities and golf courses, and venues where major events are held including:

- Olmstead Place Historical State Park
- Helen McCabe Memorial State Park
- Washington State Horse Park
- Lake Easton State Park
- Ginkgo Petrified Forest State Park, Ginkgo State Park Interpretive Trails, and Wanapum State Park/Recreation Area
- Iron Horse Trail, also known as the John Wayne Pioneer Trail
- Coal Mines Trail
- Other facilities, golf courses, and venues for major events

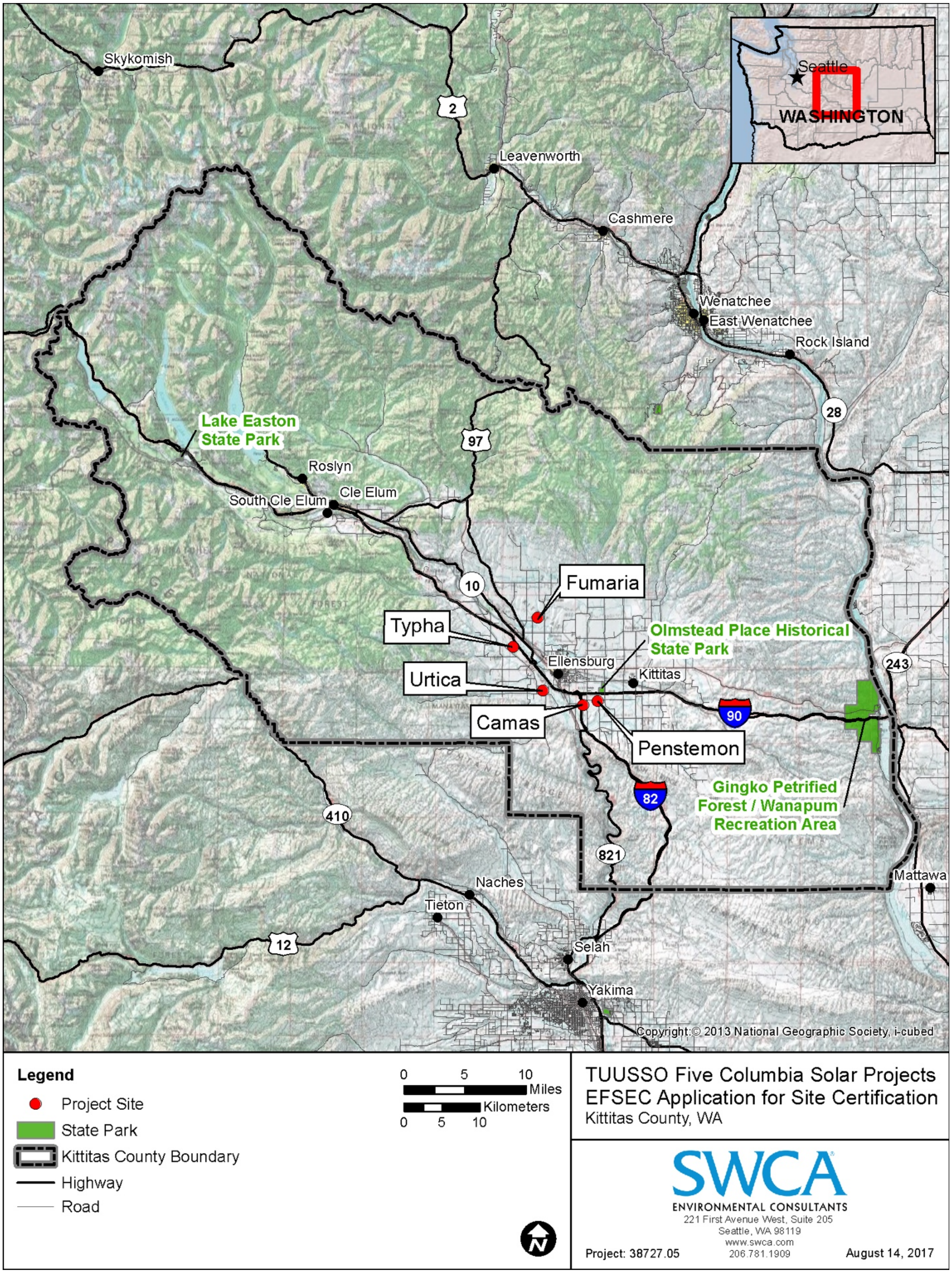


Figure 4.2-3. Kittitas County selected major state recreational parks.

The key features of some representative major facilities and recreational opportunities are described below.

Olmstead Place Historical State Park is a working pioneer-era farm and was one of the first homesteads in the Kittitas Valley, with an original log cabin built in 1875. It is a day-use 217-acre park located southeast of Ellensburg. It is managed by Washington State Parks. The park includes historic gardens and farm artifacts, a dairy barn, a granary, a wagon shed, a hay barn, the Olmstead family home, 17 unsheltered picnic tables, and restrooms. Activities at the park include hiking, fishing, interpretive activities, wildlife viewing, and a living farm museum. Recreationists can walk along Coleman Creek, following 1 mile of the Altapes Creek Interpretive Trail. During the winter, there is also cross-country skiing and snowshoeing on the site (Washington State Parks 2017a).

The Helen McCabe Memorial State Park is located on Thrall Road and the Yakima River Canyon Road, about 5 miles south of Ellensburg. It is a relatively undeveloped park located at the entrance to the Yakima River Canyon. Washington State Parks maintains the park year round. There is an 8-acre stocked pond in the park for fishing, and there are also several hiking trails around the area. An interpretive center is being built in the park, to share information about the natural and cultural values of the 33-mile Yakima River Byway (Kittitas County Chamber of Commerce 2017b).

Washington State Horse Park, a premier equestrian facility near the city of Cle Elum, serves the recreational, competitive, and educational needs of riders and horse enthusiasts in all disciplines, age groups, and skill levels. The 112-acre venue has four large arenas that can accommodate large horse events or smaller, less formal activities. The park includes (Pless et al. 2015; Washington State Horse Park 2017):

- Four large sand arenas
- 160+ covered stalls
- Two cross-country courses, for starter through preliminary skill levels
- Competitive trail course
- Trails and water crossings designed for carriage driving
- Dressage court
- Show jump courses (one schooling and one competition)
- Wash racks with safe matted footing
- Lunging areas
- Cattle pens
- Safe and sturdy mounting blocks near stalls and arenas
- Bleacher seating
- 23 recreation vehicle (RV) hook-ups with water, sewer, electricity, and a RV sanitary dump station
- Space for dry camping or tent camping, outside of the RV hook-up spaces, for no charge
- Shower building with three private shower rooms
- Hospitality tent with picnic tables, water, and electricity that accommodates large groups for meals or entertainment
- Show office with internet access
- Large gravel parking areas with plenty of turn-around space for large rigs

Lake Easton State Park is a forested, 515-acre, year-round campground located on Lake Easton State Park Road, near Easton. It features a clear lake and a beach swimming area with 24,000 feet of freshwater access to Lake Easton, in the Cascade Range. There is also a boat ramp to the lake, allowing freshwater fishing and non-motorized boating. The park has 95 tent spaces near the Yakima River and 45 RV utility spaces near the lake, an amphitheater, basketball court, playground equipment, and two horseshoe pits. There are 40 picnic tables throughout the park, available on a first-come, first-served basis. The park also has 6 miles of mountain bike trails and 6.5 miles of hiking trails for summer use. Winter uses include general snow play and 5 miles of groomed trails for cross-country skiing, snowshoeing, and dog sledding, as well as a snowmobiling trail (Kittitas County Chamber of Commerce 2017b; Washington State Parks 2017b).

River Water Parks and Recreation

Ginkgo Petrified Forest State Park and Wanapum State Park/Recreation Area is located on Huntziger Road and the Columbia River, 2 miles south of Vantage and I-90. It is a 7,470-acre park that is heavily used during the Columbia River Gorge concert season, and fills early on weekends. The Ginkgo Petrified Forest portion is a day-use park with an interpretive center, museum, 3 miles of hiking trails, 57 unsheltered picnic tables available on a first-come, first-served basis, and restrooms. Petrified wood was discovered in the region in the early 1930s, which led to the creation of the park as a national historic preserve. Ginkgo Petrified Forest is a registered national natural landmark and is regarded as one of the most unique fossil forests that exists in the world, with artifacts dating back thirteen to seventeen million years. It features displays of petrified wood, Native American petroglyphs, and historic buildings. The Ginkgo Petrified Forest Interpretive Center offers views of the Columbia River, Sentinel Gap, and the surrounding Ice Age flood–carved basalt landscape. Indoor exhibits tell the geologic story of the Vantage Petrified Forest. The Ginkgo State Park Interpretive Trails are short winding trails with petrified wood in its natural state. Wanapum State Park/Recreation Area features 27,000-feet of freshwater shoreline on the Wanapum Reservoir, along the Columbia River. Recreational activities include a trailer park with 50 full hookups and tent camping; showers; a boat ramp with boating, personal watercraft, water skiing, and freshwater fishing; swimming; bird watching; and wildlife viewing (Kittitas County Chamber of Commerce 2017b; Washington State Parks 2017c).

The Vantage Boat Launch is located on the Columbia River, in Vantage and next to I-90. It is managed by Kittitas County, was built in 1990, and includes a double-lane boat launch with an Americans with Disabilities Act boarding float, large parking area, kiosk/signage with interpretive/educational materials, 342 square feet of facilities including restrooms, and nine picnic tables and barbecue grills (Pless et al. 2015; Grant County PUD 2017).

The Cove Recreation Area is managed by the Grant County PUD and Washington State Parks. The recreation area encompasses about 20 acres and is located west of Huntzinger Road near Wanapum Dam. Public access is for day use from Thursdays through Mondays (Pless et al. 2015).

Trails

The John Wayne Pioneer Trail/Iron Horse State Park is managed by Washington State Parks and is part of the National Recreational Trail system. It is a 100-mile trail from North Bend to Vantage, and used to be a Chicago, Milwaukee, St. Paul and Pacific Railroad bed (Pless et al. 2015). The trail is open year round to non-motorized vehicle and foot traffic (Pless et al. 2015).

Coal Mines Trail is managed by the Coal Mines Trail Commission, the City of Cle Elum, the City of Roslyn, and Kittitas County. It is a 10.4-mile trail from Cle Elum to Ronald, and used to be a Northern Pacific Railway bed. (Pless et al. 2015)

Wind/Solar Facilities and Golf Courses

The Wild Horse Wind and Solar Facility and Renewable Energy Center is located on Whiskey Dick Mountain, about 16 miles east of Ellensburg on high, open-range hilltops. Built by Horizon Wind Energy and owned by Puget Sound Energy, the 149 wind turbines generate 273 MW and the solar facility generates up to 502 kW. The Renewable Energy Visitor Center has educational displays so visitors can learn more about wind and solar technology, as well as the area's unique natural history. The visitor center also has a conference facility, with a meeting room able to accommodate up to 48 people. The conference area is used for wind and solar presentations to visiting schools, businesses, clubs, and community groups. It can also be reserved for meetings, retreats, and fundraisers. Presentations lasting 45 to 60 minutes, depending on the content and audience questions, are offered to groups by appointment. Outdoor trails lead to a solar array, blade, turbine generator, gearbox, and other displays. The visitor center is open daily from April through November, is free to the public, and tours can be scheduled by appointment during the off-season, depending on staff availability and weather (Kittitas County Chamber of Commerce 2017b; Puget Sound Energy [PSE] 2017c).

Ellensburg Golf and Country Club is a nine-hole semi-private golf club located on Thorp Highway South, just southwest of Ellensburg. It is a full-service golf course featuring 2,988 yards of golf, a restaurant and bar, pro shop, locker rooms, driving range, and putting green. The course offers memberships as well as play to the public at daily rates (MyEllensburg 2017).

Some other recreational facilities in the city include (City of Ellensburg 2015):

- Memorial Pool and Fitness Center – has a 25-meter pool, a 22 × 4–foot kiddie pool, 1-meter diving board, drop slide, hot tub, sauna, fitness center, and other features
- Stan Bassett Youth Center– 406 E Capitol Avenue
- Adult Activity Center – 506 S Pine Street
- Ellensburg Racquet and Recreation Center – 6061 Vantage Highway; has two heated indoor tennis courts, three racquetball courts, a 50 × 108-foot indoor soccer facility, a fitness/weight room, and other features
- Park Administration – Second Floor, 501 N Anderson Street

Sun Country Golf and RV is located on Saint Andrews Drive in Cle Elum. It has an 18-hole, par 71, 5,715-yard golf course designed by J. Gaylord Riach/John Steidel. The RV park features include 14 full hook-up gravel sites, 50-amp service, showers, bathrooms, cable TV hookups, wireless internet connections, a self-service RV wash station, and space for tent camping (SunCountry Golf 2017).

Suncadia Resort and Golf Course is a large destination resort located on Suncadia Trail, near the city of Roslyn. The development includes several thousand acres of lodges, four golf courses, recreation centers, condominiums, clustered recreational homes and single-family recreational homes. Prospector Gold Course is an 18-hole, 7,100-yard course designed by the Palmer Course Design Company and includes a golf shop. The Rope Rider Golf Course is also an 18-hole, par 72, and 7,112-yard course designed by Jacobsen Hardy Golf Course Design, with a pro shop, driving range, pitch/chipping area, putting green, and teaching professionals (GolfNow 2017). The Tumble Creek Golf Course is a private course designed by Tom Doak. Finally, there is the par-3 Rope Rider Golf Park, a practice and casual play course. Development had slowed due to the lending crisis, but activity has since continued. The most significant of that renewed activity was the construction of Swiftwater Cellars, a 20,000-square-foot winery and distillery. This resort has contributed to significant growth in the western part of Kittitas County (Pless et al. 2015).

Major Events

The Kittitas County Fair occurs every Labor Day weekend, attracts over 30,000 visitors, and is one of the oldest fairs in the State of Washington, as it was first held in 1886. The fair features food, fine arts and photography, youth crafts, 4-H/Future Farmers of America agricultural and livestock exhibitions, Davis Amusement Cascadia carnival rides and games, and a Frontier Village. Concurrent with the fair is the Ellensburg Rodeo and Saturday night's Xtreme Bull, both top-ranking Pro Rodeo Cowboy Association outdoor arena events (Kittitas County 2017; Pless et al. 2015).

4.2.6.3 City of Ellensburg

In addition to the above facilities located throughout the county, there are a variety of other parks and recreational facilities in the city of Ellensburg. Ellensburg has 15 parks totaling over 250 acres, or about 1 acre of park for every 73 residents.

Ellensburg's Irene Rinehart Riverside Park is located on 117 acres, on Umptanum Road. Due to the park's location between the Yakima River and I-90, the park is only accessible via Umptanum Road. The park has a small parking lot on the north side of Umptanum Road. The park features a boat launch for the Yakima River, two ponds and lake swimming access, a sand volleyball area, picnic and barbecue shelters, hiking/biking trails, scenic walking paths, and other standard park facilities (City of Ellensburg 2015).

Paul Rogers Wildlife Park is a 20-acre park that has improved trails with natural settings. McElroy Park is a 6.7-acre park with walking trails, a pond, natural areas, picnic tables, large open turf area, and a natural play structure. Other parks include Rotary Park (72 acres), Lions/Mt. View Community Park (8.0 acres), West Ellensburg Neighborhood Park (6.0 acres), North Alder Street Park (5.5 acres), Kiwanis Neighborhood Park (4.0 acres), Reed Neighborhood Park (4.0 acres), Veterans' Memorial Park (3.0 acres), Skate Park (0.66 acre), and Wippel Neighborhood Park (0.6 acre) (City of Ellensburg 2015).

Additionally, a local developer has approval to build a 90-acre water park and hotel in Ellensburg. The project is considered to be a destination water park, attracting visitors locally and from the west side of the state. When construction is completed it is estimated the park would employ 750 to 800 workers (Pless et al. 2015).

Notable regular recreational events that occur in Ellensburg include (City of Ellensburg 2015):

- The Western Art Show – occurs in the third full weekend in May
- Jazz in the Valley – a 3-day music event that occurs during the last weekend of July
- A weekly farmers market that provides the vegetables and garden products to residents

4.2.6.4 Solar Project Sites

No recreation areas are located within or immediately adjacent to the proposed solar project sites. The recreation areas that are the nearest to each of the proposed solar facilities are identified below.

Camas Solar Project Site

The nearest designated potential recreation opportunity to the Camas Solar Project site is Olmstead Place State Park, located approximately 1.5 miles ("as the crow flies") northeast of the project site.

Fumaria Solar Project Site

The nearest designated potential recreation opportunity to the Fumaria Solar Project site is the Iron Horse Trail, also known as the John Wayne Pioneer Trail. The proposed generation tie line associated with this site would parallel the trail, approximately 550 feet away between U.S. Route 97 and an existing substation.

Penstemon Solar Project Site

Similar to the Camas Solar Project site, the nearest designated potential recreation opportunity to the Penstemon Solar Project site is Olmstead Place State Park, located approximately 0.75 mile ("as the crow flies") northeast of the project site.

Typha Solar Project Site

The closest recreation facility to the Typha Solar Project site is the Iron Horse Trail, across the Yakima River and I-90, approximately 1 mile ("as the crow flies") to the north of the proposed site.

Urtica Solar Project Site

The closest recreation facility to the Urtica Solar Project site is the Ellensburg's Irene Rinehart Riverside Park. The southernmost part of the park is located approximately 0.25 mile ("as the crow flies") northeast of the project site, across the Yakima River on Umptanum Road.

4.2.7 Impacts to Recreation

4.2.7.1 Construction Impacts

General County

Recreational Facilities

As described in Section 4.4.2, construction of the five Columbia Solar Projects would begin in the second quarter of 2018 and would end in the fourth quarter of 2018, occurring over about 8 months from April through November. Construction of the five solar projects would employ up to 100 workers per day during the peak construction period. Approximately 80 of the peak workforce would likely be hired locally and the remaining 20 non-local peak workforce might elect to commute to the Ellensburg area on a daily basis. However, if they elect not to commute, they are likely to either stay in a personal RV at a camp site or to rent a motel room for the duration of the construction period.

Because there would be relatively few non-local construction workers working on the Columbia Solar Projects, no positive or negative impacts are anticipated to recreational facilities, RV parks, or motels in Kittitas County overall, or in the Ellensburg area.

Recreational Activities/Opportunities

The anticipated 20 additional peak workers that could temporarily relocate into the Ellensburg area during the 8-month construction period from April through November would likely participate in some recreational activities (e.g., fishing, boating, swimming, golf, hiking, or attending the Kittitas County Fair or the Ellensburg Rodeo and Saturday night's Xtreme Bull) during their time off from work. This would overlap with the primary May–September recreational period in the county. However, because there would only be up to 20 additional participants in any one activity at any one time, there would be no impacts to recreational uses in the county or the Ellensburg area.

Solar Project Sites

As stated above, no recreation facilities are located within or immediately adjacent to the five proposed Columbia Solar Project sites, and thus no facilities would be displaced or altered by construction of the solar projects. In addition, because the sites are private, generally active agricultural lands, no other dispersed recreational uses (i.e., fishing, boating/canoeing/rafting, hunting, or hiking) are occurring on the sites, so impacts would not occur to any potential on-site dispersed recreational opportunities.

4.2.7.2 Operation Impacts

The five Columbia Solar Projects would begin operation in the fourth quarter of 2018, and would operate for approximately 30 years. The operational workforce would be relatively small and would typically be off-site. In addition, it is anticipated that four to five operations and maintenance (O&M) personnel would make about two to three visits per year to each of the five Columbia Solar Project sites to conduct the on-site O&M functions. Because there would be minimal operational staff levels, no positive or negative operational impacts are anticipated to recreational facilities or use levels in Kittitas County overall, or in the Ellensburg area.

(5) Historic and cultural preservation. The application shall coordinate with and provide a list of all historical and archaeological sites within the area affected by construction and operation of the facility to the Washington state office of archaeology and historic preservation and interested tribe(s). The application shall:

(a) Provide evidence of this coordination;

4.2.8 Washington State Department of Archaeology and Historic Preservation Consultation

SWCA Environmental Consultants (SWCA) completed the architectural and archaeological surveys for each of the five proposed TUUSSO Columbia Solar Project sites, and five individual project cultural resources reports were submitted to the Washington State Department of Archaeology and Historic Preservation (DAHP) for review on June 9, 2017. On June 12, 2017, Mike Cannon, with SWCA, received a call from Gretchen Kaehler at DAHP. Ms. Kaehler notified Mr. Cannon that DAHP would await EFSEC notifying them that the ASC was received and EFSEC had learned more about the projects, before beginning their review of the five cultural resources reports. DAHP wishes to comprehensively review the five solar project cultural resources reports as part of the entire application.

4.2.9 Tribal Consultation

On behalf of TUUSSO, on March 23, 2017, SWCA sent a letter via certified mail to notify the Tribal Council and the Cultural Resources Program of the Confederated Tribes and Bands of the Yakama Nation about all five proposed Columbia Solar Projects and the cultural resource surveys that would be conducted. On March 30, 2017, SWCA also sent a letter via certified mail to Johnson Meninick, of the Cultural Resources Program at the Confederated Tribes and Bands of the Yakama Nation. The purpose of this communication was to seek input and identify any of the Cultural Resources Program’s Tribal concerns related to cultural resources, and it was not intended to replace any government-to-government consultation that may be required pursuant to National Historic Preservation Act (NHPA) Section 106.

Joy Potter, as a representative for TUUSSO, met with Johnson Meninick of the Yakama Nation on June 15, 2017. He recalled seeing the letter sent by SWCA on March 30, 2017, but had not responded. Joy provided Mr. Meninick with a copy of the letter and associated map, and provided an overview of the proposed solar projects. Mr. Meninick informed Ms. Potter that all of Kittitas County once held villages of the Yakama Nation. He stated that the Yakama Nation is very concerned about the actual village locations and burial grounds. He noted that the proposed solar project sites were not at known villages or burial locations. He was concerned that the Tribe did not do the study, as they are mostly concerned about the oral interview history portion of the cultural resource study. The ground disturbance was a secondary concern. Ms. Potter told Mr. Meninick that the reports had a great deal of narrative and history, and also described the number of hand-dug shovel probes that were analyzed. Mr. Meninick seemed pleased with the ground surveys, but indicated that he still wanted to review the cultural resources reports. On that same day, Ms. Potter spoke with Jessica Lally, who is employed by the Yakama Nation. Ms. Lally seemed excited about the solar projects and asked to be copied when solar project representatives communicated with Mr. Johnson.

(b) Describe how each site will be impacted by construction and operation; and

The following sections describe the affected environment and potential impacts to cultural resources as a result of construction and operation of the five proposed Columbia Solar Project sites. Additional, more detailed information is provided in cultural resources reports for each of the five sites, in Appendices G through K.

4.2.10 Affected Environment for Historical and Cultural Preservation

4.2.10.1 General County

The following sections describe the pre-contact, ethnographic, and historic settings for the five Columbia Solar Project sites, focusing on material culture and cultural trends that can inform archaeologists about the kinds of cultural resources that might be present archaeologically.

Pre-contact

Archaeologists and anthropologists define the Plateau culture area of Washington and Oregon as the landscape drained by the Columbia and Fraser Rivers, bordered by the Cascade Range to the west, the Blue Mountains and the Salmon River to the south, the Rocky Mountains to the east, and the northern reaches of the Columbia River to the north. Linguistically, the people in the Plateau culture area speak Interior Salishan, Sahaptian, Athapaskan, Kootenai, Cayuse, and some linguistic isolates. Plateau settlement and culture are characterized by riverine adaptation settlement patterns; a diverse subsistence base; extensive, institutionalized trading partnerships and regional trade fairs; and political organization at the band and village level, until the adoption of the horse (Walker 1990:1).

Paleoindian

Archaeological evidence shows that people entered what is now Washington State as glaciers retreated between 14,000 and 11,000 years ago at the end of the Pleistocene (Waitt and Swanson 1987). The earliest period of human presence characterized by these inhabitants is commonly referred to as the Paleoindian period. Their presence is marked in the archaeological record by the appearance of distinctive fluted projectile points, followed by large stemmed and shouldered styles. In 1987, a cache of fluted points was discovered in East Wenatchee in association with Glacier Peak ash dating to 11,250 radiocarbon years before present (B.P.) (Mehringer 1989). These early people are believed to have been highly mobile bands of hunters and gatherers with a focus on large megafauna such as mammoth that became extinct soon after the end of the glacial epoch. Stemmed and shouldered points have been found in other nearby Plateau sites that also date to the end of the Pleistocene, between 11,000 and 8,000 years ago (Daugherty 1956; Galm and Gough 2000). Changing climate contributed to the demise of many of the animals hunted by people during the Pleistocene, causing later hunters to broaden their prey spectrum and seek other large game such as elk, bighorn sheep, antelope, and deer. People during this time lived in small groups that moved frequently to find new game and other resources (Binford 1980).

The Paleoindian material culture local to the project area is known as the Windust phase (11,000–8000 B.P.) and is known from archaeological components from Windust Caves, Marmes Rockshelter, Granite Point, and Lind Coulee (Reid 1991). Typical artifact assemblages from this phase include lithic (stone) lanceolate and oval knives, distinctive shouldered Windust points, large scrapers, and utilized flakes. Edge-ground cobbles, bone awls, needles and atlatl spurs, and antler and shell artifacts are often found in the assemblages.

Vantage

The local Vantage phase (8000–4500 B.P.) corresponds with the Cascade phase defined for the Lower Snake River (Leonhardy and Rice 1970). It coincided with the Antithermal climatic period, a warming trend that occurred across the Plateau that brought drier conditions to uplands, possibly making them less productive for hunting and gathering. This is reflected in the lack of archaeological sites found in upland areas and an apparent subsistence focus on riverine areas. Vantage artifact assemblages include lanceolate Cascade-style project points, lanceolate and triangular knives, scrapers, edge-ground cobbles, atlatl weights, bone awls, needles, and atlatl spurs.

Frenchman Springs

The Frenchman Springs phase (4500–2500 B.P.) shows an increase in population, inferred from the proliferation of subterranean pithouse dwellings. The presence of large, stationary plant processing mortars shows a more intensive use of upland areas than was seen in the previous phase. Housepit sites are found at comparatively higher elevations along the Columbia River and its tributaries as well as on terraces of small streams. Other sites and isolated artifacts from this phase are found on all of the major landforms and ecological zones of the southern Plateau. Artifact assemblages from this phase include a greater proportion of cryptocrystalline silicate (CCS) material used as toolstone and greater numbers of ground stone and cobble tools. Stemmed and corner-notched points predominate and hopper mortars and pestles become much more common. The presence of net sinkers indicates greater emphasis on fishing than in the preceding phase. These traits represent the early emergence of the Plateau culture pattern that continued until the historic period (Ames et al. 1998; Galm et al. 1981).

Cayuse

The Cayuse phase (2500 B.P.) is marked by the appearance of small, corner-, basal-, and side-notched projectile points. Regional population increased, as indicated by a shift to larger, semipermanent villages along the Columbia and Snake Rivers and an increased emphasis on fishing along with the continued exploitation of upland resources. Sites from the Cayuse phase have been found in a broad array of environmental settings and on landforms such as ridgelines, natural springs, mountain benches, and small tributary streams in the Cascade Range. Some sites exhibit seasonal use for specialized functions including root gathering, hunting, fishing, and lithic quarrying. Artifact assemblages from this recent pre-contact period consist of end scrapers, lanceolate and pentagonal knives, net weights, pestles, grinding stones, hopper mortar bases, and cobble implements. Given better preservation, wood shafts, cordage, and mats have also been recovered along with bone shafts, bone beads, bone points, and shell (DePuydt 1990).

Ethnography

The five proposed Columbia Solar Projects are located within the traditional territory of the Confederated Tribes and Bands of the Yakama Nation (Ames et al. 1998; Ray 1936; Spier 1936). The Yakama and their neighbors practiced seasonal rounds traveling from salmon fisheries on creeks and rivers, to plant gathering and hunting areas in the surrounding uplands. Winter villages were clustered along primary rivers (Schuster 1998).

Yakama people and their neighbors lived in semisedentary villages until the introduction of the horse in the 1700s (Ames and Marshall 1980–1981). Introduction of the horse into the Plateau region fostered a greater degree of mobility and increased frequency of interaction with neighboring people, leading to changes in technology and shifts in seasonal resource procurement patterns. European and American trade items, such as metal knives, were obtained as a result of wider participation in Pacific Coast– and Plains-region trade networks afforded by the horse.

Late pre-contact and ethnographic-period villages were largely independent, led by a headman who governed by consensus, assisted by a council of other respected village men. Other leadership roles might be earned on the basis of special accomplishments such as proficiency at fishing or hunting or root-digging, as well as in the crafts of weaving and basketry (Schuster 1990:28). Each village claimed the surrounding lands for fishing, hunting, and gathering, though there were often reciprocal agreements for other groups to use them, based mainly on ties through marriage. Fishing stations were owned by families or individuals and passed onto their heirs, but arrangements for others' use might also be granted.

These permanent villages were occupied for the most part through the winter months. Early dwellings consisted of semisubterranean pithouses, depressions dug into the earth with a framework of branches supporting roofs made of woven mats. Temporary mat-covered summer houses or lean-tos were used at seasonal locations (Hollenbeck and Carter 1986:152; Schuster 1990). In the eighteenth century, four-sided, A-frame kaatnams, also made of poles covered with mats, largely replaced pithouses. They were easily assembled and broken down and highly transportable once travel by horse became common (Schuster 1990:29).

Extended family groups spent the winter in the sheltered villages living on stored food and hunting locally available game until spring, when the winter villages broke up as people set out on the seasonal round of fishing, hunting, and gathering. The appearance of the first stalk of wild celery in February signaled the time for departure, and was celebrated with a feast of the First Food (Schuster 1990:21). Soon after, many of the villagers departed for fishing stations along the Yakima and Columbia Rivers.

As the spring progressed, Yakama people made their way to seasonal gathering places where the women concentrated on root-digging or gathering other wild plants, while men hunted elk, deer, bear, foxes, and game birds with bow and arrow. Mountain goats and sheep were also hunted (Shuster 1990:22–23). Groups at temporary resource camps tended to be small and focused on gathering the resources at hand, but throughout the season people congregated in larger groups at shared rendezvous sites such as fishing stations or root-digging grounds. These gatherings provided an opportunity for groups to mingle for an extended time for trade and festive activities such as horse racing, games, and gambling (Schuster 1990).

One of the largest annual gatherings took place in May and June at the Cilaxan root-digging grounds near the present-day town of Kittitas (Depuydt 1990; Ray 1936). According to explorer Alexander Ross who passed through at this time of year in 1814, the root-gathering camp stretched for 6 miles in all directions and numbered about 3,000 people and three times that number of horses (Schuster 1990:26). The Columbia Solar Project areas were also the scene of large gatherings where hundreds of people came for root-digging. At these camps, women harvested the roots and corms with special digging sticks, roasting camas and other bulbs in pits and making them into cakes to store and add to the winter food supply (Schuster 1990).

From the Cilaxan root-digging grounds, the Yakama moved on to various fishing places on the Yakima River or to Wenatchapam on the Wenatchee River for the second seasonal salmon run (Depuydt 1990; Ray 1936). Two of the most popular traditional meeting places on the Plateau were fishing stations at Celilo Falls and The Dalles, where tribes from throughout the area as well as those from the Pacific Coast and the Plains gathered to trade as well as fish (Schuster 1990). Trade items included dried roots and berries, dried salmon and pemmican, skins and hides, and weaving and basketry materials.

August brought a final push for gathering foods to store for the winter. Many from the various Yakama bands met up with other groups at root-digging grounds in Klickitat territory to the south. Trout fishing and trading occupied the men's time while the women gathered roots to prepare for winter use. Later, people moved on to camps upriver at Salmon La Sac and Fish Lake and up into the timberline to pick the ripening huckleberries, celebrating once more with a First Food feast. The berries were dried on smoking logs and packed into woven cedar bark baskets to store for winter (Shuster 1990:24–25). A variety of plants were gathered in the uplands, including various trees and bracken fern shoots that provided food, fiber, and medicines. Other foods gathered in summer months were golden current, gooseberry, serviceberry, and chokecherry (DePuydt 1990). One ethnographer mentioned at least 23 kinds of roots and 18 types of berries used by Yakama peoples, along with numerous other plants. One noted plant food was “black moss,” actually hanging lichen that was dried in the sun, and was eaten like bread (Curtis 1911, as cited in Hollenbeck and Carter 1986:160). In addition to plant gathering, hunting was good in the uplands at this time of year as well, with elk, deer, mountain goat, and bear available. Dried foods such as salmon, roots, and berries were brought back to the villages for winter use.

Yakama religious beliefs were expressed in everyday living as well as in specialized rituals and celebrations. Schuster (1990) provides a general overview of aspects of individual and collective religious life. Part of the ancient belief system related to powers of tákh, spirit guardians who could forge a relationship with an individual, conferring special powers such as ability in hunting or fishing or healing. Success in such endeavors and other needs were also addressed through petitions to the guardian spirit at special wishing sites, where individuals left offerings of stones, shells, beadwork, cloth, and other items.

Purification of the physical and spiritual body was attended to in the sweatlodge or sweatbath, where rituals were followed and prayers offered up. The village longhouse was the site of communal ceremonies. Members of the village gathered to participate in singing and dancing accompanied by drumming and special prayers and invocations. Special events such as the First Foods feasts were held in the longhouse (Schuster 1990). As for other Native Americans in the Pacific Northwest, the effects of European American contact were catastrophic for the Yakama people. Introduction of diseases for which they lacked immunities, reduction of game by European American hunters and settlers, restrictions on seasonal migration through traditional lands, and loss of lands in general contributed to the loss of many Native traditions. In spite of changes that brought most of their age-old lifeways to an end, Yakama groups persisted in some of the traditional ways.

History

Early Exploration and Early Native American Policy

The first description of Washington east of the Cascades came from the Lewis and Clark expedition, which stopped at the confluence of the Yakima and the Columbia Rivers in October of 1805 on their way to the Pacific Coast. With the help of the native people they encountered, they made the first map of the Yakima River basin. The headman of one of the Yakama groups sketched the Columbia River beyond the confluence for them. On their return trip from the coast, they visited the Yakama again, apparently obtaining horses (Babcock et al. 1986). Within a few years, fur traders made their way into the Columbia and Yakima River basins. Alexander Ross visited the Kittitas Valley in 1814, looking to trade horses with the natives. He described a celebration of an estimated 3,000 Native people gathered for collecting roots, horse-racing, gambling, and other festivities (Becker 2005). In 1840, a Yakama leader, Kamiakin, traded horses for cattle at Fort Vancouver, setting the precedent for later cattle raising in the valley. Other Yakama leaders, including one named Owhi, established cattle herds, and the cultivation of gardens began. The first wagon train passed over Naches Pass into the Puget Sound basin in 1853 (Becker 2005), passing through Owhi’s and Kamiakin’s camps (Schuster 1990).

By the 1850s, in response to the pressures of encroaching settlement, political influence among the Yakama peoples divided them into two main groups: the Kittitas or Upper Yakama led by headmen Teias and Owhi, and the Lower Yakama south of Wenas Creek led by Kamiakin. Yakama territory was ceded to the U.S. government in the Yakima Treaty, signed in 1855 by Washington Territorial Governor Isaac Stevens at the Walla Walla Council. The Yakama Nation formed by the treaty was composed of 14 formerly independent bands and treated as a single political entity (Schuster 1990). The treaty barred settlement on the ceded land. After gold was discovered in eastern Washington in 1855, the federal government opened all ceded lands for settlement, in violation of the treaty. Increased tensions between miners passing through Yakama land, settlers, and the Yakama led to the Yakama Wars of 1855–1858. After defeats in 1856 and 1858, and the ratification of the Yakima Treaty in 1859, the Yakama groups were settled on reservation lands, allowing European American settlement to accelerate east of the Cascades (Holstine 1994:3.7–3.8).

The Homestead Act and Early European American Settlement

The Homestead Act of 1862 brought more settlers across the Cascades from the Puget Sound, but focus in the area was on the search for minerals including coal, gold, and iron. The Northern Pacific Railroad sent surveyors across Snoqualmie Pass in 1867 in preparation for construction of a road that would replace a rugged supply trail originating in The Dalles that linked the numerous, small, east-side settlements to Seattle. As miners, settlers, and herders came through the area, wagon roads replaced native trails. By the 1880s, settlers arriving from the Willamette Valley and herders driving cattle, horses, and sheep along the Columbia River corridor had discovered their own route across the Yakima River and over Snoqualmie Pass (Holstine 1994:3.8).

When miners followed goldstrikes into the area in the 1860s, herders also followed with cattle to supply them with beef, settling in small ranches throughout the Yakima Valley and creating the foundation for an ongoing industry. Between 1861 and 1869, cattle drives passed through the Kittitas Valley to the Cariboo mines on the Fraser River. Beginning in 1869 and persisting until 1879, Yakima cattle were summer grazed in the Kittitas Valley and then driven over Snoqualmie Pass in the fall to Puget Sound markets.

From 1861 to 1881, the typical farmstead consisted of a cabin, a corral, and an orchard. Gardens and small grain fields were planted, but the practice of storing hay for winter feed did not become common until after the unusually hard winter of 1880–1881, when widespread cattle death ended the open range practices in the area (Whitley 1949:24). In the Kittitas Valley, stockmen began to irrigate alfalfa and clover to put up winter feed for the cattle. Early irrigation systems were simply diversions of creeks into private or partnership ditches but as more complex and expensive projects were required to respond to the demand for more irrigated acreage, private irrigation companies were organized by local farmers and bankers. The early irrigation networks tended to be small and irrigated modest patches of land but were soon followed by larger, more complex projects.

Intensified Population, Irrigation, Agriculture, and Railroads

As the markets in the mining districts dried up in the 1880s, cattle were increasingly driven to Puget Sound or the Willamette Valley. Some cattle were also shipped to Montana to stock the growing cattle industry in eastern Montana (Oliphant 1932). Moving cattle out of the valley to other markets was made much easier when the Northern Pacific Railroad mainline was constructed through the valley in 1886 on its way to Tacoma. Ellensburg was made the headquarters for the Cascade Division of the Northern Pacific and the region experienced another influx of mostly urban population. Increases in population drove the need for further complex irrigation and infrastructure development. The Town Ditch in Ellensburg was built in 1885 by the City of Ellensburg, and was capable of irrigating 12,000 acres. The West Kittitas Canal was built in 1889 and could irrigate 10,000 acres.

During this period of intensified European American population growth, conflicts arose between the Yakama Nation and the settlers for access to land. In 1887, the Yakama Nation sued to regain access to a traditional fishing site at Celilo Falls that had been fenced off by a settler. The U.S. Supreme Court ordered forced removal of the fence (Cohen 1986:54–55). Over the decades, in their determination to follow traditional fishing practices in accustomed places, Tribal members defied state law by fishing without a license and using methods such as gaffing and dip netting. Arrests and jail sentences sometimes resulted.

Twentieth Century and Modern History

Irrigation and the completion of the Northern Pacific and the Great Northern Railway to Puget Sound between 1890 and 1910 brought striking changes in eastern Washington and the West in general. The region saw increased development through the establishment of the U.S. Bureau of Reclamation under the National Reclamation Act in 1902. The Cascade Canal was built in 1903–1904, and was planned to irrigate 25,000 acres (Whitley 1949). In Kittitas County, the value of irrigated land ranged from $100 to $150 per acre, and farming on irrigated land placed a high premium on commercialized, highly capitalized agriculture utilizing intensive methods and crops that brought relatively high returns. The average size of an irrigated farm in Kittitas County in 1910 was about 108 acres. Kittitas County's farmers accounted for three-fourths of the irrigated timothy hay produced in the state in 1910 and three-fifths of the irrigated clover (Nesbit and Gates 1946).

The effects of the railroads on the interior areas of Washington transformed agriculture and ranching from a small-holder subsistence to commercial enterprise (Nesbit and Gates 1946). The Chicago, Milwaukee, St. Paul and Pacific Railroad completed its transcontinental line through the valley and over Snoqualmie Pass in 1909. Stock driveways were established to uplands along ridgelines and other easily traveled routes to move livestock from winter feed areas to summer pasturage. Due to overgrazing by cattle, sheep became more common on degraded rangeland and eventually became more important than cattle as they fared better in the mountains and were more efficient grazers. As late as the turn of the nineteenth to twentieth century, the winter range of grazing lands in the basins draining the eastern Cascades slopes were still considered to be in poor condition.

The Yakama Nation's fight for fishing, land, and treaty rights continued into the twentieth century. Yakama politicians successfully litigated for access to their accustomed fisheries in 1905 in United States v. Wicans. In 1913, George Meminock and Jim Wallahee were successful in litigation that reaffirmed Yakama treaty fishing rights in United States v. State of Washington. During the 1960s, in response to state regulations, the Yakama participated in widespread fish-ins, non-violent forms of civil protest that eventually led to a lawsuit against the State of Washington on behalf of Tribes throughout the state. In 1974, a judicial ruling known as the Boldt Decision reiterated the right of the Tribes to fish in common in their usual and accustomed places. "In common" was interpreted to mean the Tribes were entitled to one-half of the salmon catch. As a result of the decision, many Tribes, including the Yakama, developed or revised their own fisheries laws and management programs.

4.2.10.2 Background Research and Field Survey Methods

The following sections describe preparation activities and the methods used to conduct field surveys for each of the five Columbia Solar Project sites.

Specific Background Research

Prior to field investigations, SWCA staff searched DAHP's Washington Information System for Architectural and Archaeological Records Data (WISAARD) database to identify previous cultural resource assessments and recorded archaeological and historical sites located within and near each solar project site. Additional archival research examined historical documents, maps, research publications, and books that provided information about the natural history, human settlement, and land use around the Kittitas Valley. Specific attention was given to review of available historical maps, such as General Land Office plats and Metsker Maps, as part of this overview investigation.

WISAARD Review

The WISAARD review indicated that 56 cultural resource investigations have been completed within 1 mile of the solar project sites (Table 4.2-5). The Camas, Fumaria, Typha, and Urtica Solar Project sites themselves have not been previously surveyed for cultural resources. One cultural resources survey was previously conducted along the north and east edges of the Penstemon Solar Project site. Schroeder and Landreau (2013a) excavated 13 probes in the Penstemon Solar Project site, but did not identify cultural resources within the solar project site.

Table 4.2-6. Previous Cultural Resource Investigations Within Approximately 1 Mile of the Project Area

Author	Date	Project	Relation to Project	Results[1]
Rutan and Stevens	1982	A Survey for Cultural Resources at Quarry Site QS-S-234 and Pit Site PS-S-226	0.5 mi W of Camas	Information has been redacted
Hartt	1989	Olmstead Place State Park Interpretive Master Plan	0.5 mi N of Penstemon	
Schalk	1990	Cultural Resources Reconnaissance in Washington State Parks, Biennial Summary for 1987–1989	0.7 mi NE of Penstemon	
Bicchieri	1994	Olmstead Place State Park Survey Report	0.6 mi NE of Penstemon	
Emerson	1995	Cultural Resources Surveys of Nine Yakima Fish Production Project Phase II Fish Screen Sites, Kittitas and Yakima Counties, Washington	Within 1 mi of Typha	
Hartmann	1997	Cultural Resources Surveys of the Fogarty Fishscreen and John Cox Fishscreen Facilities, Kittitas and Yakima Counties, Washington	0.2 mi E of Urtica	
Valentine	1998	U.S. Fish and Wildlife Service Archaeological and Historical Resources Identification Report: Naneum Creek	0.5 mi S of Camas	
Chapman and Fagan	1999	Cultural Resources Survey of Irrigation Features Within the Proposed Level 3 Fiber Optic Line in Kittitas and Yakima Counties, Washington	1 mi W of Typha	
Fagan et al.	1999	Cultural Resources Survey of Level 3's Proposed Fiber Optic Line from Seattle to Boise: Washington Segment, Non-Federal Lands	0.8 mi SW of Typha	
Schablitsky et al.	1999	Cultural Resources Survey of Route Modifications and Shovel Testing of Sites for Level 3's Proposed Fiber Optic Line from Seattle to Boise: Washington Segment, Non-Federal Lands, Addendum	0.8 mi SW of Typha	
Cleveland and Fraser	2000	Safe Access for Salmonids on Lower Wilson Creek	Adjacent to Camas; 0.7 mi W of Penstemon	
Juell	2000	Cultural Resources Inventory of the proposed Washington Light Lanes Project Regeneration Station Surveys Associated with the Route 3 Backbone (I-90)and the Route 4 Backbone (I-82)	0.7 mi N of Camas	
Miller and Lentz	2002	From Native American Trails to the Inland Empire Highway: A Cultural Resources Inventory of Tile Canyon Road Improvement Project	0.8 mi W of Camas	
Miller	2003	Archaeological and Historic Resources Inventory of Kittitas County's Proposed Faust Road Improvement Project Kittitas County, Washington	0.9 mi S of Fumaria	
Orvald	2003a	Dry/Cabin Creek Fish Access and Protection Project Kittitas County, Washington	0.6 mi SW of Fumaria; 0.4 mi NE of Typha	

Table 4.2-6. Previous Cultural Resource Investigations Within Approximately 1 Mile of the Project Area

Author	Date	Project	Relation to Project	Results[1]
Amara	2004a	EQIP Projects in Kittitas County, Washington: OAHP Log no: 102003-23-NRCS (Graaff, Hanson), OAHP Log no: 022304-08-NRCS (Mellegaard, Brunson)	0.6 mi W of Camas; 0.9 mi NW of Urtica	
Amara	2004b	EQIP Projects in Kittitas County, Washington: Katzele; Laub Farm; Jack Wheatley/Level Best Farms; Cooke Coleman LLC, Gardinier, Kayser, and Morgan; Davis, Duncan, Hunter & Titus; Anderson, Edwards, Gregerich, Mason, Mihelich and Poulsens	0.7 mi W of Typha	
Middleton and Hackenberger	2004a	Coleman Creek – Hernandez/Ringer Project Archaeological Monitoring Report	0.8 mi SE of Camas	
Middleton and Hackenberger	2004b	Cultural Resource Pedestrian Survey for Ludwick Diversion Replacement/Redesign Project	0.5 mi W of Camas; 0.8 mi SW of Penstemon	
Amara	2005a	NRCS Don Rinehart EQIP 2005 Site Identification Survey in Kittitas County, Ellensburg, Washington	0.4 mi S of Fumaria	
Amara	2005b	NRCS Extreme Farms LLC EQIP 2005 Cultural Resources Site Identification Survey in Kittitas County, Washington	Adjacent to Typha	
Amara	2005c	NRCS John Smith EQIP 2005 Site Identification Survey in Kittitas County, Washington	0.8 mi S of Urtica	
Middleton and Hackenberger	2005	Naneum Creek/Bull Canal Project Archaeological Monitoring Report	Adjacent to Camas; 0.9 mi W of Penstemon	
Orvald	2005	Cultural Resource Inventory for Proposed Fogarty Ditch Diversion Redesign Project, Kittitas County, Washington	0.2 mi E of Urtica	
Sharley	2005	A Cultural Resources Survey of the Bonneville Power Administration's Proposed Fogarty Ditch Fish Screen Project, Kittitas County, Washington	0.2 mi NE of Urtcia	
Amara	2006a	NRCS Jeff Brunson Farm EQIP 2006 Cultural Resources Site Identification	0.1 NW of Camas	
Amara	2006b	NRCS Double DJ Farms EQIP 2006 Cultural Resources Site Identification Survey in Kittitas County, Washington	0.2 mi E of Fumaria	
Orvald	2006	Cultural Resource Inventory for the Proposed Durand-Fagalde Diversion Redesign Project, Lower Reecer Creek, Kittitas County, Washington	0.7 mi NE of Urtica	
Orvald and Hoyt	2006	Cultural Resource Inventory for Bonneville Power Administration's Proposed Lyle Creek Barrier Removal and Restoration Project	Adjacent to Camas; 1 mi W of Penstemon	
Green	2007	NRCS Taylor Ranches LLC Environmental Quality Incentives Program EQIP 2005 Site Identification Survey in Kittitas County, Washington	0.2 mi S of Fumaria; 0.9 mi NE of Typha	
Landreau et al.	2007	An Archaeological Review and Inventory of the Proposed Coleman and Cherry Creek Irrigation Projects	0.4 mi E of Camas; Adjacent to Penstemon	
Anderson and Roulette	2008	Letter Report: Results of an Archaeological Survey of the Ellensburg-Columbia No.1 Transmission Line, Kittitas County, Washington	1 mi E of Fumaria	
Landreau	2008	An Archaeological Review and Inventory of the Proposed Gregerich Rill Irrigation Modification Project, Kittitas County, Washington	0.6 mi SW of Typha	
Bowden and Shaw	2009	Olmstead Place State Park Pioneer Cabin Site Archaeological Investigation: Addendum to the Olmstead Place State Park Pioneer Cabin Historic Structures Report	0.7 mi NE of Penstemon	
Landreau	2009	A Section 106 Archaeological Review and Inventory of Six Proposed Installation/Upgrade Irrigation Sites Along the Menastash Ditch, Kittitas County, Washington	1 mi SW of Typha	

Table 4.2-6. Previous Cultural Resource Investigations Within Approximately 1 Mile of the Project Area

Author	Date	Project	Relation to Project	Results[1]
Luttrell	2009	Letter Report: Olmstead Place State Park - Coleman Creek Bridge Removal Project Letter Report, Kittitas County, Washington	0.7 mi NE of Penstemon	
Becker and Ragsdale	2010	Results of Archaeological Investigations of the Wenatchee Facilities Modification Project – Plymouth to Zillah and Yakima to Wenatchee	0.5 mi SW of Camas	
Hoyt et al.	2011	City of Ellensburg Hayward and Route 10 Water Wells Cultural Resources Assessment Project, Kittitas County, Washington	0.6 mi NW of Fumaria	
Luttrell	2011b	Letter Report: Olmstead Place State Park – Culvert Replacement Project, Kittitas County, Washington	0.7 mi NE of Penstemon	
Luttrell	2011c	Letter Report: Olmstead Place State Park – Coleman Creek Increased Riparian Buffer Project, Kittitas County, Washington	0.6 mi NE of Penstemon	
Landreau and Schroeder	2012	Section 106 Archaeological Review and Inventory of the Mellergaard Sprinkler Conversion Project, Kittitas County, Washington	0.9 mi SW of Urtica	
Vaughn and Schroeder	2012	2012 Pedestrian Survey and Subsurface Reconnaissance of the Schaake Parcels, Kittitas County	0.4 mi NE of Urtica	
Schroeder	2013	A Section 106 Archaeological Review and Inventory of the Cherry Creek Tributaries Sprinkler Conversion, Fish Screening and Passage Project, Kittitas County, Washington	0.5 mi S of Penstemon	
Schroeder and Landreau	2013a	A Section 106 Archaeological Review and Inventory of the YTAHP–Coleman Creek Poulsen/Hanson Project	0.8 mi NE of Camas; overlaps Penstemon	
Schroeder and Landreau	2013b	A Section 106 Archaeological Review and Inventory of the Bland Sprinkler Conversion Project, Kittitas County, Washington	0.2 mi S of Urtica	
Emerson	2014	Cultural Resources Survey for the Kittitas County No. 6 Road Improvements Project	0.5 mi SE of Camas	
Landreau	2014	A 05-05 Archaeological Review and Inventory of the Bland Family Farm Sprinkler Conversion Project, Kittitas County, Washington	0.6 mi NW of Urtica	
Landreau and Schroeder	2014	Archaeological Review and Inventory of the Circle Lazy H Sprinkler Conversion #2 Project, Kittitas County, Washington	0.6 mi N of Urtica	
Woody	2014	Cultural Resources Identification Survey of the Lynn Brown 2014 NRCS EQIP Project	0.5 mi SE of Fumaria	
Amara	2015	NRCS Bland Environmental Quality Incentives Program Cultural Resources Site Identification Survey in Kittitas County, Washington	0.5 mi W of Urtica	
Landreau	2015	A Section 106 Archaeological Review and Inventory of the David Rinehart Sprinkler Conversion Project, Kittitas County, Washington	0.9 mi NW of Fumaria	
McFarland et al.	2015	Cultural Resources Review for the Non-Bureau of Reclamation Owned Portion of the Schaake Property Habitat Improvement Project, Kittitas County, Washington	0.9 mi SE of Urtica	
Woody	2015a	Cultural Resources Identification Survey of the Circle Lazy H Farm 2015 NRCS EQIP Project	0.5 mi N of Urtica	
Amara	2016	KCCD Three Bar G Ranch Sprinkler Conversion Cultural Resources Site Identification Survey in Kittitas County, Washington	0.9 mi SE of Typha	
Landreau	2016a	A Section 106 Archaeological Review and Inventory of the Naneum Creek-Valley Land Company Diversion and Fish Screen project, Kittitas County, Washington	0.2 mi E of Camas; 0.4 mi W of Penstemon	
Landreau	2016b	An Archaeological Review and Inventory of the Broadmoor Farm, Berry Road Sprinkler Conversion Project, Kittitas County, Washington	1 mi NW of Camas	

1. Newly recorded cultural material identified within 1 mile of solar project sites.

Eight archaeological sites have been recorded within 1 mile of the solar project sites (Table 4.2-6); however, no cultural resources have been recorded within the solar project sites.

Table 4.2-7. Previously Recorded Sites Within Approximately 1 Mile of the Project Areas

Site No.	Compiler/Date	Age	Description	Relation to Project Area
Table has been redacted				

Field Methods

Archaeological Survey

Archaeological fieldwork for each project site was conducted on the following dates:

- Camas Solar Project site – April 12 to 15, 2017
- Fumaria Solar Project site – April 4 to 8, 2017
- Penstemon Solar Project site – April 16 and 17, 2017
- Typha Solar Project site – April 4 to 6, 2017
- Urtica Solar Project site – April 9 to 15, 2017.

Yonara Carrilho directed 11 SWCA archaeologists and field technicians.

Archaeological surveys were conducted in a similar manner at each solar project site, and deviations are described in the individual project reports in in Appendices G through K. Each solar project site was surveyed with pedestrian transects spaced at approximately 20-meter intervals. The pedestrian surveys were supplemented with shovel probes (SPs) measuring between 35 and 40 cm in diameter. SPs were spaced approximately 30 meters apart. The SPs were excavated in arbitrary 20-cm levels, and the sediments from each level were passed through a ¼-inch mesh screen.

SPs were terminated at 100 cm, when native alluvial cobbles or gravels were encountered, or when other obstructions prevented further excavation. If a probe was positive for cultural material, a minimum of two 20-cm negative levels were excavated beyond the lowest positive level, unless an obstruction or depth of 100 cm was reached first. Any cultural material identified during the pedestrian survey and SP survey was recorded and photographed. Subsurface artifacts were bagged in plastic bags, labeled, and reburied where they were found.

The findings of each probe were recorded on standard shovel/auger probe forms that included information regarding soil color, texture, composition, and observed cultural materials. A Trimble handheld global positioning system (GPS) unit was used to collect the Universal Transverse Mercator (UTM) coordinates of shovel probes. Digital photographs were taken of each solar project site and a sample of the excavated SPs, and information about the photographs was recorded on a standard photograph log. SP photographs included cardinal direction overview photos and at least one photograph of the soil stratigraphy. Project field records and files are on file at SWCA's office in Seattle.

Information about any identified archaeological sites or isolates was recorded on State of Washington Archaeological Site Inventory Forms, which were entered into the WISAARD database.

Built Environment Survey

SWCA architectural historian Eileen Heideman conducted field surveys for built environment resources for all five solar projects on April 5 and 6, 2017. Built environment resources over 50 years old were identified, and included buildings such as houses, barns, and sheds, and structures such as bridges and irrigation ditches. Resources were photographed and described on field forms, and these data were then entered into the WISAARD database, and an inventory form was generated for each resource.

4.2.10.3 Solar Project Sites

The following sections describe the cartographic reviews and results of field surveys conducted for each of the five proposed Columbia Solar Project sites.

Camas Solar Project Site

Cartographic Review

Historical sources provided additional important information about the Camas Solar Project site. A Native American trail is shown [redacted] on a General Land Office (GLO) map of T17N, R19E from 1884, and a Shooshooskin camp is shown [redacted]. By 1956, land in the project site was farmed by A.B. Paine, Paul Wipple, E. Clerf, and Louis E. Poulsen (Metsker Maps 1956). The Poulsen family still owns the land across Tjossem Road from the project site. Today, there is a barn in the project site, and the Valley Land Company owns the land.

Field Survey Findings

One pre-contact isolate and two historic properties were identified during the survey for the Camas Solar Project site (Figures 4.2-4 and 4.2-5).

A utilized white chalcedony tertiary flake, designated 45KT4010, was found [redacted]. The flake exhibits retouch on the distal margin and three facets on the dorsal surface. As an isolate, it is recommended not eligible for the National Register of Historic Places (NRHP).

The Paul Wipple Barn appears to date to the early twentieth century and has undergone several changes in the course of its existence, including the enlargement of several door openings and removal of most doors, the loss of most windows, and the removal of a portion of one wall. This building has lost its integrity of design, materials, workmanship, and association and is recommended not eligible for the NRHP.

An unlined irrigation lateral extends through the northern portion of the project site. The lateral measures approximately 10 to 15 feet across. The lateral contains several irrigation features of varying ages, including a turnout for a field pipe and a group of weirs and turnouts where the ditch connects to Naneum Creek. The weirs located at the confluence of the ditch and Naneum Creek also appear to be less than 50 years old. This irrigation resource is recommended not eligible for the NRHP due to the loss of integrity of location and design.

Image has been redacted

Figure 4.2-4. Camas Solar Project cultural and built environment resources, north portion.

Image has been redacted

Figure 4.2-5. Camas Solar Project cultural and built environment resources, south portion.

Fumaria Solar Project Site

Cartographic Review

Review of historical sources provides additional important information about the Fumaria Solar Project area. Trails used by the Yakama to travel between their villages and resource-gathering locales may have once followed [redacted], up from the Yakima River, but the original locations of these creeks have shifted due to irrigation canals and roads (GLO 1884c). In 1864, the Northern Pacific Railroad Company was granted most of the land in Sections 9 and 17, T18N, R19E, as well as the NW¼ of Section 21, which they claimed in 1895. According to the BLM, the State of Washington obtained Section 16 in 1934 via a grant for numbered school sections. Land in the NE¼ of Section 20 left public domain when Carl Justus Larson and Peter A. Wold claimed their homesteads in 1892 and 1883, respectively. The 1884 GLO map of T18N, R18E does not show any historical structures in the project vicinity (GLO 1884c).

By 1956, the land where the Fumaria Solar Project is proposed was farmed by Creston S. Crest. Reecer Creek is shown as an intermittent creek flowing across the Crest property (Metsker Maps 1956). The land south of the solar project site and along Faust Road, which holds the Cascade Canal, was farmed by the Penningtons and Howard Altice. Jack Bopp and John Liboky farmed the land on the south side of Hungry-Junction Road where Reecer Creek once flowed freely and another irrigation canal, the Town Ditch, was present. Liboky's property was also adjacent to the railroad and land owned by Joseph McManamy at the southwest end of the proposed project. Several highways were present in the vicinity by 1956.

The Fumaria Solar Project site is currently used for agriculture and is owned by Jay T. and Lori A. Pittenger, as is the land on the north and south sides of Clarke Road following the proposed generation tie line right-of-way. Three buildings were constructed on the solar project site in 2002 and no other structures are present.

Field Survey Findings

One pre-contact site, four pre-contact isolates, and three historic properties were identified during the survey of the Fumaria Solar Project site (Figures 4.2-6 to 4.2-12). As isolates, it is recommended that 45KT3592, 45KT4007, 45KT4008, and 45KT4009 are not eligible for the NRHP.

Site 45KT4000 consists of two small flakes of semi-translucent white CCS material. One is a proximal tertiary flake measuring 1.2 × 0.9 × 0.2 cm; the second is the broken proximal portion of a secondary flake measuring 3.0 × 2.0 × 6 cm. Found during shovel probing, the artifacts originated [redacted]. Because the archaeology site consists of only two artifacts, it is not likely to provide additional information about prehistory, and it is recommended not eligible for the NRHP.

A tertiary flake, designated 45KT3592, was found [redacted]. The artifact is a 2-cm flake of semi-translucent CCS with a hinge fracture.

A modified flake, designated 45KT4007, was found [redacted]. The flake is a semi-translucent gray CCS and measures 2.5 × 2 × 0.25 cm.

Image has been redacted

Figure 4.2-6. Fumaria Solar Project cultural and built environment resources, Map 1 of 7.

Image has been redacted

Figure 4.2-7. Fumaria Solar Project cultural and built environment resources, Map 2 of 7.

Image has been redacted

Figure 4.2-8. Fumaria Solar Project cultural and built environment resources, Map 3 of 7.

Image has been redacted

Figure 4.2-9. Fumaria Solar Project cultural and built environment resources, Map 4 of 7.

Image has been redacted

Figure 4.2-10. Fumaria Solar Project cultural and built environment resources, Map 5 of 7.

Image has been redacted

Figure 4.2-11. Fumaria Solar Project cultural and built environment resources, Map 6 of 7.

Image has been redacted

Figure 4.2-12. Fumaria Solar Project cultural and built environment resources, Map 7 of 7.

A broken bifacial thinning flake, designated 45KT4008, was found [redacted]. The flake is semi-translucent pink CCS and measures 2.1 × 1.0 × 0.5 cm.

A tertiary flake, designated 45KT4009, was found [redacted] cm below surface (cmbs). The flake is opaque white CCS and measures less than 1 cm.

The Cascade Canal, currently called the Cascade Irrigation District Canal, is 42 miles long. The section passing through the Fumaria Solar Project generation tie line corridor is unlined and approximately 20 feet across. The Cascade Canal Irrigation Company formed in 1902 as a successor firm to the Inter-Mountain Irrigation Association, proposing the construction of two canals: a lower canal with an intake on the Yakima River near Thorp, and an upper canal with a dam on Lake Kachess. Construction of the lower canal began in 1903 and water began flowing in the spring of the following year (Boening 1919:31–32). The Cascade Canal is one of the earliest canals built in Kittitas County and continues to be used more than 100 years later. It is recommended eligible for the NRHP under Criterion A for its contribution to the history of irrigation in the Pacific Northwest.

Crest Field Ditch Turnout is located at the north end of the Fumaria Solar Project site and appears to be infrequently maintained and not in regular use. The turnout is connected to underground pipes within the project site (the exact locations of these pipes are unknown) and is associated with an open, unlined field ditch that extends to the north through a pasture. The turnout is associated with a field ditch and lacks individual significance. This resource is recommended not eligible for the NRHP.

Lateral NB 7.7, which is part of the Kittitas Reclamation District (KRD) system, extends through a portion of the Fumaria Solar Project site and terminates in a spill end at the south end of the project site (KRD 2017). A small ditch extends from the end of this lateral on an east-west line to a retaining pond located outside of the project site. The lateral measures approximately 3 to 5 feet in width, with depth varying by terrain. The spill end consists of a series of poured concrete weirs with turnouts to direct water to a wastewater ditch that extends to the west, or to the retention pond to the east. This lateral is a minor component of a large and vastly complex irrigation network that may be eligible for the NRHP; however, the eligibility of the irrigation district was not evaluated as part of this solar project. This resource is not recommended individually eligible for the NRHP.

Penstemon Solar Project Site

Cartographic Review

The review of historical sources provides additional important information about the Penstemon Solar Project site. A Native American trail is shown [redacted] on a GLO map of T17N, R19E from 1884, and a Shooshooskin camp is shown [redacted] (GLO 1884b). Additional trails are mapped [redacted], such as the Squaw Creek Trail that [redacted].

Field Survey Findings

One multi-component site and one pre-contact isolate were identified during the survey for the Penstemon Solar Project site (Figure 4.2-13). No built environment resources were identified on the solar project site.

Site 45KT4012 is a historic debris scatter with two concentrations of artifacts located [redacted]. A total of 363 historic artifacts and one lithic artifact were observed at the archaeological site. The lithic artifact is a complete, secondary, freehand percussion flake made of fine-grained volcanic rock, displaying plow damage on the lateral margin.

Image has been redacted

Figure 4.2-13. Penstemon Solar Project cultural and built environment resources.

The majority of artifacts were found [redacted] (n = 303) or [redacted] (n = 51). Artifacts observed [redacted] included many historic artifacts (e.g., agricultural implements, building materials, and domestic refuse) as well as one lithic artifact. Agricultural implements include a horseshoe, a harrow spike, and a horse bit. Building materials include both square and round nails, bricks, concrete pieces, and window glass fragments. Domestic refuse includes many fragments and diagnostic vessel elements of clear, green, aqua, and milk glass, as well as whiteware, other earthenware, and porcelain fragments. Diagnostic artifacts include ceramic and glass pieces with maker's marks, such as two refitting earthenware fragments of a plate produced by The Homer Laughlin China Company in 1925. These diagnostic artifacts suggest that the site was occupied during the 1920s. Several children's objects were also identified on the surface including three glass marbles, a small animal figurine, and a piece of a porcelain doll.

This archaeological site is recommended not eligible for the NRHP due to a lack of integrity. The site appears to be associated with domestic and agricultural activities and to date to the 1920s based on diagnostic artifacts observed. It cannot be associated with any people or events important in history. No remains of buildings or structures are present, and the site therefore possesses no distinctive characteristics of a type, period, or method of construction. Most artifacts are [redacted]. Although buildings or other structures may have stood at this location, no intact remains of them, such as foundations, were observed. The types of artifacts present and their lack of integrity give them little potential to yield information important to history beyond what can be obtained from the area's historical record.

A secondary, bipolar flake, designated 45KT4011, was found [redacted]. The flake is weathered, fine-grained volcanic material, and measures 5.5 × 5.7 × 2.0 cm. Cortex is present along one lateral margin, and there are four flake scars on the dorsal surface. Anvil crushing is visible on the distal end. As an isolate, it is recommended not eligible for the NRHP.

Typha Solar Project Site

Cartographic Review

The review of historical sources provides additional important information about the Typha Solar Project site. The closest known ethnographic Yakama village site is on [redacted] (Luttrell et al. 1999; Luttrell and McKenney 1999; Ray 1936). The Yakama followed well-established trails from their villages to important resource-gathering locales, such as fishing sites at Selah, Icicle Creek, and Priest Rapids (Flenniken and Trautman 2004; Hollenbeck and Carter 1986). A known crossing of the Yakima River was [redacted] (Luttrell et al. 1999; Luttrell and McKenney 1999). Because of the river crossing and proximity to an ethnographic village, this solar project site has heightened sensitivity for encountering pre-contact and ethnographic-period cultural materials.

According to the BLM, land in the Typha Solar Project site left public domain by Cash Entry in 1873 and Homestead Entry in 1888. The 1884 GLO map of T18N, R18E does not show any historical structures or trails in the immediate project vicinity (GLO 1884c). B.W. Frisby and R. Geddes may have farmed land south of the project site when the earliest maps of the vicinity were drawn (GLO 1884c). By 1956, land in the project site was owned by L. D. Peters and adjacent properties west of the river were owned by P. F. P. Young (Metsker Maps 1956). A golf course was present southeast of the project site by this time (Metsker Maps 1956). The property is currently owned by Douglas Dicken and is used for agricultural purposes. One mobile home that was built in 1979 and a few outbuildings that were built in 1910, 1960, 1980, 1982, and 1987 are present on the property, but these structures are located south of the project boundary.

Field Survey Findings

Six pre-contact isolates and two historic properties were identified during the survey for the Typha Solar Project site (Figures 4.2-14 and 4.2-15). As isolates, it is recommended that these resources are not eligible for the NRHP.

A lanceolate biface, designated 45KT4013, was found [redacted]. The artifact measures 90 × 35 × 0.8 mm, and is made from petrified wood with light gray, brown, and white longitudinal banding. The biface is broken at the base. One side exhibits more retouch than the other.

A tertiary, red jasper flake, designated 45KT4014, was recovered [redacted]. The flake measures 0.8 × 0.5 × 0.1 cm. It is triangular in shape with a longitudinal break and an irregular dorsal surface. [redacted]

A tertiary chalcedony flake, designated 45KT4015, was recovered [redacted]. The flake measures 1.6 × 1.3 × 0.3 cm. It is triangular in shape with a longitudinal break and an irregular dorsal surface. [redacted]

A secondary jasper flake, designated 45KT4016, was recovered [redacted]. The flake measures 1.0 × 1.0 × 0.3 cm. [redacted]

A complete, fine-grained volcanic secondary flake, designated 45KT4017, was recovered [redacted]. The flake measures 7.7 × 4.8 × 2.3 cm. It has cortex along one lateral margin and a slightly lipped platform [redacted]

A complete, fine-grained volcanic tertiary flake, designated 45KT4018, was recovered during shovel probing at 12 to 44 cmbs. The flake measures 1.5 × 1.0 × 0.2 cm. The shovel probe from which it came was located in the agricultural field adjacent to the Yakima River.

The Ellensburg Power Canal varies in width, measuring an average of 40 feet across, and is unlined along the Typha Solar Project generation tie line corridor and access road. A steel- and timber-deck bridge carries a farm driveway across the canal to provide access to a farm. A field ditch inlet on the east side of the canal, southeast of the farm bridge, indicates that in addition to power generation, the canal was also utilized for irrigation. The Ellensburg Power Canal was constructed in the first half of the twentieth century to divert water from the Yakima River for a power generation facility. This canal is recommended eligible for the NRHP under Criterion A for its contribution to the history of power generation in the region of Thorp and Ellensburg.

The Ellensburg Golf Club Cart Shed is single-story, shed-roofed building standing one bay deep and 17 bays wide, facing north toward a driving range. Each of the 17 bays is accessed through side-hinged doors. The building footprint has been expanded over time with two to three additions that have more than doubled the building size. The Ellensburg Golf Club existed on this property as early as 1956 (Metsker Maps 1956), but the age of the golf cart shed is unknown. The construction style of the building indicates that the shed could be 50 years old, but it is unlikely to predate the popular use of golf carts, which were still something of a novelty in the 1950s (Windsor 1956). This building lacks individual significance under the NRHP Criteria and has lost its integrity of design due to the construction of several additions. This building is recommended not eligible for the NRHP.

Image has been redacted

Figure 4.2-14. Typha Solar Project cultural and built environment resources, north portion.

Image has been redacted

Figure 4.2-15. Typha Solar Project cultural and built environment resources, south portion.

Urtica Solar Project Site

Cartographic Review

The review of historical sources provides additional important information about the Urtica Solar Project site. According to the BLM, land in the project site left public domain in 1884 when Hiram H. Swasey claimed a homestead. The 1884 GLO map of T17N, R18E does not show any historic structures or trails in the immediate project vicinity (GLO 1884a). By 1956, land in the project site was farmed by Jeff Walters, Robert Kuhn, and Mare Bender (Metsker Maps 1956). A branch of the West Side Canal, the remnants of which are south of the current project and Manastash Road, flowed through Mr. Walter's property. Land in the project site is currently owned by Herbert J. Etux Snowden who continues to use the property for agriculture. Farm buildings and structures on Mr. Snowden's property (but not within the proposed solar project site) date to between 1984 and 1988, with updates as recently as 2011.

Field Survey Findings

One pre-contact site, one contact isolate, and three historic properties were identified during the survey for the Urtica Solar Project site (Figures 4.2-16 and 4.2-17).

Site 45KT4019 is a lithic scatter [redacted]. It was initially observed during the systematic shovel probe survey when 25 flakes were identified in a probe. Additional probes were excavated to delineate site boundaries, resulting in the identification of flakes in nine more probes. Artifacts are [redacted]

A total of 100 lithic artifacts were recovered from 10 shovel probes. These artifacts are mostly small (1–2 cm) tertiary flakes. A variety of material types are represented, including chert (white, gray, pink, and brown), jasper, agate, chalcedony, fine-grained volcanic rock, and obsidian. The majority (67%) of artifacts were recovered [redacted]. Five flakes are heat damaged, and 26 are broken. An obsidian tool was recovered from [redacted]. This tool exhibits use-wear along one edge. A flake, recovered from [redacted] also exhibits wear.

SWCA recommends this site not eligible for the NRHP. It is a relatively low-density scatter of non-diagnostic lithic debitage, with one obsidian tool, and the artifacts are not associated with datable material. Further, it has limited integrity because most of the artifacts observed are located [redacted], and because it has likely been impacted by the farm road [redacted].

A complete tertiary chalcedony flake, designated 45KT4020, was recovered from [redacted]. The flake measures 1 cm in length. As an isolate, it is recommended not eligible for the NRHP.

McCarl Creek is a waterway that has been straightened into a ditch and contains several remnants of concrete weirs. The waterway is marked on a 1956 map as a ditch. The alignment of McCarl Creek has changed since the mid-twentieth century (Metsker Maps 1956) and now extends roughly southwest to northeast across the solar project site, then turns north to parallel Umptanum Road. Although this resource contributes to the larger history of irrigation in Kittitas County, it has lost integrity of location and design due to the reorientation of this creek. This resource lacks individual significance and is recommended not eligible for the NRHP.

Image has been redacted

Figure 4.2-16. Urtica Solar Project cultural and built environment resources, east portion.

Image has been redacted

Figure 4.2-17. Urtica Solar Project cultural and built environment resources, west portion.

Walters Field Ditch is on the west edge of the Urtica Solar Project site, within a field owned in the 1950s by Jeff Walters (Metsker Maps 1956). The ditch is a V-shaped precast concrete ditch with steel tie rods across the top and steel field plates covering row turnouts. This ditch is a very common type of field ditch that can be seen in irrigated farmland throughout the region. It does not have individual significance under NRHP Criteria and is therefore recommended not eligible for the NRHP.

Walters Field Pipe Access Box is located at the southern edge of the Urtica Solar Project site. This poured-concrete box measures approximately 4 feet across and is set in the ground to provide access to turnouts for buried irrigation pipes. The field in which this pipe access box stands was owned in the 1950s by Jeff Walters (Metsker Maps 1956), but this feature was likely added at a later date, although the exact date of construction is unknown. Although this resource contributes to a broader history of irrigation in Kittitas County, it lacks individual significance under NRHP Criteria and is therefore recommended not eligible for the NRHP.

4.2.11 Impacts to Historic and Cultural Preservation

4.2.11.1 General County

There have been 56 cultural resource surveys completed within 1 mile (1.6 km) of the proposed solar project sites (see Table 4.2-5). The Camas, Fumaria, Typha, and Urtica Solar Project sites have not been subject to prior cultural resource investigations. One cultural resources survey was previously conducted along the north and east edges of the Penstemon Solar Project site, resulting in no newly recorded cultural resources.

Eight cultural resources have been recorded within 1 mile (1.6 km) of the proposed solar project sites (see Table 4.2-6). None of these resources are eligible or potentially eligible for listing in the NRHP. As a result, the proposed solar project sites would have no anticipated historic and cultural preservation impacts on the surrounding area. No mitigation measures are required.

4.2.11.2 Solar Project Sites

Camas Solar Project Site

Three cultural resources were recorded in the Camas Solar Project site: 45KT4010, an isolated pre-contact flake; the Paul Wipple Barn; and an irrigation lateral. SWCA recommends that none of the resources are eligible for the NRHP. Impacts to the resources would be minimal as all three would be fenced off from the solar facility. Construction impacts include vibration of machinery and lay-down areas (as yet identified). Similarly, operational impacts include vibration of machinery during maintenance and inspection of the solar facility and perimeter fence.

Fumaria Solar Project Site

Eight cultural resources were recorded in the Fumaria Solar Project survey area: 45KT4000, a pre-contact lithic scatter; four pre-contact isolates (45KT3592, 45KT4007, 45KT4008, and 45KT4009); the Cascade Canal; the Crest Field Ditch Turnout; and Lateral NB 7.7. Of these eight resources, only the Cascade Canal is recommended eligible for the NRHP. The canal is one of the earliest canals built in Kittitas County and continues to be used more than 100 years later. It is recommended eligible for the NRHP under Criterion A for its contribution to the history of irrigation in the Pacific Northwest.

The Cascade Canal is located along the proposed generation tie line for the Fumaria Solar project, which would originate from the southwestern site boundary corner and follow Clarke Road, to Faust Road, where it would parallel Faust Road south along existing transmission lines on the east side of the road

ROW. The transmission line would continue to Hungry Junction Road, to U.S. Highway 97, to McManamy Road, eventually connecting into an existing PSE substation. As the generation tie line would be located within an existing transmission right-of-way along the Cascade Canal, the project would result in no direct construction or operational impacts to the NRHP-eligible Cascade Canal.

Penstemon Solar Project Site

Two cultural resources were recorded in the Penstemon Solar Project site: 45KT4012, a historic debris scatter; and 45KT4011, a pre-contact isolate. SWCA recommends that neither of the resources are eligible for the NRHP. Both resources are located [redacted], and would be impacted by the construction of the solar panels, including grubbing, access roads, and use of lay-down areas (as yet identified). Operation impacts include vibration of heavy equipment during maintenance.

Typha Solar Project Site

Eight cultural resources were recorded in the Typha Solar Project survey area: six pre-contact isolates (45KT4013, 45KT4014, 45KT4015, 45KT4016, 45KT4017, and 45KT4018), the Ellensburg Power Canal, and the Ellensburg Golf Club Cart Shed. Of these eight resources, only the Ellensburg Power Canal is recommended eligible for the NRHP. It is recommended eligible for the NRHP under Criterion A for its contribution to the history of irrigation in the Pacific Northwest.

The generation tie line for the Typha Solar Project would originate from the southwestern site boundary and follow existing transmission lines to cross south along an existing access road, crossing the Ellensburg Power Canal three times, and passing through the Ellensburg Golf and Country Club to connect to the existing PSE distribution transmission line along Thorp Highway South. As the generation tie line would be located within an existing transmission right-of-way at the Ellensburg Power Canal intersections, the project would result in no direct construction or operational impacts to the NRHP-eligible Ellensburg Power Canal.

Urtica Solar Project Site

Five cultural resources were recorded in the Urtica Solar Project site: 45KT4019, a pre-contact lithic scatter; 45KT4020, an isolated pre-contact flake; McCarl Creek waterway; the Walters Field Ditch; and Walters Field Pipe Access Box. SWCA recommends that none of these resources are eligible for the NRHP. Impacts to the McCarl Creek waterway and Walters Field Ditch would be minimal as these resources would be fenced off from the solar facility. Construction impacts include vibration of machinery and lay-down areas (as yet identified). Similarly, operational impacts include vibration of machinery during maintenance and inspection of the solar facility and perimeter fence.

(c) Identify what mitigation will be required.

Monitoring and mitigation measures are prescribed to ensure avoidance of significant cultural resources because of unavoidable impacts resulting from a project's construction, operation, or decommissioning. Mitigation measures are designed to minimize the impact on any kind of significant cultural resource, whether an element of the built environment, an ethnographic property, or an archaeological site. Projects whose design cannot be changed to avoid known significant cultural resources would have mitigation activities.

SWCA recommends that an Inadvertent Discovery Plan be prepared for the solar project sites prior to project construction to inform construction personnel what to do in the event that previously unidentified cultural resources are discovered during excavation. In addition, it is understood that DAHP may recommend additional mitigation measures after reviewing the reports on the cultural resource surveys conducted for the proposed solar projects, which they would do after EFSEC notifies them that this ASC has been received.

Camas Solar Project Site

The Camas Solar Project site plans include fencing off the Paul Wipple Barn and the irrigation lateral from the solar project site, and this would protect the resources from potential construction impacts. The pre-contact isolate (45KI4010) appears to lie [redacted]. No further mitigation measures are required for these non-NRHP-eligible resources.

Fumaria Solar Project Site

The Fumaria Solar Project site plans specifically offer protection to Lateral NB 7.7, which would be located outside of the perimeter fence. The Crest Field Ditch Turnout is in the fenced facility, and project plans state this feature would be maintained. Also located [redacted] is 45KT4000, and project plans do not include solar panels in this location. No further mitigation measures are required for these non-NRHP-eligible resources.

The Cascade Canal is eligible for the NRHP under Criterion A. Project plans include using the existing generation tie line to connect the solar facility with the existing PSE substation on McManamy Road. Use of the existing line would avoid direct impact to the Cascade Canal, and no further mitigation measures are required.

Portions of the proposed transmission line ROW alternatives have not undergone pedestrian inventory, and it is therefore recommended that the remaining accessible portions of the ROW undergo such survey prior to project construction. Further, because no subsurface probing was conducted for the proposed transmission line ROW, it is recommended that a Monitoring and Discovery Plan be prepared for the transmission line, and that all project excavation within or associated with the transmission line ROW be monitored by a professional archaeologist.

Penstemon Solar Project Site

The two cultural resources recorded in the Penstemon Solar Project site—45KT4011 and 45KT4012—are recommended not eligible for the NRHP and no further mitigation measures are required.

Typha Solar Project Site

The Typha Solar Project site plans include the use of the existing generation tie line near the Ellensburg Golf Club Cart Shed, and this feature would be avoided during construction. The six isolates are located [redacted]. No further mitigation measures are required for these non-NRHP-eligible resources.

The Ellensburg Power Canal is eligible for the NRHP under Criterion A. Project plans include using the existing generation tie line to connect the solar facility with the existing PSE substation on Thorp Highway South. Use of the existing line would avoid direct impact to the Cascade Canal, and no further mitigation measures are required.

Because no subsurface probing was conducted for the proposed transmission line ROW, it is recommended that a Monitoring and Discovery Plan be prepared for the transmission line, and that all project excavation within or associated with the transmission line ROW be monitored by a professional archaeologist.

Urtica Solar Project Site

The Urtica Solar Project site plans include protection of the McCarl Creek waterway, and the Walters Field Ditch would be located outside of the solar facility. These measures would protect the resources from potential construction impacts. The remaining three resources are located within the solar project site. No further mitigation measures are required for these non-NRHP-eligible resources.

(6) Agricultural crops/animals. The application shall identify all agricultural crops and animals which could be affected by construction and/or operation of the facility and any operations, discharges, or wastes which could impact the adjoining agricultural community.

4.2.12 Affected Environment for Agriculture

The principal farm products in Kittitas County are hay, cereal grain, and livestock. Kittitas County is one of the leading producers of beef cattle and sheep in the State. In addition, timothy hay is an important crop in Kittitas County. Timothy hay is grown commercially on an estimated 25,000 to 35,000 acres and generates approximately $35 million annually to local growers. An estimated 90% of the hay is exported to Japan and other Pacific Rim countries, for use as cattle and racehorse feed. Apple and pear fruit orchards provide another cash crop. Additional agricultural details are provided below (Pless et al. 2015).

4.2.12.1 General County

According to the USDA 2012 Census of Agriculture, Kittitas County had 1,006 farms that accounted for 183,124 acres of agricultural land use. There were 68,314 acres of total croplands, of which 51,234 acres were harvested lands and 66,908 acres were irrigated lands. The market value of crops, including nursery and greenhouse crops, was $47,157,000 and the market value of livestock, poultry, and their products was $21,754,000. Table 4.2-7 provides additional agricultural information for Kittitas County and, for comparison purposes, the State of Washington (USDA 2012).

Average farm size was 182 acres, average land and building values were $804,841, and average of machinery and equipment values were $77,593. The average market value of agricultural products sold by each farm was $68,500 (USDA 2012).

A planned hay storage and compression facility is to be built on a 23.39-acre site. The building to be constructed at the site would be 158,400 square feet. The project would consist of three phases spanning over the next 5 years. Timothy hay would be the primary crop for the export business, with alfalfa as an alternative crop, and would be grown throughout eastern Washington. The compressed hay is intended to be exported overseas in containers, via the Seattle and Tacoma Ports, to the Middle East markets.

Table 4.2-8. Agricultural Characteristics for Kittitas County and Washington (2012)

Characteristic	Kittitas County	Washington
Farms (number)	1,006	37,249
Land in farms (acres):	183,124	14,748,107
• Average size of farm (acres)	182	396
• Median size of farm (acres)	25	24
Estimated market value of land and buildings:		
• Average per farm (dollars)	804,841	910,249
• Average per acre (dollars)	4,421	2,299
Estimated market value of all machinery and equipment ($1,000)	78,059	3,672,289

Characteristic	Kittitas County	Washington
• Average per farm (dollars)	77,593	98,588
Total cropland:		
• farms	615	25,045
• acres	68,314	7,526,742
Harvested cropland:		
• farms	525	20,846
• acres	51,234	4,342,904
Irrigated land:		
• farms	741	14,736
• acres	66,908	1,633,571
Market value of agricultural products sold ($1,000):	68,911	9,120,749
• Average per farm (dollars)	68,500	244,859
• Crops, including nursery and greenhouse crops ($1,000)	47,157	6,492,042
• Livestock, poultry, and their products ($1,000)	21,754	2,628,708

Sources: USDA (2012).

4.2.12.2 Solar Project Sites

Three of the proposed solar project sites are being actively farmed for alfalfa or hay production, and two sites are fallow. None of the sites are used for animal-based agriculture. The agricultural uses of each of the proposed solar facilities are identified below.

Camas Solar Project Site

The Camas Solar Project site is an actively farmed alfalfa field. Agricultural facilities such as a barn/equipment storage building are located on the property. Agriculture on the Camas Solar Project site and surrounding area is supplied with water through a canal that separates the 34.95-acre subject parcel from the 4.17-acre parcel. According to the Natural Resources Conservation Service's (NRCS's) Web Soil Survey's Kittitas County Area, Washington (WA637) map, the Camas site has three classifications of soil types (NRCS 2017). Of the three, Mitta ashy silt loam is considered prime farmland if irrigated (Class 4) and the Nosal ashy silt loam is considered prime farmland if irrigated and drained (Class 6). Therefore, the agricultural land use at the Camas Solar Project site is considered prime farmland. Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. Each soil designated as prime farmland is also assigned a number code designating the current quality of farmland and the management actions required to utilize it for adequate farmland. Generally, only prime farmland Codes 1 through 4 are considered adequate farmland, which are defined as 1) all areas are prime farmland, 2) prime farmland if drained, 3) prime farmland if protected from flooding or not frequently flooded during the growing season, and 4) prime farmland if irrigated.

Fumaria Solar Project Site

The Fumaria Solar Project site is fallow agricultural land (see Section 3.4.1.1 and 3.4.1.2 for additional details), currently used for grazing cattle. According to the NRCS Web Soil Survey's Kittitas County Area, Washington (WA637) map, the Fumaria Solar Project site has two predominant classifications of soil types (NRCS 2017). The Reeser-Reelow-Sketter complex accounts for approximately 98% of the project site, of which 94% is considered farmland of statewide importance. The Metmill loam classification accounts for approximately 2% of the solar project site and is considered prime farmland, if irrigated

(Class 4). Therefore, the agricultural land use at the Fumaria Solar Project site is considered prime farmland and farmland of statewide importance. Farmland of statewide importance is defined as nearly meeting the definition of prime farmland, and land that can economically produce high yields of crops when treated and managed according to acceptable farming methods. Often times, areas categorized as farmland of statewide importance do not meet the criteria for prime or unique farmland but are still considered potentially acceptable farmland as designated by state law. These areas are designated by the Washington State Department of Agriculture.

Penstemon Solar Project Site

The Penstemon Solar Project site is actively farmed alfalfa or hay agricultural land. According to the Natural Resources Conservation Services (NRCS) Web Soil Survey's Kittitas County Area, Washington (WA637) map, the Penstemon Solar Project site has three predominant classifications of soil types (NRCS 2017). The Mitta ashy silt loam is considered prime farmland if irrigated (Class 4). The Nack-Brickmill complex soil type is considered prime farmland if irrigated and drained (Class 6). The Deedale clay loam is considered farmland of statewide importance. Therefore, the agricultural land use at the Penstemon Solar Project site is considered prime farmland and farmland of statewide importance.

Typha Solar Project Site

The Typha Solar Project site is fallow agricultural land that is actively grazed (see Section 3.4.1.1 and 3.4.1.2 for additional details). According to the NRCS Web Soil Survey's Kittitas County Area, Washington (WA637) map, the Typha Solar Project site has four predominant classifications of soil types (NRCS 2017). The Weirman gravelly sandy loam is not considered prime farmland. The Mitta ashy silt loam, drained, is considered prime farmland if irrigated (Class 4). The Weirman-Kayak-Zillah complex and Nossal ashy silt loam soil types are considered prime farmland if irrigated and drained (Class 6). Therefore, a portion of the agricultural land use on the Typha Solar Project site is considered prime farmland.

Urtica Solar Project Site

The Urtica Solar Project site is actively farmed alfalfa agricultural land. According to the NRCS Web Soil Survey's Kittitas County Area, Washington (WA637) map, the Urtica Solar Project site has four classifications of soil types: Ackna loam, Brickmill loam, Brysill loam, and Nanum loam (NRCS 2017). All four soil classifications are considered prime farmland by the NRCS if irrigated (Class 4).

4.2.13 Impacts to Agriculture

None of the five Columbia Solar Projects would affect or be affected by any of the surrounding working farms during normal business operations. None of the projects would negatively impact or cause any changes in any existing, accepted farming practices, nor would they in any fashion cause or force changes in any farming operations or practices. Although some heavy construction equipment and materials would be hauled to the sites, there would be direct access to parking/staging areas on each solar project site and, thus, the equipment and materials should not have impacts on area roads and access. None of the surrounding farming activities would affect the solar projects.

Construction of the Columbia Solar Projects would represent a conversion of the roughly 232 acres of leased properties currently used for agricultural hay production and grazing, to use as solar electricity generation facilities for the approximately 30-year lives of the solar projects. Conversion of those 232 acres to solar facilities would represent only 0.13% of the total 183,124 acres of farmlands in Kittitas County, and 0.34% of the 68,314 acres of total croplands (USDA 2012). Because these conversions are extremely minimal, and unlike residential development, temporary (for the life of the facility), there would be no significant impacts to agriculture in the county during construction or operation of the five Columbia Solar Projects.

It is very unlikely that any spills, discharges or wastes during construction or operation of any of the five solar projects would impact any of the adjoining agricultural lands. Indeed, petroleum fuels are the only potentially hazardous materials that would be used in any significant quantity during construction and operation of the Columbia Solar Projects, and these fuels are commonly used today by the farming equipment used on the project sites as well as on the adjoining agricultural lands.

In order to ensure that spills do not impact adjacent landowners, a detailed construction SPCC Plan would be developed by TUUSSO's engineering, procurement, and construction (EPC) contractor and submitted to EFSEC for review prior to construction. EFSEC, as well as pertinent local emergency response organizations, where appropriate, would review and approve all plans before they are implemented. The plan would address prevention and clean-up of any potential spills from construction activities. Measures to prevent and contain any accidental spills resulting from fuel storage and use are described in detail in Sections 2.10 and 4.1.6, above. Construction and operation of the solar projects would not result in the generation of any hazardous wastes in quantities regulated by state or federal law.

4.3 Transportation 463-60-372

(1) Transportation systems. The application shall identify all permanent transportation facilities impacted by the construction and operation of the energy facilities, the nature of the impacts and the methods to mitigate impacts. Such impact identification, description, and mitigation shall, at least, take into account:

(a) Expected traffic volumes during construction, based on where the work force is expected to reside;

4.3.1 Construction Traffic Volumes

During the peak of construction, a typical day would include the transportation of workers, transportation of materials, and movement of heavy equipment. Vehicular trip generation for employees, delivery trucks, and heavy equipment would vary depending on the phase of construction for each of the five Columbia Solar Projects. As shown in Table 4.3-1, it is estimated that a total of approximately 1,500 trips would be made to each site during a 3-month construction period, with conservatively 25% of those trips (375) made by heavy vehicles. On average, approximately 25 trips would be made to each site each day during construction, again assuming that 25% (6) would be heavy vehicle trips. These heavy vehicle trips could haul materials and equipment from Ellensburg on state highways and county roads (see Section 4.3.2). But, depending upon where they are purchased and shipped from, deliveries could also be made from Seattle, Portland, the Tri-Cities, and other urban areas using the federal interstates and highways.

Table 4.3-1. Estimated Construction Vehicle Traffic Volumes

Type of Vehicle	Average Daily Trips (ADT)	Total Site Trips
Each Site Over About 3 Months		
Heavy Vehicles	6	375
Non-heavy Vehicles	19	1,125
Total	**25**	**1,500**
Maximum for All Five Sites Over 8 Months[1]		
Heavy Vehicles	30	1,875
Non-heavy Vehicles	95	5,625
Total	**125**	**7,500**

1. This assumes that all five solar projects would be constructed simultaneously and at peak, as a worst-case scenario. However, peak ADTs would not reach these levels because construction would be phased between all five sites over 8 months.

As described in Section 4.4.2, construction of the five Columbia Solar Projects would begin in the second quarter of 2018 and would end in the fourth quarter of 2018, occurring over about 8 months from April through November. Construction of the five solar projects would employ up to 100 workers per day during the peak construction period. Approximately 80 of the peak workforce would likely be hired locally, or would be provided by locally-contracted companies or businesses, and the remaining 20 non-local peak workforce might elect to commute to the Ellensburg area on a daily basis. However, if they elect not to commute, they are likely to either stay in a personal RV at a camp site or to rent a motel room in the Ellensburg area or Kittitas County for the duration of the construction period. These workers would commute daily to each project site individually, in pairs, or in small groups.

Table 4.3-2 lists the typical construction equipment commonly associated with the construction of solar facilities. Construction staging and material lay-down areas would be set up for each section of each Columbia Solar Project site, to allow for efficient distribution of components to different parts of each project site. These lay-down areas would be temporarily fenced and would cover approximately 1.5 acres each within the project boundaries.

Table 4.3-2. Construction Equipment

Type of Equipment	Construction Use
Heavy Vehicles	
Boom Truck/Truck Mounted Crane	Moving materials
Bore/Drill Rigs	Drilling holes into the ground
Concrete Mixing Trucks	Delivering concrete used for any slabs and foundations
Dump Trucks	Delivering and spreading aggregates
Excavators	Trenching and foundations
Graders	Access road and driveway leveling
Paving Equipment	Paving, if required
Pile/Vibratory Drivers	Driving structure posts
Rollers	Compacting access roads and driveways
Semi-Tractor Trailers	Moving materials and equipment
Non-heavy Vehicles	
Forklifts	Moving materials, loading and unloading of trucks
Personnel transport vehicles	Transporting workers
Other Material Handling Equipment	Moving materials
Service Trucks	Maintaining heavy equipment

Type of Equipment	Construction Use
Skid Steer Loaders	Light soil work for slabs and foundations
Sweepers/Scrubbers	Dust control on paved areas
Tractors/Loaders/Backhoes	Clearing and grubbing and moving soil
Trenchers	Light trench work
Water Trucks	Dust control
Other Equipment	
Disposal Containers	Disposing of and removing construction debris
Other General Industrial Equipment	Assembling structures
Plate Compactors/Jumping Jacks	Compacting soil under concrete slabs and foundations
Pressure Washers	Cleaning
Storage Containers	Storing on-site materials
Welders	Assembling structures

(b) Access routes for moving heavy loads, construction materials, or equipment;

4.3.2 Affected Environment for Transportation

4.3.2.1 General County Highways and Roads

The anticipated access routes for construction equipment, materials deliveries, and construction and operation crews to access each of the five Columbia Solar Project sites consist of the existing roads that are adjacent to the sites and the existing roads that would be used to access the nearest interstate and Ellensburg (Figure 4.3-1). The interstates and state highways that would be used to access the sites include I-82, I-90, State Route (SR) 821, and U.S. Route 97. I-90 and I-82 are four-lane divided highways with limited-access on- and off-ramps and average daily traffic (ADT) counts of 16,333 vehicles and 18,477 vehicles both ways, respectively. SR 821 and U.S. Route 97 are two-lane highways with 1,500 and 2,800 ADT, respectively. Table 4.3-3 below provides more detailed information on each road that would be used to access the sites, including jurisdiction, lanes, and average daily traffic (if available).

The major roads that are part of the Kittitas County's County Road System that would be used to access the sites include Tjossem Road, Road No. 6, Clarke Road, Faust Road, Hungry Junction Road, Reecer Creek Road, Thorp Highway South, and Umptanum Road. These are two-lane roads with ADTs ranging from 66 to 3,648 vehicles. The major streets within Ellensburg city limits that would be used to access the sites include West University Way (two lanes with 3,648 ADT), Umptanum Road (two lanes with 2,612 ADT), and Canyon Road (four lanes with 8,300 ADT).

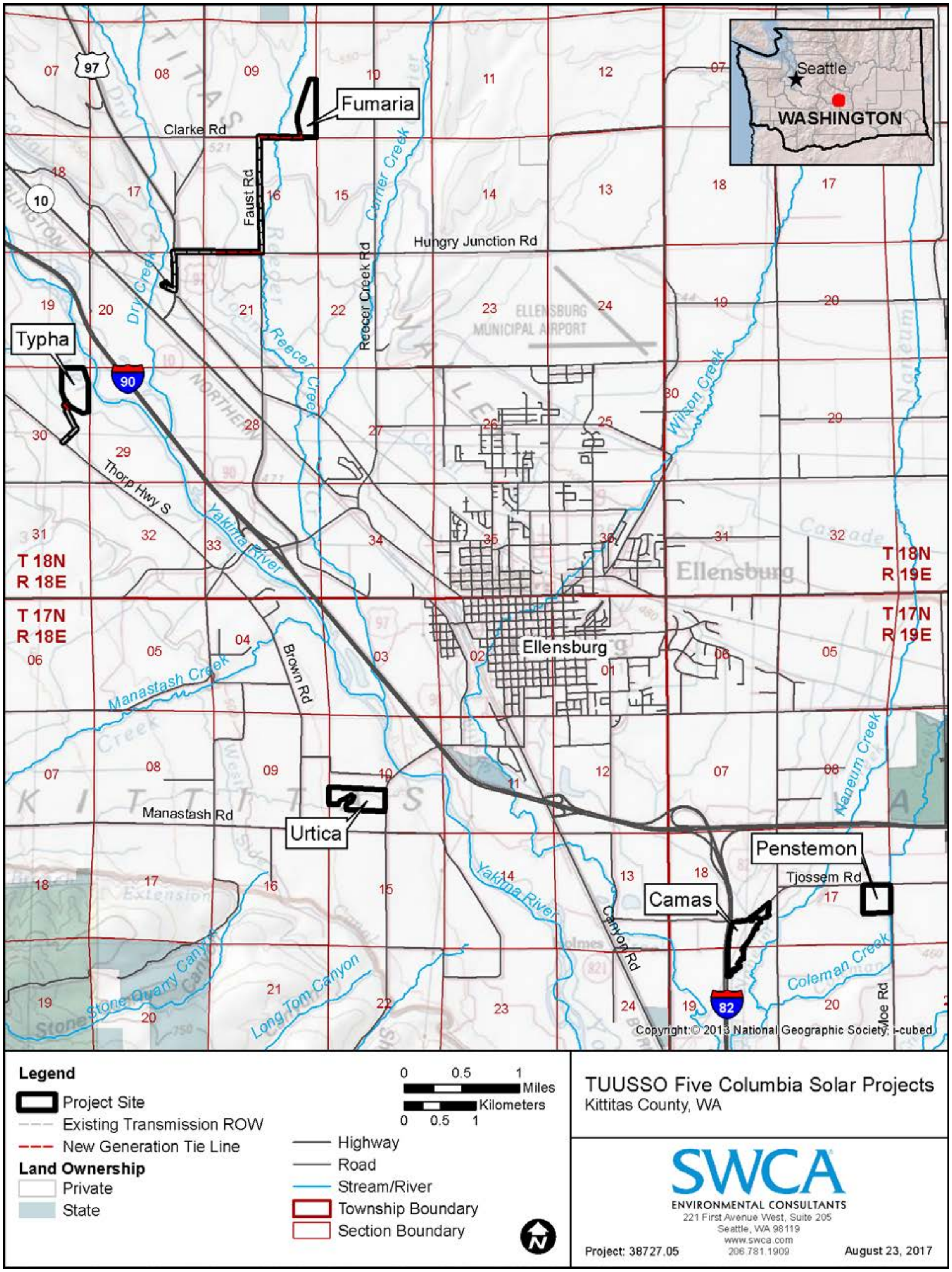


Figure 4.3-1. Columbia Solar Project locations, highways, and roads.

Table 4.3-3. Highway and Access Road Information for the Five Columbia Solar Project Sites

Access Highway/Road	Sites Involved	Number of Through-lanes	Jurisdiction	Average Daily Traffic
Interstate 82	Camas Penstemon	4	FHWA/WSDOT	18,477 (both ways)[1]
State Route 821	Camas Penstemon	2	WSDOT	1,500 (2016 estimate)[1]
Tjossem Road	Camas Penstemon	2	Kittitas County	634 at intersection with Road No. 6 (2017 count)[3]
Road No. 6	Camas Penstemon	2	Kittitas County	865 at intersection with Tjossem Road (2015 count)[3]
Interstate 90	Fumaria Typha Urtica	4	FHWA/WSDOT	16,333 (both ways)[1]
U.S. Route 97	Fumaria (generation tie line only)	2	FHWA/WSDOT	2,800 (2016 estimate)[1]
Clarke Road	Fumaria	2 (no centerline)	Kittitas County	66 near Faust Road (2016 count)[3]
Faust Road	Fumaria	2 (no centerline)	Kittitas County	201 south of Clark Road (2016 count)[3]
Hungry Junction Road	Fumaria	2	Kittitas County	271 at intersection with Faust Road (2016 count)[3]
Reecer Creek Road	Fumaria	2	Kittitas County	2,612 at intersection with West University Road (2016 count)[3]
Thorp Highway South	Typha	2	Kittitas County	579 at intersection with Cove Road (2016 count)[3]
West University Way	Typha	2	City of Ellensburg	3,648 at intersection with Reecer Creek Road (2016 count)[3]
Umptanum Road	Urtica	2	Kittitas County/City of Ellensburg	2,612 at intersection with Manastash Road (2016 count)[3]
Canyon Road	Urtica	4	City of Ellensburg	8,300 at intersection with Umptanum Road (2005 estimate)[2]

Note: Average Daily Traffic 2016 data for interstates is from the closest permanent traffic recorders used (R042 for I-90 and R048 for I-82).
Sources: 1. WSDOT (2016).
2. Kittitas County Public Works Department (2008).
3. Kittitas County Public Works Department (2017).

4.3.2.2 Solar Project Site Driveways and Internal Access Roads

The points of access and associated construction methods vary for each project site and are described below in greater detail. Interior all-weather access roads within each site would be designed to provide access to the inverter pads from the site entrance. These all-weather access roads would be 12 feet wide, would consist of compacted soils or gravel to 90%, and a soil binder would then be sprayed or aggregate would be laid down to protect them from wind and water erosion to allow for continuous access. The soil binder would be reapplied annually to ensure the integrity of the access roads.

The remainder of the access roads throughout each solar project site would be unpaved vegetated drive roads, with slopes less than 4%. All access roads have been located to minimize grading, closely following the existing elevations.

4.3.3 Impacts to Transportation

4.3.3.1 Construction Impacts

General County

Table 4.3-4 shows the potential changes in traffic volumes as a result of construction of an individual solar project site. Most of the highways and roads would experience less than a 5% increase in average daily traffic volumes and, thus, transportation systems and volumes would not be impacted for four of the solar project sites (i.e., Camas, Penstemon, Typha, and Urtica).

Table 4.3-4. Potential Construction Vehicle Impacts for Columba Solar Project Sites

Access Highway/Road	Sites Involved	Existing Average Daily Traffic (ADT)	Construction ADT	Percent Change in ADT
Interstate 82	Camas Penstemon	18,477 (both ways)[1]	25	0.14
State Route 821	Camas Penstemon	1,500 (2016 estimate)[1]	25	1.67
Tjossem Road	Camas Penstemon	634 at intersection with Road No. 6 (2017 count)[3]	25	3.94
Road No. 6	Camas Penstemon	865 at intersection with Tjossem Road (2015 count)[3]	25	2.89
Interstate 90	Fumaria Typha Urtica	16,333 (both ways)[1]	25	0.15
U.S. Route 97	Fumaria (generation tie line only)	2,800 (2016 estimate)[1]	25	0.89
Clarke Road	Fumaria	66 near Faust Road (2016 count)[3]	25	37.88
Faust Road	Fumaria	201 south of Clark Road (2016 count)[3]	25	12.44
Hungry Junction Road	Fumaria	271 at intersection with Faust Road (2016 count)[3]	25	9.23
Reecer Creek Road	Fumaria	2,612 at intersection with West University Road (2016 count)[3]	25	0.96
Thorp Highway South	Typha	579 at intersection with Cove Road (2016 count)[3]	25	4.32
W University Way	Typha	3,648 at intersection with Reecer Creek Road (2016 count)[3]	25	0.69

Access Highway/Road	Sites Involved	Existing Average Daily Traffic (ADT)	Construction ADT	Percent Change in ADT
Umptanum Road	Urtica	2,612 at intersection with Manastash Road (2016 count)[3]	25	0.96
Canyon Road	Urtica	8,300 at intersection with Umptanum Road (2005 estimate)[2]	25	0.30

Note: Average Daily Traffic 2016 data for interstates is from the closest permanent traffic recorders used (R042 for I-90 and R048 for I-82).
Sources: 1. WSDOT (2016).
2. Kittitas County Public Works Department (2008).
3. Kittitas County Public Works Department (2017).

The exception would be three county roads accessing the Fumaria Solar Project site, with ADT increases on Clarke Road (37.88%), Faust Road (12.44%), and Hungry Junction Road (9.23%) for the 3-month construction period, representing minor to moderate temporary impacts.

Solar Project Sites

The anticipated routes for construction equipment, materials deliveries, and construction and operation crews to access each of the five Columbia Solar Project sites consist of the existing roads that are adjacent to the sites and the existing roads that would be used to access the nearest interstate and Ellensburg. No new roads would need to be constructed to access the five proposed solar project sites or the generation tie lines associated with the Fumaria and Typha Solar Project sites.

Camas Solar Project Site

The access roads to the Camas Solar Project site are from Tjossem Road, located immediately north of the project site. There would be a single point of access to Camas A from Tjossem Road, and a separate point of access to Camas B from Tjossem Road. The point of access to Camas A would use the existing 20-foot gravel road running to the entry gate, which would be widened slightly from current conditions between Tjossem Road and the existing culvert, and would provide emergency access as well as access for maintenance and operation purposes. The point of access to Camas B would comprise a new, short span of 20-foot gravel road off of Tjossem Road leading to the entry gate for Camas B.

Even though the Camas Solar Project would be adjacent to I-82 and within 1 mile of I-90, the closest access to the interstate system (I-82) is located 2.5 miles to the south via Road No. 6 and SR 821. By travelling north on Road No. 6 from the solar project site and crossing I-90, local roads can be accessed that lead to Ellensburg, approximately 4.5 miles to the northwest of the project area.

Fumaria Solar Project Site

TUUSSO may incorporate one of two paths for accessing the Fumaria Solar Project site. The first potential site access would be provided from the southwest on Clarke Road. This access route would use the existing 12-foot gravel and dirt road (up to the entry gates) to provide emergency access as well as access for maintenance and operation purposes. The second potential site access would be provided from the east on Reecer Creek Road. This access route would utilize a new 12 to 20-foot-wide, approximately 0.5-mile-long gravel road up to entry gates on the east boundary of the project site, to provide emergency access as well as access for maintenance and operation purposes.

The closest access to I-90 is located 5.5 miles south via Clarke Road, Faust Road, Hungry Junction Road, and Reecer Creek Road. This route also provides access to Ellensburg, approximately 6 miles to the southeast of the solar project site. From Hungry Junction Road, the generation tie line would parallel a 0.3-mile segment of U.S. Route 97.

Penstemon Solar Project Site

The access road to the Penstemon Solar Project site is Tjossem Road, located immediately north of the project site. The point of access would be a short paved or gravel driveway leading up to the entry gates from Tjossem Road, to provide emergency access as well as access for maintenance and operation purposes.

Even though the Penstemon Solar Project site is near I-82 and within 1 mile of I-90, the closest access to the interstate system is located 2.5 miles to the south via Road No. 6 and SR 821. By travelling north on Road No. 6 from the solar project site and crossing I-90, local roads can be accessed that lead to Ellensburg, approximately 4.5 miles to the northwest of the project site.

Typha Solar Project Site

The access road to the Typha Solar Project site is Thorp Highway South, located southwest of the project area, via a small private dirt road. This access route would use the existing 12-foot gravel and dirt road (up to the entry gates) to provide emergency access as well as access for maintenance and operations purposes. TUUSSO is in consultation with local fire authorities, and may widen the existing road to 20 feet based on the final requirements agreed to in consultation with such authorities. An existing bridge along this road over the Ellensburg Power Canal would also need to be improved in one of three ways: 1) reinforce, improve, and/or replace existing bridge supports to accommodate the truck traffic to the project site; 2) completely remove and replace the existing bridge with a new bridge; or 3) install a temporary bridge over the existing bridge during the construction period to accommodate the truck traffic.

The Typha Solar Project generation tie line route would generally follow the access roads to the solar facility. Thus, it would cross Thorp Highway South and traverse northeast across a field, before following along the private access road northwest to the site.

The closest access to I-90 is located 2.3 miles to the southeast via Thorp Highway South. Ellensburg is accessed by Thorp Highway South and West University Way, and is approximately 4 miles to the east of the project area.

Urtica Solar Project Site

Access to the Urtica Solar Project site is provided by Umptanum Road that serves as the eastern border of the site. TUUSSO would use the existing 12-foot gravel/dirt road to access much of the Urtica Solar Project site. The point of access would be a short paved or gravel driveway leading up to the entry gates from Umptanum Road, to provide emergency access as well as access for maintenance and operation purposes.

Though I-90 is located 0.6 mile northeast of the Urtica Solar Project site, Umptanum Road does not provide access to the interstate. Canyon Road provides the closest access to I-90, approximately 1.8 miles east of the solar project site via Umptanum Road. This route also provides access to Ellensburg.

(c) Expected traffic volumes during normal operation of the facility;

4.3.3.2 Operation Impacts

None of the operational workforce is anticipated to permanently in-migrate or relocate into the Ellensburg area. The operational workforce for the five Columbia Solar Project sites would be relatively small and would typically be off-site. In addition, it is anticipated that four to five O&M personnel would make about two to three visits per year to each of the solar project sites to conduct the on-site O&M functions. These staff would likely use water trucks, utility vehicles, and pickup trucks to conduct maintenance activities. Because there would be minimal operational staff levels and vehicle trips, no positive or negative impacts are anticipated to transportation infrastructure or use levels in Kittitas County, in the Ellensburg area, or on roads accessing the individual solar project sites.

(d) For transmission facilities, anticipated maintenance access; and

The proposed generation tie line associated with the Fumaria Solar Project site would parallel and/or cross Clarke Road, Faust Road, Hungry Junction Road, U.S. Route 97, and McManamy Road between the proposed solar facility and the existing substation.

The Typha Solar Project generation tie line route would generally follow the access roads to the solar facility. Thus, it would cross Thorp Highway South and traverse northeast across a field, before following along the private access road northwest to the site.

(e) Consistency with local comprehensive transportation plans.

The last Kittitas County Long Range Transportation Plan was prepared in 2008 (Kittitas County Public Works Department 2008). That plan identified the primary factors affecting the county transportation system as being increased recreational traffic from the major urban areas and freight movement of container trucks taking timothy hay to the Seattle and Tacoma international ports. As a result, the three primary investments in the transportation system were anticipated to be maintaining the existing system, promoting safe and efficient travel, and adding the capacity needed for planned growth (Kittitas County Public Works Department 2008).

4.3.3.3 Bridges

At that time, the county identified the following bridges as requiring replacement (Kittitas County Public Works Department 2008):

- Clark Road, over Dry Creek (over 20 feet wide with a sufficiency rating of 66.50 in 2006)
- Hungry Junction Road, over Cascade Canal (under 20 feet wide with a sufficiency rating of 51.26 in 2005)
- No. 6 Road, over Town Ditch (under 20 feet wide with a sufficiency rating of 49.47 in 2006)
- Reecer Creek Road, over Highline Canal (over 20 feet wide with a sufficiency rating of 61.13 in 2006)
- Thorpe Highway South, over Westside Ditch (under 20 feet wide with a sufficiency rating of 49.31 in 2005)
- Tjossem Road, over Town Ditch (over 20 feet wide with a sufficiency rating of 79.90 in 2006)

That plan did not identify any of these roads as having inadequate load ratings and, therefore, not being able to handle normal truck traffic and permitted overweight loads.

4.3.3.4 Traffic Accidents and Safety

In Kittitas County, there were seven fatal collisions in 2006, 10 fatal collisions in 2005, and 12 fatal collisions in 2004. However, none of these fatalities occurred on county roadways. But many injury related accidents did occur on county roads. Project-related roads that were considered high-accident locations included (Kittitas County Public Works Department 2008):

- Reecer Creek Road – University Way – Old Highway Ten: 5 accidents with 1 involving an injury.
- Thorp Highway South from I-90 to Robinson Canyon Road: 6 accidents with 1 involving an injury.
- Umptanum Road: 10 accidents with 2 involving an injury.

4.3.3.5 Overall Kittitas County Transportation Assessment and Summary

Overall, the existing transportation network in Kittitas County was considered to be in good operating condition. Average daily traffic volumes on roadways ranged from less than 10 vehicles to 8,200 vehicles, very low traffic volumes compared to daily traffic volumes on typical arterial roads statewide (Kittitas County Public Works Department 2008).

Because none of the potential project access highways or roads had inadequate load ratings and, therefore, were not determined to be unable to handle normal truck traffic and permitted overweight loads; accident rates were low; and traffic volumes were low, the five Columbia Solar Projects would have no or minimal impacts on the planned transportation system outlined in the Kittitas County Long Range Transportation Plan during construction or operation.

(2) Vehicular traffic. The application shall describe existing roads, estimate volume, types, and routes of vehicular traffic which will arise from construction and operation of the facility. The applicant shall indicate the applicable standards to be utilized in improving existing roads and in constructing new permanent or temporary roads or access, and shall indicate the final disposition of new roads or access and identify who will maintain them.

The existing highway, road, and street systems that would provide access to the five Columbia Solar Project sites are described above in Section 4.3.3.1.

(3) Waterborne, rail, and air traffic. The application shall describe existing railroads and other transportation facilities and indicate what additional access, if any, will be needed during planned construction and operation. The applicant shall indicate the applicable standards to be utilized in improving existing transportation facilities and in constructing new permanent or temporary access facilities, and shall indicate the final disposition of new access facilities and identify who will maintain them.

4.3.4 Affected Environment for Waterborne, Rail, and Air Traffic

4.3.4.1 Waterways

Although Kittitas County is bordered on the east by the Columbia River, no waterway barging or shipping occurs in Kittitas County.

4.3.4.2 Railways

The Burlington Northern Santa Fe Railroad (BNSF) crosses Kittitas County and has an office at 608 W 3rd Avenue in Ellensburg; however, the railroad does not stop to load or unload freight in the city. The rail line begins in the southern part of Kittitas County north of Selah, crosses north and northwest through Pomona, then parallels SR 821 north and northwest on the same side or opposite side of the canyon, until it passes through Ellensburg, and then crosses northwest along U.S. Route 97, diverting from U.S. Route 97 and passing through Thorp, parallels the Yakima River on its eastern side, travels along SR 10 through Teanaway and Cle Elum, where it crosses under and then follows along the west/south side of I-90 through Easton, until nears Snoqualmie Pass.

4.3.4.3 Airports

Bowers Field Airport is located at the Bowers Field Airport's Aeronautical and Industrial Areas, in northeastern Ellensburg, and is managed by Kittitas County. The site is located on about 1,300 acres, is used by about 55,000 aircraft annually, and has the following features (Pless et al. 2015):

- Runway 07/25, 5,590 × 150 feet, asphalt
- Runway 11/29, 4,300 × 150 feet, asphalt
- 58,890-square-foot parking apron area
- 12 small publicly owned aircraft hangars
- 12 small privately owned aircraft hangars
- one large publicly owned aircraft hangar
- Bowers Field Hanger Building No. 404, built in 1997, 20,000 square feet
- Bowers Field T-Hanger, built in 1960, 12,500 square feet

Mid-State Aviation conducts day-to-day operations of the Aeronautical Area. Central Washington University (CWU) leases space at the airport for their contractor to provide flight training to CWU students. Improvements were made to the airport apron and tie-down areas in 2013. The airport has designed an extension of Runway 11/29, which is expected to begin construction in 2020 (Pless et al. 2015).

Cle Elum Municipal Airport is managed by the city of Cle Elum. It is located on 135 acres, is used by about 1,000 aircraft annually, and has the following features (Pless et al. 2015):

- Runway 07/25, 2,552 × 40 feet, asphalt
- 50,000-square-foot parking apron area

The Easton State Airfield is managed by WSDOT. It is located on 15 acres, was built in 1930s, is used by about 30 aircraft per month, and has one turf runway (09/27) measuring 2,640 × 100 feet (Pless et al. 2015).

There is also a privately owned airstrip, DeVere Field, that is owned by Jim DeVere. It is located on 50 acres, six single-engine aircraft are based there, and it has one asphalt runway (08/26) measuring 2,055 × 30 feet (Pless et al. 2015).

4.3.5 Impacts to Waterborne, Rail, and Air Traffic

The solar panels for the Columbia Solar Project sites would likely be shipped from China via normal shipping routes (likely waterborne); however, delivery of the panels would not affect any existing shipping routes. No other equipment or materials would be shipped to the five Columbia Solar Project sites via waterborne, rail, or air routes. Based on these reasons, there would be no impacts to those modes of travel as a result of construction or operation of the solar projects.

(4) Parking. The application shall identify existing and any additional parking areas or facilities which will be needed during construction and operation of the energy facility, and plans for maintenance and runoff control from the parking areas or facilities.

4.3.6 Affected Environment for Parking

Because the Columbia Solar Project sites are rural agricultural land, no formal parking spaces occur on the sites. However, informal parking is available within the fields, on access roads into the fields, and along roads that would be used for access.

4.3.7 Impacts to Parking

Construction staging and material lay-down areas would be set up for each Columbia Solar Project site, to allow for efficient distribution of components to different parts of each project site. These lay-down areas would be temporarily fenced and would cover approximately 1.5 acres each within the project boundaries. In addition, personal and utility vehicles would be parked on each solar project site, and thus not require parking along roads or in parking lots. Thus, because all vehicles would be parked on the leased project and construction sites, there would be no impacts to parking from construction or operation of the solar projects.

(5) Movement/circulation of people or goods. The application shall describe any change to the current movement or circulation of people or goods caused by construction or operation of the facility. The application shall indicate consideration of multipurpose utilization of rights of way and describe the measures to be employed to utilize, restore, or rehabilitate disturbed areas. The application shall describe the means proposed to ensure safe utilization of those areas under applicant's control where public access will be granted during project construction, operation, abandonment, termination, or when operations cease.

As indicated previously, access to the Camas, Penstemon, Typha, and Urtica Solar Project sites during construction would result in less than a 5% increase in average daily traffic volumes on area interstates, highways, and county roads accessing those sites. Thus, transportation volumes and movement/circulation of people and goods would not be impacted for those four solar project sites.

The exception would be three county roads accessing the Fumaria Solar Project site, with ADT increases on Clarke Road (37.88%), Faust Road (12.44%), and Hungry Junction Road (9.23%) for the 3-month construction period, representing potential minor to moderate temporary impacts to the movement/circulation of people and goods on those roads during the 3-month construction period.

(6) Traffic hazards. The application shall identify all hazards to traffic caused by construction or operation of the facility. Except where security restrictions are imposed by the federal government the applicant shall indicate the manner in which fuels and waste products are to be transported to and from the facility, including a designation of the specific routes to be utilized.

The routes to be used to transport construction equipment, materials, supplies, and fuels to and from the sites, as well as waste products from the sites are identified above in Section 4.3.2. Similarly, the types of vehicles that would traveling to and from the sites are identified in Section 4.3.1. In some cases, heavily-laden vehicles might move slower than other vehicles currently using the highway and road systems. But the number of slow moving trucks and the duration would be minimal, and in some cases might be similar to agriculture equipment movement occurring in the area, and thus should have minimal impacts on traffic hazards.

4.4 Socioeconomics 463-60-535

The application shall include a detailed socioeconomic impact analysis which identifies primary, secondary, positive as well as negative impacts on the socioeconomic environment in the area potentially affected by the project, with particular attention to the impact of the proposed facility on population, work force, property values, housing, health facilities and services, education facilities, governmental services, and local economy. The study area shall include the area that may be affected by employment within a one-hour commute distance of the project site. The analysis shall use the most recent data as published by the U.S. Census or state of Washington sources.

The five proposed Columbia Solar Project sites are located within unincorporated Kittitas County and are 1 to 6 miles away from Ellensburg. Demographic data for Kittitas County, the city of Ellensburg, and other smaller communities were analyzed to determine potential socioeconomic impacts (Figure 4.4.-1). The demographic data used in this analysis were from the U.S. Census Bureau's 2000 Census, 2010 Census (the most current 10-year period for the county and city), and the U.S. Census Bureau's 2011–2015 American Community Survey (ACS) 5-year Estimates.

(1) The analysis shall include:

(a) Population and growth rate data for the most current ten-year period for the county or counties and incorporated cities in the study area;

Table 4.4-1 summarizes population information for Kittitas County; the cities of Ellensburg, Kittitas, and Cle Elum; and the State of Washington for the years 2000, 2010, and 2015. Kittitas County had a population of 42,204 in 2015 and Ellensburg had a population of 18,637, comprising about 44% of the total county population. Both the county and Ellensburg have experienced very low annual population growth (0.5 to 0.6% annually) from 2010 to 2015, less than half the growth rate for the State of Washington (1.3%). The population level in Cle Elum was unchanged during this period, while Kittitas experienced a slight decline.

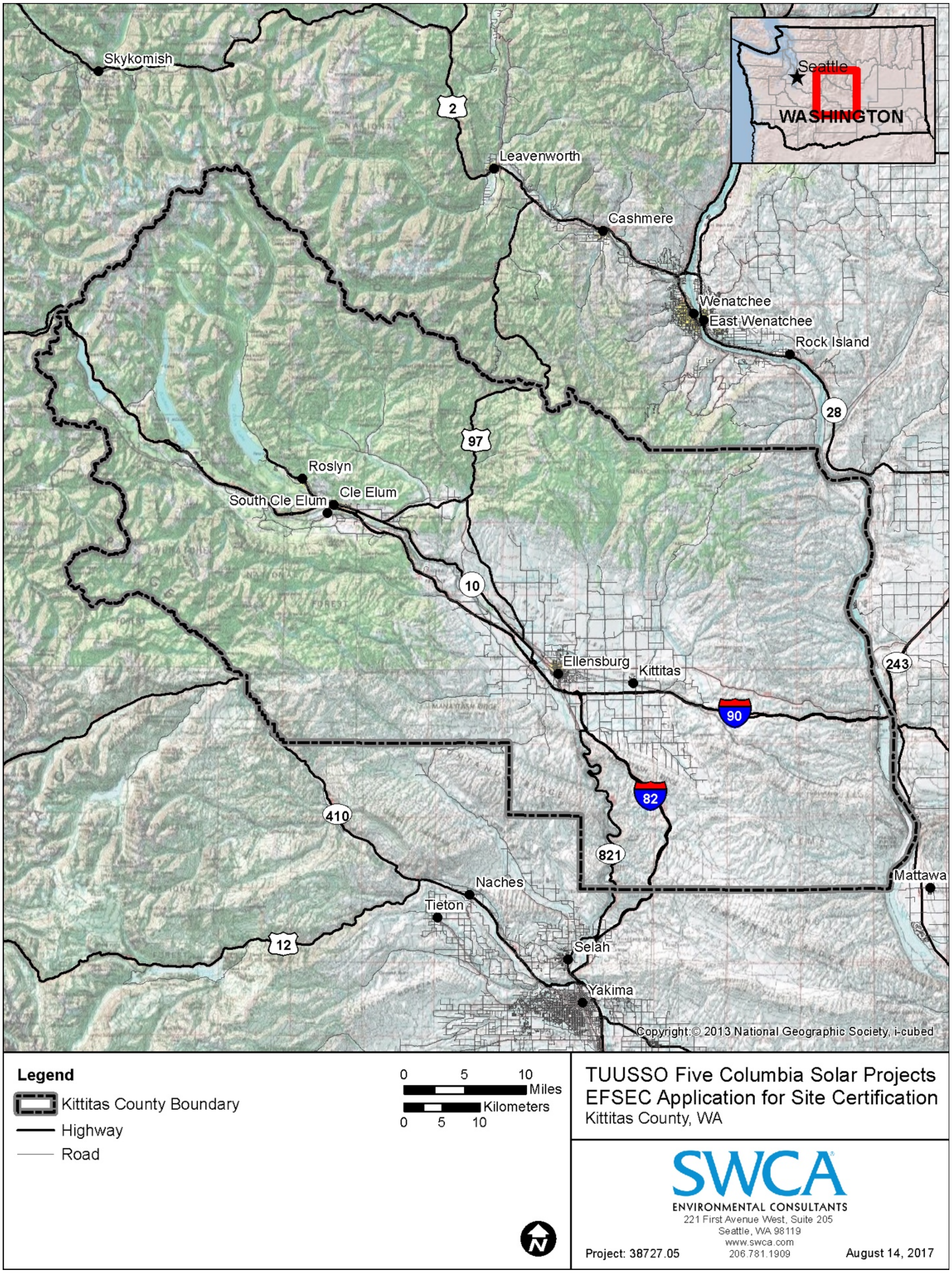


Figure 4.4-1. Kittitas County and cities overview map.

Table 4.4-1. Population and Growth Rate Data for Kittitas County, the Cities, and Washington (2000, 2010, and 2015)

Jurisdiction	2000 Census Population[1]	2010 Census Population[2]	2015 Estimated Population[3]	Population Change (2010–2015)	Percent Change per Year (2010–2015)
Kittitas County	33,362	40,915	42,204	1,289	0.6
City of Ellensburg	15,414	18,174	18,637	463	0.5
City of Kittitas	1,105	1,433	1,387	-46	-0.3
City of Cle Elum	1,755	2,545	2,544	-1	0.0
Washington	5,894,121	6,724,540	7,170,351	445,811	1.3

Sources: 1. U.S. Census Bureau (2000).
2. U.S. Census Bureau (2010).
3. U.S. Census Bureau (2015).

(b) Published forecast population figures for the study area for both the construction and operations periods;

The Washington State Office of Financial Management (WFO) provides high, medium, and low population forecasts for each county and incorporated city in the state. In 2005, the WFO's high population projection estimated that the Kittitas County population would be 52,810 people by the year 2025, an increase of 10,606 people and major growth at 2.5% annually from 2015 (the Kittitas County Conference of Governments adopted this high population projection for its planning purposes). When compared to the current estimated annual population growth rate of 0.6 percent between 2010 and 2015, the annual population growth rate would need to increase by more than four times the current estimated growth rate between 2015 and 2025 in order to meet the WFO's high population forecast for 2025.

The WFO high population growth projection estimated that the city of Ellensburg would have a total of 23,765 people by the year 2025, an increase of 5,128 people and major growth at 2.75% annually from 2015 (the city approved this projection for planning purposes in the Ellensburg Comprehensive Plan – 2006 Update, amended through 2014). This projection assumed that the city of Ellensburg would continue to comprise 45% of the Kittitas County total population. Similar to the WFO's high population growth forecast for Kittitas County, the city of Ellensburg has not recently experienced the high population growth that the WFO projected between 2010 and 2015. Instead, the Census Bureau's estimated annual population growth rate for this period was 0.5% (see Table 4.4-1).

(c) Numbers and percentages describing the race/ethnic composition of the cities and counties in the study area;

Table 4.4-2 identifies the percent non-white population levels in Kittitas County; the cities of Ellensburg, Kittitas, and Cle Elum; and for comparative purposes the State of Washington. The non-white population is calculated by subtracting the ACS percent of "Not Hispanic or Latino: White alone" from 100%. As shown in Table 4.4-2, non-white populations comprise 15.4% of Kittitas County and 20.6% of Ellensburg. Kittitas and Cle Elum have much lower non-white population levels, around 5%. The percent non-white populations in Kittitas County and Ellensburg are noticeably lower than the 29.3% non-white population in the State of Washington.

Table 4.4-2. Percent Minority Population in Kittitas County, the Cities, and Washington (2015)

Jurisdiction	Percent White Population[1]	Percent Non-white Population[2]
Kittitas County	84.6	15.4
City of Ellensburg	79.4	20.6
City of Kittitas	95.0	5.0
City of Cle Elum	94.2	4.8
Washington	70.7	29.3

Source: U.S. Census Bureau (2015).
1. U.S. Census Bureau category: Not Hispanic or Latino: White alone.
2. Total percent of non-white population, including Hispanic or Latino and race/ethnicity.

Hispanic or Latino populations, which can also include other races/ethnicities, make up the largest racial/ethnic population in Kittitas County and Ellensburg (8.5% and 10.5%, respectively), similar to the 12.0% for the State of Washington. The largest single racial group was the Asian population (2.2% and 3.5%, respectively), less than half the 7.6% composition for the State of Washington. The aggregate population of the racial/ethnic categories in Kittitas County and the city of Ellensburg are identified in Table 4.4-3.

Table 4.4-3. Population by Race/Ethnicity, Including Hispanic or Latino in Kittitas County, Ellensburg, and Washington (2015)

Race/Ethnicity	Race Population and Percent		
	Kittitas County	City of Ellensburg	Washington
Total Population	42,204	18,637	6,985,464
Not Hispanic or Latino:	38,629 (91.5%)	16,672 (89.5%)	6,149,976 (88.0%)
• White alone	35,720 (84.6%)	14,791 (79.4%)	4,943,228 (70.8%)
• Black or African American alone	398 (0.9%)	354 (1.9%)	243,786 (3.5%)
• American Indian and Alaska Native alone	334 (0.8%)	119 (0.6%)	80,838 (1.2%)
• Asian alone	948 (2.3%)	652 (3.5%)	530,928 (7.6%)
• Native Hawaiian and Other Pacific Islander alone	23 (0.05%)	23 (0.12%)	42,532 (0.6%)
• Some other race alone:	28 (0.07%)	0 (0.0%)	9,467 (0.14%)
• Two or more races	1,178 (2.8%)	733 (3.9%)	299,197 (4.3%)
Hispanic or Latino	3,575 (8.5%)	1,965 (10.5%)	835,488 (12.0%)

Source: U.S. Census Bureau (2015).

(d) Average per capita and household incomes, including the number and percentage of the population below the poverty level for the cities and counties within the study area;

Table 4.4-4 identifies the median household incomes, per capita household incomes, and the percentage of the population living below the poverty level for Kittitas County; the cities of Ellensburg, Kittitas, and Cle Elum; and for comparative purposes the State of Washington. While the median household income is similar for Kittitas County ($46,458) and Cle Elum ($45,324), Ellensburg and Kittitas have noticeably lower income levels ($29,952 and $39,803, respectively). However, all of these jurisdictions have significantly lower median incomes than the State of Washington overall ($61,062), including 24% lower for Kittitas County and 49% lower for Ellensburg. Those same patterns exist for per capita income levels, with Kittitas County being 24% lower and Ellensburg being 53% lower than Washington per capita income.

The percentage of the population living below the poverty level is highest in Ellensburg (38.5%), followed by Kittitas County (22.2%), Cle Elum (21.8%), and Kittitas (17.4%). The percentage of population living below the poverty level in Kittitas County is approximately 1.7 times higher than in the state, and in Ellensburg is approximately 2.9 times higher than the state percent.

Table 4.4-4. Median Annual Household and Per Capita Incomes, and Percent of the Population Below the Poverty Level (2015)

Jurisdiction	Median Household Income	Per Capita Income	Population Below the Poverty Level	
			Number	Percent
Kittitas County	$46,458	$24,014	9,369	22.2
City of Ellensburg	$29,952	$18,004	7,176	38.5
City of Kittitas	$39,803	$19,526	241	17.4
City of Cle Elum	$45,324	$25,450	555	21.8
Washington	$61,062	$31,762	953,657	13.3

Source: U.S. Census Bureau (2015).

(e) A description of whether or not any minority or low-income populations would be displaced by this project or disproportionately impacted;

No residential or commercial facilities exist on any of the leased parcels for the five Columbia Solar Projects, and thus no non-white or low-income populations, or anyone else, would be displaced as a result of constructing or operating/maintaining the proposed solar facilities.

As described in Section 4.4.2.2, construction of the five Columbia Solar Projects would employ up to 100 workers per day during the peak construction period. It is estimated that approximately 80 of the workers would be hired locally, and could include individual hires as well as employees of existing construction-related firms and businesses that might be retained for various phases of construction. It is assumed these local workers would be hired from within Kittitas County, or a maximum commuting distance of 75 miles from Ellensburg such from as Yakima (36 miles away), Wenatchee (70 miles), or Moses Lake (71 miles).

The remaining 20 non-local hires might elect to commute to the Ellensburg area on a daily basis, or to stay in either a personal RV at a camp site, or to rent a motel room. Thus, it is not anticipated that construction of the solar projects would result in the permanent relocation or in-migration of any of the construction workforce. Thus, although the construction of the solar facilities might provide some temporary employment opportunities to low-income or minority residents, the levels would be minimal and there would be minimal beneficial impacts to employment.

As described in Section 4.4.2.3, it is anticipated that the workforce performing ongoing operations would be relatively small and would typically be off-site, and that an additional four to five maintenance personnel would make about two to three visits per year to each of the five Columbia Solar Project sites to conduct the on-site maintenance functions. This latter workforce would be comprised of general laborers for cleaning the PV panels and general landscaping; skilled electricians for visual inspections and performance testing of the inverters, transformers, and switchyard equipment; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. It is not anticipated that operation of the solar projects would result in the permanent relocation or in-migration of any operational workforce. Thus, although operation of the solar facilities might provide some long-term employment opportunities to low-income or minority residents, the levels would be minimal and, thus, there would be no beneficial impacts to employment.

(f) The average annual work force size, total number of employed workers, and the number and percentage of unemployed workers including the year that data are most recently available. Employment numbers and percentage of the total work force should be provided for the primary employment sectors;

4.4.1 Overall Economy

Kittitas County's overall economy and employment is largely influenced by the government (including higher education), healthcare, agriculture/food processing, and tourism sectors (Pless et al. 2015). Additional information about agriculture can be found in Section 4.2.12, and about tourism/recreation in Section 4.2.6.

Wind farms have been a growing industry in Kittitas County, with four facilities generating 101 to 273 MW each. PSE operates the Wild Horse Wind and Solar Facility. Wild Horse Wind has 149 turbines that can generate up to 273 MW of electricity. Invenergy operates the Vantage Wind Power Project, which has 60 turbines that can generate up to 103.5 MW of electricity. The Kittitas Valley Wind Farm, owned by EDP (formerly Horizon Wind Energy), has 48 turbines that generate up to 100.8 MW. And finally, the Desert Claim Wind Farm, owned by EDF (formerly known as enXco), has been permitted through EFSEC for up to 95 turbines that can generate up to 190 MW, but has yet to be constructed (Pless et al. 2015).

4.4.2 Workforce, Employment, and Unemployment

4.4.2.1 Affected Environment

Table 4.4-5 identifies the annual workforce size (population 16 years old and over), the percent of the labor force that was employed, and the percent of the labor force that was unemployed in 2015. Kittitas County had a workforce of 35,450 people aged 16 years and older employed and Ellensburg had 16,243 employed. While the percentage employed was within the range of 54.7% to 59.4% for Kittitas County, most cities, and Washington State, Cle Elum had a much higher percentage of employed residents with 70.9%.

Unemployment rates were similar for Kittitas County (7.8% and 1,669 people) and Ellensburg (8.0% and 772 people), which were also similar to the 7.9% for the state. However, the city of Kittitas (5.3% and 57 people) and Cle Elum (4.8% and 100 people) had noticeably lower unemployment rates.

Table 4.4-6 identifies the employment type by industry for Kittitas County, the city of Ellensburg, and for comparative purposes the State of Washington in 2015. Primary employment industries in Kittitas County included educational services, healthcare, and social assistance (27.9%); arts, entertainment, recreation, and accommodation and food services (14.2%); and retail trade (13.5%). The primary employment industries in Ellensburg were the same with 33.4%, 16.7%, and 14.9%, respectively.

Table 4.4-5. Workforce, Employment, and Unemployment in Kittitas County, the Cities, and Washington (2015)

Jurisdiction	Workforce Population 16 Years Old and Over	Employed		Unemployed	
		Number	Percent	Number	Percent
Kittitas County	35,450	19,811	55.9	1,669	7.8
City of Ellensburg	16,243	8,888	54.7	772	8.0
City of Kittitas	1,076	582	59.4	57	5.3
City of Cle Elum	2,029	1,339	70.9	100	4.8
Washington	5,568,640	3,259,877	58.5	277,806	7.9

Source: U.S. Census Bureau (2015).

Table 4.4-6. Employment by Industry in Kittitas County, Ellensburg, and Washington (2015)

Industry	Kittitas County	City of Ellensburg	Washington
Total employed population 16 years and over	19,811	8,888	3,259,877
Agriculture, forestry, fishing and hunting, and mining	1,014 (5.1%)	156 (1.8%)	86,192 (2.6%)
Construction	1,345 (6.8%)	271 (3.0%)	198,176 (6.1%)
Manufacturing	988 (5.0%)	384 (4.3%)	340,891 (10.5%)
Wholesale trade	493 (2.5%)	116 (1.3%)	95,060 (2.9%)
Retail trade	2,683 (13.5%)	1,320 (14.9%)	385,279 (11.8%)
Transportation and warehousing, and utilities	1,030 (5.2%)	403 (4.5%)	169,356 (5.2%)
Information	248 (1.3%)	77 (0.9%)	74,949 (2.3%)
Finance and insurance, and real estate and rental and leasing	560 (2.8%)	185 (2.1%)	176,782 (5.4%)
Professional, scientific, and management, and administrative and waste management services	1,012 (5.1%)	518 (5.8%)	399,860 (12.3%)
Educational services, and healthcare and social assistance	5,529 (27.9%)	2,966 (33.4%)	700,729 (21.5%)
Arts, entertainment, and recreation, and accommodation and food services	2,807 (14.2%)	1,486 (16.7%)	301,829 (9.6%)
Other services, except public administration	968 (4.9%)	494 (5.6%)	156,614 (4.8%)
Public administration	1,134 (5.7%)	512 (5.8%)	174,160 (5.3%)

Source: U.S. Census Bureau (2015).

In general, industries employed at approximately the same rates in the county and city as they did in the state. A few notable differences between the employment by industry percentage rates were: 1) the county had higher employment in the “agriculture, forestry, fishing, hunting, and mining” industry than the city and the state, 2) the state had a higher employment rate in the “manufacturing” and “professional, scientific, and management, and administrative and waste management services” industries than the county and city, and 3) the city had a higher employment rate for the “educational services, and health care and social assistance” industry than the county and the state. Regarding employment from education, the city of Ellensburg is home to Central Washington University, which is one of the primary employers (33.4%) in the city and it had a larger comparative percent.

The top 10 employers in Kittitas County employed over 3,900 people in 2014, or about 18.5% of the total workforce. The greatest single employer in Kittitas County was Central Washington University, with about 1,450 employees (Table 4.4-7) (Pless et al. 2015).

Table 4.4-7. Top 10 Employers in Kittitas County (2014)

Employer	Employees	Rank	Percent of Total County Employment
Central Washington University	1,450	1	6.83
Kittitas Valley Community Hospital	500	2	2.35
Ellensburg School District	390	3	1.84
Anderson Hay Grain/Agriculture	315	4	1.48
Kittitas County	305	5	1.44
Fred Meyer	225	6	1.06
Elmview	200	7	0.94
Auvil Fruit Company	188	8	0.89
City of Ellensburg	179	9	0.84
Suncadia	170	10	0.80
Totals	**3,922**	**–**	**18.47**
Total County Working Population (2014)	21,240		
Total County Working Population (2005)	19,170		

Source: Pless et al. (2015).

(g) An estimate by month of the average size of the project construction, operational work force by trade, and work force peak periods;

4.4.2.2 Impacts to Employment

Construction Impacts

Construction Schedule and Phases

Table 4.4-8 provides the proposed schedule for construction and operation of the five Columbia Solar Projects. While the schedule might be modified due to the date of EFSEC's approval as well as other approvals/permits, this table illustrates the approximate duration of major project activities.

Construction of all five solar projects is anticipated to commence in the second quarter of 2018 and would require approximately 6 to 9 months to complete, but most likely occurring over about 8 months from April through November. Each solar project would require about 3 months to construct. When possible, specialized work crews would move from site to site to efficiently manage the construction phases on each project. Construction activities would occur between 7:00 a.m. and 10:00 p.m., Monday through Saturday.

Table 4.4-8. Columbia Solar Projects Construction Schedule

Project Activity	Schedule
Approval of all other required non-discretionary permits	1st quarter 2018
Approval of all administrative permits	1st quarter 2018
Approved Site Certification Agreements	March 2018
Construction begins	2nd quarter 2018
Completion of construction	4th quarter 2018
Projects operational	4th quarter 2018

Project construction would include several phases occurring simultaneously across the five Columbia Solar Project sites, including:

1. the grading and construction of a temporary gravel construction entrance/exit at the entry gates of each site;
2. the installation of silt fencing;
3. the pile driving of piers or posts and the placement of trackers on support piers;
4. the trenching and installation of the DC and AC collection system, including the installation of the inverter enclosures;
5. the installation of the PV panels;
6. the construction of electrical interconnection facilities, including the construction of the interconnection and generation tie lines;
7. the mowing, application of herbicide treatment, discing/tilling and planting of native plant species on the sites, as well as the planting of landscaping species (e.g., trees and bushes along certain boundaries of the sites); and
8. the grading, compaction, and placement of gravel (as necessary) for all-weather access roads.

Construction Workforce

As shown in Table 4.4-9, construction of the five Columbia Solar Projects would employ up to 100 workers per day during the peak construction period. Roughly 80% of the workforce would be non-craft laborers and 20% would be mixed craft laborers.

Based upon prior experience, approximately 80% of the workforce would be hired locally, and could include individual hires as well as employees of existing construction-related firms and businesses that might be retained for various phases of construction. It is assumed these local workers would be hired from within Kittitas County, or a maximum commuting distance of 75 miles from Ellensburg such from as Yakima (36 miles away), Wenatchee (70 miles), or Moses Lake (71 miles).

Table 4.4-9. Peak Construction Workforce Characteristics for the Five Columbia Solar Projects

Workforce Characteristics	Number of Workers	Percent of Workers
Type of Labor		
Mixed Craft Laborers	20	20
Non-craft Laborers	80	80
Location of Hire		
Non-local Hires	20	20
Local Hires	80	80
Total Peak Workforce	**100**	**100**

The remaining 20% of non-local hires might elect to commute to the Ellensburg area on a daily basis from urban areas such as the Tri-Cities (over 96 miles away), the eastern suburbs of Seattle such as Issaquah (91 miles) or North Bend (79 miles), or from the Seattle Metropolitan area (107 miles). However, if they elect not to commute, they are likely to either stay in either a personal RV at a camp site, or to rent a motel room. Thus, it is not anticipated that construction of the solar projects would result in the permanent relocation or in-migration of any of the construction workforce.

For each solar project site, an individual solar project would host up to 50 workers per day during peak construction, representing only a portion of the anticipated 3-month individual solar project construction periods.

Operation Impacts

The five Columbia Solar Projects would begin operation in the fourth quarter of 2018, and would operate for approximately 30 years. PV facilities contain very few moving parts and have limited ongoing maintenance requirements. Thus, the workforce performing ongoing operations would be relatively small and would typically be located off-site. The facilities would be monitored remotely in real time. Skilled operations monitoring personnel would review the information provided by a Supervisory Control and Data Acquisition (SCADA) system. If a fault or an error occurs, an automatically generated email would be sent to alert monitoring personnel. The monitoring personnel would then assess the fault or error information to determine what corrective actions would be needed. In most cases with PV systems, the fault is auto-correctable and does not require reactive repair at the site.

It is anticipated that four to five maintenance personnel would make about two to three visits per year to each of the five Columbia Solar Project sites to conduct the on-site O&M functions. This workforce would be composed of general laborers for cleaning the PV panels; skilled electricians for visual inspections and performance testing of the inverters, transformers, and switchyard equipment; and skilled mechanics to inspect and maintain the mechanical portions of the tracking system. No major equipment would be required for maintenance of the solar projects, except as necessary for maintenance of the all-weather access roads.

Other than O&M, general landscape labor would perform vegetation maintenance based on the weather and vegetation growth, to mow/maintain ground covering, and for weed abatement and to remove unwanted vegetation. In addition, occasional dust control activities and all-weather access road maintenance would occur.

Because there would be minimal operational staff levels, no positive or negative impacts are anticipated on employment levels in Kittitas County overall, or in the Ellensburg area. Similarly, no permanent or temporary relocations are anticipated into the Ellensburg area.

(h) An analysis of whether or not the locally available work force would be sufficient to meet the anticipated demand for direct workers and an estimate of the number of construction and operation workers that would be hired from outside of the study area if the locally available work force would not meet the demand;

As shown in Table 4.4-5, there were 1,669 unemployed people in Kittitas County in 2015. Thus, this unemployed labor pool would significantly exceed and provide the estimated 80 people that could be individually, temporarily hired during peak construction of the five Columbia Soar Projects. This part of the workforce could also include employees of existing construction-related firms and businesses that might be retained for various phases of construction.

This unemployed labor pool would also be adequate to meet the need for four to five maintenance personnel that would make about two to three visits per year to conduct the on-site O&M functions at each of the five Columbia Solar Project sites during operation.

Because of the temporary nature of the 100-person peak construction workforce, the very limited number of operational workforce, and the 1,669 unemployed labor pool in Kittitas County, there would be no impacts on the available labor pool due to the five Columbia Solar Projects.

(i) A list of the required trades for the proposed project construction;

Trades required during the construction phase of each of the five Columbia Solar Projects would include:

- semi-tractor trailer, concrete mixing truck, dump truck, and water trucks drivers;
- heavy equipment operators for bore/drill rigs, boom/truck or truck-mounted cranes, pile/vibratory drivers, graders, trenchers, tractors/loaders/backhoes, excavators, skid steer loaders, paving equipment, sweepers/scrubbers, rollers, and fork lifts;
- form construction and cement workers;
- electricians;
- general laborers to operate plate compactors/jumping jacks, install fencing, pressure washers, and other material handling equipment; and
- general laborers to plant and maintain the shrubs and brush providing visual screening and on-site native plantings.

(j) An estimate of how many direct or indirect operation and maintenance workers (including family members and/or dependents) would temporarily relocate;

As indicated above for construction, the 20 non-local direct hires might elect to commute to the Ellensburg area on a daily basis from urban areas such as the Tri-Cities (over 96 miles away), the eastern suburbs of Seattle such as Issaquah (91 miles) or North Bend (79 miles), or from the Seattle Metropolitan area (107 miles). However, if they elect not to commute, they are likely to either stay in either a personal RV at a camp site, or to rent a motel room, and most likely in the Ellensburg area. Because of the relatively short 8-month construction period, the phasing of various parts of the work, and the estimated 20 non-local temporary hires, it is not anticipated that construction of the five Columbia Solar Projects would result in the temporary relocation or in-migration of any of the construction workforce into the Ellensburg area.

Because the construction workforce would only be in the Ellensburg area for about 8 months, it is assumed that they won't relocate their family members for that short period. Also, because there would only be 100 construction workers during the peak period, the amount of indirect employment generated by the five Columbia Solar Projects would be minimal, and would be available from the pool of 1,669 unemployed people in Kittitas County in 2015. Thus, there are not anticipated to be any relocations during construction of the solar projects.

Similarly, because there would be few off-site operational monitoring personnel and only four to five maintenance personnel that would make about two to three visits per year to each site, it is assumed that there would be no need relocate their family members to the Ellensburg area for the operational life of the five Columbia Solar Projects. Also, because there would be very few operational workers, the amount of indirect employment generated by the solar projects would be minimal and would not require relocation of any of the indirect workforce or their families.

(k) An estimate of how many workers would potentially commute on a daily basis and where they would originate.

Approximately 80 members of the construction workforce would be hired locally. It is assumed these local workers would be hired from within Kittitas County, most likely from the Ellensburg area, or a maximum commuting distance of 75 miles from Ellensburg such from as Yakima (36 miles away), Wenatchee (70 miles), or Moses Lake (71 miles).

As indicated in the response to item (j) above, the 20 non-local hires might elect to commute to the Ellensburg area on a daily basis from more distant urban areas such as the Tri-Cities (over 96 miles away), the eastern suburbs of Seattle such as Issaquah (91 miles) or North Bend (79 miles), or from the Seattle Metropolitan area (107 miles), or to stay at local RV parks or motels.

(2) The application shall describe the potential impact on housing needs, costs, or availability due to the influx of workers for construction and operation of the facility and include the following:

(a) Housing data from the most recent ten-year period that data are available, including the total number of housing units in the study area, number of units occupied, number and percentage of units vacant, median home value, and median gross rent. A description of the available hotels, motels, bed and breakfasts, campgrounds or other recreational facilities;

4.4.3 Affected Environment for Housing

4.4.3.1 Housing Units

Table 4.4-10 summarizes the housing characteristics for Kittitas County; the cities of Ellensburg, Kittitas, and Cle Elum; and for comparative purposes the State of Washington for 2015. Table 4.4-11 provides similar information for 2000. Overall, Kittitas County had 22,364 total housing units, of which 16,953 were occupied and 5,411 (24.2%) were vacant. Ellensburg had a total of 7,921 housing units, of which 7,314 were occupied and 607 (7.7%) were vacant. Thus, Kittitas County had a higher number and over double the vacancy rate of housing units than the city of Ellensburg and the State of Washington.

Table 4.4-10. Housing Characteristics in Kittitas County, the Cities, and Washington (2015)

Jurisdiction	Total Number of Housing Units	Number of Units Occupied	Number and Percent of Units Vacant	Median Home Value (owner-occupied units)	Median Gross Rent
Kittitas County	22,364	16,953	5,411 (24.2%)	$242,900	$798/month
City of Ellensburg	7,921	7,314	607 (7.7%)	$195,000	$758/month
City of Kittitas	598	529	69 (11.5%)	$136,400	$1,000/month
City of Cle Elum	1,198	1,082	116 (9.7%)	$183,800	$772/month
Washington	2,942,127	2,668,912	273,215 (9.3%)	$259,500	$1,014/month

Source: U.S. Census Bureau (2015).

Table 4.4-11. Housing Characteristics in Kittitas County, the Cities, and Washington (2000)

Jurisdiction	Total Number of Housing Units	Number of Units Occupied	Number and Percent of Units Vacant	Median Home Value (owner-occupied units)	Median Gross Rent
Kittitas County	16,475	13,382	3,093 (18.8%)	$133,400	$497/month
City of Ellensburg	6,732	6,249	483 (7.2%)	$113,200	$489/month
City of Kittitas	510	443	67 (13.1%)	$92,200	$557/month
City of Cle Elum	956	792	164 (17.2%)	$103,000	$434/month
Washington	2,451,075	2,271,398	179,677 (7.3%)	$168,300	$663/month

Source: U.S. Census Bureau (2000).

The median home value in the county ($242,900) and Ellensburg ($195,000) in 2015 were 6.3 and 24.9% lower, respectively, than the state median home value of $259,500. The median gross monthly rent in 2015 was lower in the county ($798/month) and Ellensburg ($758/month); approximately 21.3% and 25.2% lower, respectively, than the state median gross rent of $1,014/month.

4.4.3.2 Hotels, Motels, and Bed and Breakfasts

In addition to the above available housing, Kittitas County and the city of Ellensburg have a variety of hotels, motels, and bed and breakfasts available for short-term rental. Twenty-five of these facilities are identified and summarized in Table 4.4-12. According to the Kittitas County Chamber of Commerce (2017a) list of lodging amenities, 15 hotels, motels, and bed and breakfasts are available in Ellensburg and the surrounding area. An additional 10 facilities are available about 25 miles further west in the Cle Elum area.

Reviews of websites that offer short-term rentals at private residences, such as Vacasa Rentals (2017) and Airbnb (2017), indicate that many short-term rental options are also available throughout the year in the city of Ellensburg.

Table 4.4-12. Representative Hotels, Motels, and Bed & Breakfasts in Kittitas County

Hotel/Motel/Bed and Breakfast	Location	Amenities
Ellensburg Area		
Best Western Plus Lincoln Inn and Suites	W Umptanum Road, Ellensburg	Business center, pool, fitness center, on-site parking
Econo Lodge Cedars Inn	N Dollarway Road, Ellensburg	Business center, on-site parking, laundry facilities, on-site parking
Comfort Inn	Canyon Road, Ellensburg	Business center, pool, laundry facilities, truck and bus parking
Days Inn	Berry Road, Ellensburg	Business center, pool, laundry facilities, bus/truck and RV parking
Guesthouse Ellensburg	N Main Street, Ellensburg	N/A
Hampton Inn	Triple L Loop, Ellensburg	Business center, pool, fitness center, laundry facilities, on-site parking
Holiday Inn Express	S Canyon Road, Ellensburg	Business center, pool, fitness center, on-site parking
Lazy F Camp and Retreat Center	Manastash Road, Ellensburg	N/A
Lodge at Canyon River Ranch	Canyon River Road, Ellensburg	Business center, pool, fitness center, restaurant, on-site parking
Motel 6	W University Way, Ellensburg	N/A
Nites Inn Motel & RV Park	S Ruby Street, Ellensburg	N/A
Red Lion Hotel and Conference Center	S Canyon Road, Ellensburg	Conference center, business center, fitness center, indoor pool, on-site parking
Rainbow Motel	W University Way, Ellensburg	N/A
Super 8	Canyon Road, Ellensburg	Business center, pool, laundry facilities, bus/truck and RV parking
Brew House Boarding	Main Street, Kittitas	N/A

Hotel/Motel/Bed and Breakfast	Location	Amenities
Cle Elum Area		
Aster Inn	E 1st Street, Cle Elum	N/A
Best Western Snowcap Lodge	W Davis Street, Cle Elum	Pool, on-site parking
Chalet Motel	E 1st Street, Cle Elum	N/A
Cle Elum Travelers Inn	E 1st Street, Cle Elum	N/A
Econo Lodge Cle Elum	E 1st Street, Cle Elum	Exercise room, on-site parking
Flying Horseshoe Ranch	Red Bridge Road, Cle Elum	N/A
Iron Horse Inn Bed and Breakfast	Marie Avenue, Cle Elum	N/A
Stewart Lodge	W 1st Street, Cle Elum	Business center, pool, spa, on-site parking
Suncadia Resort	Suncadia Trail, Cle Elum	Business center, swim and fitness center, coffee shop, restaurant, on-site parking
Timber Lodge Inn	W 1st Street, Cle Elum	Access to Roslyn Ridge Activity Center, business center, laundry facilities

Sources: Kittitas County Chamber of Commerce (2017a), Airbnb (2017), and Vacasa Rentals (2017).

4.4.3.3 RV Parks and Campgrounds

In addition to available housing, Kittitas County and Ellensburg also have a variety of RV parks and campgrounds. Eighteen representative RV and camping parks located in Kittitas County are summarized in Table 4.4-13. Six of those facilities with over 310 sites are located in the Ellensburg area, seven facilities with over 94 sites are in the Cle Elum area, and five facilities with over 434 sites are in the Easton area. A KOA campground, three RV parks, and two other facilities are located in or near the city of Ellensburg. Additional information about camping facilities is also provided in Section 4.2.6.

Table 4.4-13. Representative RV and Camping Parks in Kittitas County

RV and Camp Sites	Location	Spaces Available	Amenities
Ellensburg Area			
E & J RV Park	Berry Road Ellensburg	79	Pool, fitness center
Ellensburg Mobile Estates Park	S Ruby Street Ellensburg	N/A	N/A
KOA Campgrounds	Thorp Highway South Ellensburg	26 RV spaces, ~75 car camp sites, 4 cabins, and 19 tent sites	Pool, pavilion, recreation center, store
Rock'n'Tomahawk Ranch	Upper Green Canyon Road Ellensburg	N/A	N/A
Yakima River RV Park	Ringer Loop Road Ellensburg	36	Clubhouse
Vantage Riverstone Resort	Vantage	75	Laundry facilities
Cle Elum Area			
Cle Elum Trailer Corral RV Park	Cle Elum	22	N/A

RV and Camp Sites	Location	Spaces Available	Amenities
Eagle Valley Campground	Watson Cutoff Road Cle Elum	N/A	N/A
Mountain River Trails Camping	Cle Elum	N/A	Clubhouse, laundry facilities
Sun Country Golf Resort & RV Park	Saint Andrews Drive Cle Elum	14	Golf course
Tadpole RV Park	Bullfrog Road Cle Elum	N/A	N/A
Trailer Corral RV Park	Highway 970 Cle Elum	22	N/A
Whispering Pines RV Center	Cle Elum	35	Laundry facilities
Easton Area			
Lake Easton Resort	Easton	137	Clubhouse, pool, laundry facilities
RV Town	Easton	72	N/A
Silver Ridge Ranch	Easton	34 (tent sites)	Kitchen facilities
U Fish RV Park	U Fish Road Easton	20 RV spaces, 6 cabins, 30 camp sites	N/A
Ust Kaches Campground	Kaches Lake Road Easton	141	N/A

Sources: CountyOffice (2017) and RVParkStore (2017).

(b) How and where the direct construction and indirect work force would likely be housed. A description of the potential impacts on area hotels, motels, bed and breakfasts, campgrounds and recreational facilities;

4.4.4 Impacts on Housing, Motels, and Campgrounds

4.4.4.1 Construction Impacts

It is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the construction workforce. Thus, temporary employment of the up to 100 peak workforce (including 20 non-local workers) would not affect the current supplies of vacant and available permanent or rental housing (5,411 vacant units in Kittitas County and 607 vacant units in Ellensburg in 2015) in the Ellensburg area.

The 20 non-local hires might elect to commute to the Ellensburg area on a daily basis from urban areas such as the Tri-Cities (over 96 miles away), the eastern suburbs of Seattle such as Issaquah (91 miles) or North Bend (79 miles), or from the Seattle Metropolitan area (107 miles). However, if they elect not to commute, they are likely to either stay in a personal RV at a camp site, or to rent a motel room at the more than 25 motels in the area. Although there could be some competition for camping spaces during the busy summer recreational season, the over 310 sites at six facilities in the Ellensburg area, over 94 sites at seven facilities in the Cle Elum area, and over 434 sites at five facilities in the Easton area should be adequate to meet the needs of the 20 non-local temporary hires for construction of the five Columbia Solar Projects. Because there would be minimal additional uses of camp sites or motels in the Ellensburg area construction, there would be minimal impacts to RV parks and motels in Kittitas County or in the Ellensburg area.

4.4.4.2 Operation Impacts

Because there would be minimal direct operational staff levels and no in-migration or relocation into the Ellensburg area, no positive or negative impacts are anticipated on housing levels or availability in Kittitas County overall, or in the Ellensburg area. Similarly, no permanent or temporary relocations of family members or indirect operational employees are anticipated into the Ellensburg area, so there would be no impacts to the current supplies of permanent or rental housing, or to motels or RV parks.

(c) Whether or not meeting the direct construction and indirect work force's housing needs might constrain the housing market for existing residents and whether or not increased demand could lead to increased median housing values or median gross rents and/or new housing construction. Describe mitigation plans, if needed, to meet shortfalls in housing needs for these direct and indirect work forces.

Because of the minimal direct and indirect workforces' housing needs and impacts, as described above in Section 4.4.4, the construction and operational workforces of the five Columbia Solar Projects would result in no additional demand or constraints on area housing, no impacts on median housing values or median gross rents, and no new housing construction. Because there would be no housing impacts, no mitigation is proposed or needed.

(3) The application shall have an analysis of the economic factors including the following:

(a) The approximate average hourly wage that would likely be paid to construction and operational workers, how these wage levels vary from existing wage levels in the study area, and estimate the expendable income that direct workers would likely spend within the study area;

The U.S. Bureau of Labor Statistics (BLS) tracks employment, hourly wages, and annual salaries for a wide variety of occupations. Table 4.4-14 summarizes the potential Washington hourly wages and annual earnings for the most likely construction and operation occupations of employees for the five Columbia Solar Projects. Construction mean wages could range from $15.54/hour to $41.05/hour and mean annual wages could range from $32,330/year to $85,390/year. Operations mean wages could range from $17.34/hour to $41.75/hour and mean annual wages could range from $36,060/year to $86,850/year.

Because approximately 80 construction workers would be hired locally (i.e., within Kittitas County or the Ellensburg area), any additional wages/earnings derived from construction of the five Columbia Solar Projects would likely stay in the county, at proportions currently occurring for existing residents. For the 20 non-local hires that might elect to commute to the Ellensburg area on a daily basis from more distant urban areas such as the Tri-Cities (over 96 miles away), the eastern suburbs of Seattle such as Issaquah (91 miles) or North Bend (79 miles), or from the Seattle Metropolitan area (107 miles), their expenditures in the county would like be limited to food and fuel for their vehicles. For those non-local hires that would elect to stay at local RV parks or motels, they would make those additional expenditures locally. These local construction period expenditures would provide a very minimal additional economic benefit to Kittitas County or the Ellensburg area.

Table 4.4-14. Potential Columbia Solar Projects Construction and Operations Employees Washington State Occupational Wages (May 2016)

Occupation Code	Occupation Title	Median Hourly Wage	Mean Hourly Wage	Annual Mean Wage
Potential Construction Employees				
47-0000	Construction and Extraction Occupations	$25.58	$27.45	$57,090
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	$35.50	$36.41	$75,730
47-2031	Carpenters	$25.13	$26.96	$56,070
47-2051	Cement Masons and Concrete Finishers	$23.35	$25.41	$52,840
47-2061	Construction Laborers	$19.56	$22.00	$45,760
47-2071	Paving, Surfacing, and Tamping Equipment Operators	$23.67	$25.46	$52,950
47-2072	Pile-Driver Operators	$40.98	$37.56	$78,130
47-2073	Operating Engineers and Other Construction Equipment Operators	$28.38	$28.94	$60,190
47-2111	Electricians	$30.45	$31.37	$65,260
47-3011	Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	$21.08	$23.02	$47,880
47-3012	Helpers--Carpenters	$14.63	$15.54	$32,330
47-3013	Helpers--Electricians	$22.70	$23.50	$48,890
47-3019	Helpers, Construction Trades, All Other	$18.97	$20.30	$42,230
49-9051	Electrical Power-Line Installers and Repairers	$43.76	$41.05	$85,390
49-9098	Helpers--Installation, Maintenance, and Repair Workers	$16.05	$17.34	$36,060
49-9099	Installation, Maintenance, and Repair Workers, All Other	$23.94	$24.90	$51,790
Potential Operations Employees				
51-8013	Power Plant Operators	$43.34	$41.75	$86,850
51-8099	Plant and System Operators, All Other	$31.73	$30.83	$64,120
47-2111	Electricians	$30.45	$31.37	$65,260
47-3013	Helpers--Electricians	$22.70	$23.50	$48,890
49-9051	Electrical Power-Line Installers and Repairers	$43.76	$41.05	$85,390
49-9098	Helpers--Installation, Maintenance, and Repair Workers	$16.05	$17.34	$36,060
49-9099	Installation, Maintenance, and Repair Workers, All Other	$23.94	$24.90	$51,790

Source: BLS (2016).

For the minimal Columbia Solar Project off-site operations workers, the expenditures of their wages would continue to occur where they now reside. The four to five additional maintenance workers would likely live in Kittitas County and, thus, any additional wages/earnings would likely stay in the county, at proportions currently occurring for existing residents. These local operational period expenditures would not provide a perceptible economic benefit to Kittitas County or the Ellensburg area.

(b) How much, and what types of direct and indirect taxes would be paid during construction and operation of the project and which jurisdictions would receive those tax revenues;

4.4.5 Affected Environment for Tax Revenues

The following sections describe the applicable major tax rates assessed by the State of Washington, Kittitas County, and the City of Ellensburg.

4.4.5.1 Washington State

The State of Washington assesses a variety of business and excise taxes, depending upon the activity that would occur. The Washington State Business and Operation (B&O) tax rate for Services and Other Activities is 0.015% (Washington State Department of Revenue 2017b). The Washington Public Utility tax rate for Generation/Distribution of Electrical Power is 0.038734% (Washington State Department of Revenue 2017c). There are a number of other vehicle, utility, and other excise taxes that area also assessed.

4.4.5.2 Kittitas County

Kittitas County assesses property, sales and use, and other taxes, as described below.

Property Taxes

Kittitas County has a median property tax rate of 0.69% (Property Tax 101 2017). Table 4.4-15 summarizes the top 10 property tax payers in Kittitas County for 2015. The top 10 property tax payers had a total assessed value of $626,253,417 (comprising 11.2% of the total assessed values), and ranged from $15,314,760 to $256,512,283. The biggest property tax payers are PSE (the electric division) and Vantage Wind Energy, having 6.3% of the total assessed values in the county (Pless et al. 2015).

Table 4.4-15. Kittitas County Top 10 Property Tax Payers, 2014 Assessment for 2015 Tax

Tax Payer	Type of Business	Assessed Value ($)	Percent of Total Assessed Value
Puget Sound Energy/Electric	Electrical Utility	256,512,283	4.4362
Vantage Wind Energy, LLC	Wind Farm	109,511,373	1.8939
Sagebrush Power Partners, LLC	Wind Farm	64,912,011	1.1226
New Suncadia, LLC	Destination Resort	45,014,430	0.7785
Puget Sound Energy/Gas	Gas Utility	42,895,980	0.7419
BNSF Railway Co. – Tax Department	Railroad Transit	40,481,110	0.7001
Campus Crest at Ellensburg, LLC	Residential Condominium	19,145,440	0.7001
CNL Income Snoqualmie, LLC	Recreational Activities	16,270,510	0.2814
Ellensburg Telephone Co., Inc.	Telephone Company	16,195,520	0.2801
Auvil Fruit Co., Inc.	Food Production	15,314,760	0.2649
Totals	**–**	**626,253,417**	**11.1995**

Note: Based on Kittitas County Assessor TerraScan Report dated 02/23/2015.
Source: Pless et al. (2015).

Sales and Other Taxes

As shown in Table 4.4-16, the combined local and state sales tax rates for Kittitas County and the associated cities is the same at 1.5% (with Ellensburg being 0.002 higher; Washington State Department of Revenue 2017a).

Table 4.4-16. Sales Tax Rates in Kittitas County and the Cities, 3rd Quarter 2017

Jurisdiction	Local Rate	State Rate	Combined Rate
Kittitas County, unincorporated area	.015	.065	.080
City of Ellensburg	.017	.065	.082
City of Kittitas	.015	.065	.080
City of Cle Elum	.015	.065	.080

Source: Washington State Department of Revenue (2017a).

Other taxes levied by the County include (Pless et al. 2015):

- Excise taxes
- Special sales taxes
- Hotel motel/lodging receipts taxes – 4%
- Admissions taxes

4.4.5.3 City of Ellensburg

The City of Ellensburg assesses property, sales and use, hotel/motel, and utility taxes, as described below.

Property Taxes

Ellensburg's property tax rate was $2.301816 per $1,000 value, in 2014. It comprised $2.168009 for regular property taxes and $0.133807 for a Library Bond/Timber Tax (City of Ellensburg 2015).

Table 4.4-17 summarizes the top 10 property tax payers in the city of Ellensburg for 2015. The top 10 property tax payers had a total assessed value of $93,670,345 (comprising 7.8% of the total assessed values), and ranged from $6,297,340 to $13,335,870. The biggest property tax payers are Fred Meyer Stores and Fairway Investments, having 2.1% of the total assessed values in the county (City of Ellensburg 2015).

Table 4.4-17. City of Ellensburg Top 10 Property Tax Payers, 2014 Assessment for 2015 Tax

Tax Payer	Type of Business	Assessed Value ($)	Percent of Total Assessed Value
Fred Meyer Stores, Inc.	Retail	13,335,870	1.11
Fairway Investments, LLC	Multi-residential Property	11,520,470	0.96
Timothy Park, LLC	Multi-residential Property	10,942,860	0.91
Ellensburg Telephone Company, Inc.	Telephone Company	10,383,590	0.87
Twin City Foods, Inc.	Food Processing	9,990,930	0.84
Pautzke Bait Co., Inc,	Fish Bait Processing	9,421,790	0.79
Directv, LLC	Satellite Television	7,985,985	0.67
Sun Lakes Properties, LLC	Commercial Properties	6,969,610	0.58
Lakeside Town Center Assoc., LLC	Multi-residential Property	6,821,900	0.57
University Park Apts., LLC	Multi-residential Property	6,297,340	0.53
Totals		**93,670,345**	**7.83**

Note: Based on Kittitas County Assessor TerraScan Report dated 02/23/2015.
Source: City of Ellensburg (2015).

Sales and Other Taxes

As stated above, the City of Ellensburg has a combined 1.7% sales tax rate. In addition, the city assesses a number of other taxes, including a 4% Hotel/Motel tax on hospitality services and utility taxes that include (as of 2/13/2015) (City of Ellensburg 2015):

- Electric – 6.0%
- Gas – 6.0%
- Garbage – 8.1%
- Water – 10.5%
- Sewer – 10.5%
- Telephone – 6.0%
- Cable – 1.75%
  (City Code 6.52.160, and 6.52.480)

4.4.6 Impacts to Tax Revenues

4.4.6.1 Construction Impacts

The state would likely realize the greatest benefits in sales tax revenues from construction of the five Columbia Solar Projects. The greatest share of the estimated $8 to $10 million in project construction costs (for a total of $40 to $50 million for all five projects) would be from the purchase of the solar panels, steel piles, tracker cross-beams/rails, inverters, transformers, switchgear, and above- and below-ground conductors. Construction of the solar projects would generate several hundred thousand dollars in state sales tax revenues.

Kittitas County Tax Payments

The county meanwhile would likely realize about one hundred thousand dollars in sales tax revenues from construction of the Columbia Solar Projects, and thus small beneficial impacts.

Ellensburg Tax Payments

Ellensburg might realize some minimal increased sales tax revenues, from a 1.7% city sales tax rate, as a result of materials and supplies purchases made during construction of the five Columbia Solar Projects. In addition, if the 20 non-local construction workers elect to stay in Ellensburg motels for the up to 6 days per week for the 8 months that they would work, there could be some additional city tax revenues generated from the 4% hotel/motel tax on hospitality services. Thus, the city would realize minimal tax revenue benefits.

4.4.6.2 Operation Impacts

Kittitas County Tax Payments

Initially, TUUSSO would make an estimated $117,300 lump sum back payment of taxes for converting the solar project sites from open space to the base tax rate. Then, TUUSSO would make annual property tax payments to Kittitas County for each of the five Columbia Solar Projects at the current tax rates. Table 4.4-18 summarizes the estimated tax payments for Years 1, 10, 20, and 30 of the approximately 30-year operations periods. These property tax payments would decrease somewhat annually because of depreciation of the values of each of the solar projects. As shown in the table, TUUSSO would pay property taxes totaling $376,200 in Year 1, $197,700 in Year 10, $99,100 in Year 20, and $61,700 in Year 30. In total, TUUSSO would pay an estimated $4,883,900 in property taxes over the approximately 30-year operational life of the five solar projects, a noticeable beneficial impact to Kittitas County revenues.

Table 4.4-18. Operational Kittitas County Property Tax Payments from the Five Columbia Solar Projects

Solar Project Site	Annual Property Tax Payments[1]				Total 30-year Payments
	Year 1	Year 10	Year 20	Year 30	
Camas Solar Project	$79,900	$42,000	$21,100	$13,100	$1,038,000
Fumaria Solar Project	$79,900	$42,000	$21,100	$13,100	$1,038,000
Penstemon Solar Project	$79,900	$42,000	$21,100	$13,100	$1,038,000
Typha Solar Project	$77,100	$40,500	$20,300	$12,600	$1,000,800
Urtica Solar Project	$59,200	$31,100	$15,600	$9,700	$769,300
Total Gross Taxes	**$376,200**	**$197,700**	**$99,100**	**$61,700**	**$4,883,900**

1 All numbers have been rounded, so the Total Gross Taxes might not exactly reflect the sum of the columns.

Because it is not likely that many purchases of materials or supplies would be made in Kittitas County during operation, the county is unlikely to realize noticeable sales tax revenues from its 1.5% county sales tax rate, or from excise taxes, special sales taxes, or hotel motel/lodging taxes.

Ellensburg Tax Payments

No project facilities would be located in Ellensburg and no in-migration of the operational workforce is anticipated for the five Columbia Solar Projects. Therefore, no new home construction would be required for the workforce, and thus no additional project-related property tax revenues would be realized by the city of Ellensburg.

Ellensburg might realize some minimal increased sales tax revenues, from a 1.7% city sales tax rate, as a result of materials purchases during operation of the five Columbia Solar Projects. However, because there would be no in-migration or new housing, there would be no generation of revenues from the 4% hotel/motel tax on hospitality services or from utility taxes such electric (6.0%), natural gas (6.0%), garbage (8.1%), water (10.5%), sewer (10.5%), telephone (6.0%), or cable (1.75%).

(c) The other overall economic benefits (including mitigation measures) and costs of the project on the economies of the county, the study area and the state, as appropriate, during both the construction and operational periods.

As described above, the greatest economic benefits from the five Columbia Solar Projects would be derived from Kittitas County operation property tax revenues, and the provision of up to 100 full-time peak construction jobs over the 8-month construction period. If solar panels, steel piles, tracker cross-beams/rails, inverters, transformers, switchgear, and above- and below-ground conductors are purchased in Washington, it could generate several hundred thousand dollars in state sales tax revenues. Also, Kittitas County would benefit from TUUSSO paying property taxes totaling $376,161 in Year 1, $197,741 in Year 10, $99,076 in Year 20, and $61,666 in Year 30. In total, TUUSSO would pay an estimated $4,883,924 in property taxes over the approximately 30-year operational life of the five solar projects. The majority of the remaining construction and operation economic impacts would either be non-existent or would have minor beneficial effects to the area economy and, thus, no mitigation is proposed.

(4) The application shall describe the impacts, relationships, and plans for utilizing or mitigating impacts caused by construction or operation of the facility to the following public facilities and services:

(a) Fire;

4.4.7 Affected Environment for Fire Protection and Safety Services

4.4.7.1 General County

Kittitas County provides fire and rescue services from its nine fire districts (see Table 4.4-19 for information about the eight applicable districts for the project area). Kittitas County Fire and Rescue has two full-time stations and nine volunteer stations. In total, these stations have 27 career firefighters, approximately 70 volunteer firefighters, 12 reserve firefighters, and nine resident firefighters (Kittitas Valley Fire & Rescue 2017).

The City of Ellensburg Fire Department merged with the Kittitas County Fire District No. 2 in 2007 and became Kittitas Valley Fire and Rescue. Fire District No. 2 has 10 stations, including Stations 21 through 29 and two satellite stations (Table 4.4-19) (Pless et al. 2015).

Table 4.4-19. Kittitas County Emergency Services Facilities

Facility	Service Provider	Description
Ellensburg Area		
Station 11, Thorp	Fire District No. 1	• 10700 N Thorp Highway, Thorp • all of the district's 43.5 square miles, serving 2,500 residences • built in 2000, remodeled in 2005 • 2 engines, 2 tenders, 1 aid unit, 1 mini pumper, 1 rescue, 1 support, and 1 MCI van
Station 12, Clark Flats	Fire District No. 1	• 10941 SR 10, Thorp • 2 buildings at site • 1 tender, 1 brush truck, and 1 engine
Station 21	Fire District 2 (Kittitas Valley Fire and Rescue)	• 2020 Vantage Highway • 280 square miles for all of District 2 • B-211, E-211, E-212, T-211, B-212, M-211, M-212 • Living Quarters – 1960s, Bay – late 1980s
Station 22	Fire District 2 (Kittitas Valley Fire and Rescue)	• 2671 Tjossem Road • E-221 – 1950s
Station 23	Fire District 2 (Kittitas Valley Fire and Rescue)	• 3301 Denmark Road • 1950s
Station 24	Fire District 2 (Kittitas Valley Fire and Rescue)	• 4901 – 4th Parallel Road • B-241, E-241, T-241 - 2004
Station 25	Fire District 2 (Kittitas Valley Fire and Rescue)	• Main Street, Kittitas • E-251 – 2010
Station 26	Fire District 2 (Kittitas Valley Fire and Rescue)	• 6651 Brick Mill Road • E-261 – 1940s
Station 26 Satellite	Fire District 2 (Kittitas Valley Fire and Rescue)	• 2380 Game Farm Road • E-262 – 1950s
Station 27	Fire District 2 (Kittitas Valley Fire and Rescue)	• 8800 Reecer Creek Road • E-271 – 1950s

Facility	Service Provider	Description
Station 28	Fire District 2 (Kittitas Valley Fire and Rescue)	• 5640 Cove Road • B-281, E-281, T-281 - 2002
Station 28 Satellite	Fire District 2 (Kittitas Valley Fire and Rescue)	• 51 Barnes Road • E-282 – 1960s
Station 29	Fire District 2 (Kittitas Valley Fire and Rescue)	• 102 N Pearl Street • M-291, M-292, M-293, R-291, B-291, E-291, L-291 - 1955
Vantage Station	Fire District No. 4 (Vantage)	• N/A
Western Kittitas County Area		
Ronald Station	Fire District No. 6 (Ronald/Lake Cle Elum)	• 7 square miles for all of District 6
South Cle Elum Fire Station	South Cle Elum	• 523 Lincoln Avenue, South Cle Elum • Serves a 0.5 mile area, with 580 people. Can handle twice that area. • 1 pumper and 1 utility truck
Easton Station	Fire District No. 3 (Easton)	• 180 Cabin Creek, P.O. Box 52, Easton, WA 98925 • 12 square miles for all of the district • 33,182-square-foot building, built in 1992 • 1 aid car, 1 engine, 2 tankers, 1 rescue truck
Station No. 1 Peoh Point Road	Fire District No. 7 (Upper County Area)	• 80 square miles for all of District 7 • 1 fire engine, 1 wild land brush truck, 1 water tender, 1 aid unit, and ambulance
Station No. 2	Fire District No. 7 (Upper County Area)	• SR 970 and Airport Road • N/A
Station No. 3	Fire District No. 7 (Upper County Area)	• Off I-90 at golf course, Exit 77 • N/A
Station No. 4	Fire District No. 7 (Upper County Area)	• Ballard Hill Road • N/A
Station No. 5	Fire District No. 7 (Upper County Area)	• Teanaway Valley, at Middle Fork Road • N/A
Station No. 81	Fire District No. 8 (Kachess)	• 13 square miles for all of District 8, located in Kachess Village • 1 engine 811, 1 command vehicle, 1 aid car, and 1 brush truck
Station No. 82	Fire District No. 8 (Kachess)	• located at the intersection of Kachess Lake and Via Kachess Roads • 1 wild land engine, 1 tender/pumper, and rescue snowmobiles and trailer
Station No. 83	Fire District No. 8 (Kachess)	• located at the intersection of Stampede Pass and Lost Lake Roads • 1 pumper/rescue truck, 1 tender, 1 brush truck, 1 aid car, and 1 support car
Snoqualmie Pass Station	Fire District No. 5/King FPD No. 51 (Snoqualmie Pass)	• 1211 SR 906, east of I-90, Exit 53 • built in 2011 • E-291, E-292, A-291, A-292, B-291, Brush291, and Snow291 (snowmobile trailer)

Source: Pless et al. (2015).

All fire districts have emergency medical equipment and extraction equipment for auto accidents. Most fire districts have minimal services (equipment and personnel) for search and rescue. All rural county fire districts have mutual aid agreements with neighboring districts and with Kittitas Valley Fire and Rescue (KVFR) (KVFR 2017; EFSEC 2007).

4.4.7.2 Solar Project Sites

The Camas, Fumaria, Penstemon, and Urtica Solar Project sites are served by Kittitas Valley Fire and Rescue/Fire District 2 (at 400 E Mountain View Avenue, Ellensburg). The Typha Solar Project site is served by Kittitas County Fire District 1 (at 10700 North Thorp Highway, Thorp) (Kittitas County Assessor 2018). KVFR provides fire suppression; technical rescue; advanced life support (ALS) and basic life support (BLS) response and ambulance transport (including inter-facility transport); fire prevention; code enforcement; hazardous material response; and fire investigations. Its service area includes 278 square miles for fire suppression and 1,200 square miles for Emergency Medical Service (EMS) coverage (KVFR 2017). Please refer to Table 4.4-19 for additional information about these districts.

4.4.8 Impacts to Fire Protection and Safety Services

A Draft Communication and Emergency Response Plan has been prepared, and is attached as new Appendix M. This plan will be finalized prior to construction.

4.4.8.1 Construction Impacts

As with any major developments, construction of the Columbia Solar Projects presents some minimal fire risks. Each of the project sites is currently farmed agricultural land, mostly for hay production or grazing. The Fumaria Solar Project site is the only fallow agricultural field (not recently grazed) at this time. Thus the predominant groundcover is non-native grasses and weed species, with the greatest fire risks being associated with grass fires during the hot, dry summer season. TUUSSO has initiated discussions with the Kittitas County Fire Marshal about potential fire issues, locations and dimensions of access gates and internal access roads, and other issues. A Fire Protection and Safety Plan would be developed and implemented prior to construction, in coordination with the Kittitas County Fire Marshal, Fire District No. 2/Kittitas Valley Fire and Rescue, Fire District No. 1, and other appropriate agencies, and the sources of water for fighting fires on each of the five solar project sites would be described in that plan in coordination with the appropriate fire department. TUUSSO would coordinate with Fire District No. 2/Kittitas Valley Fire and Rescue and Fire District No. 1 to provide PV training to fire responders and construction staff.

Construction equipment would have spark-arresting mufflers, heat shields, and other protection measures to avoid starting fires. Fire extinguishers would be available in vehicles and on equipment, to quickly address any accidental fire issues. Work crews also would be trained about fire avoidance and response measures. If a fire were to occur, the Fire Protection and Safety Plan would be followed in responding to that fire.

As a result of the above fire avoidance measures and close coordination with local fire departments to arrive at a final Fire Protection and Safety Plan for responding to on-site to potential fires, the risks of and potential impacts from on-site fires during construction of the five Columbia Solar Projects would be minimal.

4.4.8.2 Operation Impacts

Unlike thermal power plants, solar power projects pose a much smaller risk of accidental fires or explosions because there is no need to transport, store, or combust fossil fuels to generate electricity. The five Columbia Solar Projects also would be designed to comply with the National Electric Code (NEC) and the National Fire Protection Agency (NFPA) requirements, to avoid potential electrical fire risks. A strict Fire Prevention and Safety Plan would be developed and enforced during project operation, to reduce and address potential fire risks.

TUUSSO would coordinate with Fire District No. 2/Kittitas Valley Fire and Rescue and Fire District No. 1 to provide PV training to fire responders, and operation and maintenance staff. The intent of this training would be to familiarize both responders and workers with the codes, regulations, associated hazards, and mitigation processes related to solar electricity. This training would include techniques for fire suppression of PV systems.

Combustible vegetation on and around each of the five Columbia Solar Project boundaries would be maintained by TUUSSO and the landowner. Each solar project site would include fire breaks around the project boundary, in accordance with applicable state and/or county standards.

As a result of the above fire avoidance measures and close coordination with local fire departments to arrive at a final Fire Protection and Safety Plan for responding on-site to potential fires, the risks of and potential impacts from on-site fires during operation of the five Columbia Solar Projects would be minimal.

4.4.8.3 Solar Project Sites

The following discussions summarize access to each of the five Columbia Solar Project sites.

Camas Solar Project Site

The entrance gates to the Camas Solar Project site for the Camas A and Camas B parcels would be about 8 feet high, 12 feet wide, and set back from the edge of Tjossem Road, to allow for fire department and maintenance access without disrupting traffic flows.

Fumaria Solar Project Site

The entrance gates for the Fumaria Solar Project site would be about 8 feet high and 12 feet wide to allow for fire department and maintenance access.

Penstemon Solar Project Site

The entrance gates for the Penstemon Solar Project site would be about 8 feet high, 12 feet wide, and would be set back from the edge of Tjossem Road, to allow for fire department and maintenance access without disrupting traffic flow.

Typha Solar Project Site

The entrance gates for the Typha Solar Project site would be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access.

Urtica Solar Project Site

The entrance gates for the Urtica Solar Project site would be about 8 feet high, 12 feet wide, and would be set back from the edge of Umptanum Road, to allow for fire department and maintenance access without disrupting traffic flow.

(b) Police;

4.4.9 Affected Environment for Police

The Kittitas County Sheriff's Department and the Washington State Patrol provide law enforcement services for the entire county, except for the cities of Ellensburg, Kittitas, Cle Elum, and Roslyn (covered by Cle Elum) that provide their own law enforcement. Law enforcement services provided by the Washington State Patrol, Kittitas County Sheriff's Office, and the Ellensburg Police Department are described below.

4.4.9.1 Washington State Patrol

The Washington State Patrol (WSP) has offices at 291 Thorp Highway South near Ellensburg. Kittitas County lies within District 6 of the patrol, which also includes Chelan, Douglas, Grant, Okanogan, and the northeast corner of Adams counties. The district covers the largest geographical area of any district in the state, with a population of over 250,000 people in the five-plus county area. The main headquarters is located in Wenatchee, with additional detachment offices located in Okanogan and Moses Lake (WSP 2017).

WSP provides traffic enforcement on state highways, drug enforcement, Hazardous Materials Team (HAZMAT) oversight, and incident response (WSP 2017; EFSEC 2007). It patrols all federal and state highways and routes, including I-90, I-82, U.S. Route 97, SR 970, SR 10, and SR 821.

The Ecology facilities in Union Gap (i.e., Yakima), approximately 35 miles south of Ellensburg, provide a HAZMAT response team (Ecology 2018).

4.4.9.2 Kittitas County Sheriff's Department

The Kittitas County Sheriff's Department provides services to the entire county, and their service area includes all of the five Columbia Solar Projects. The Kittitas County Sheriff's Department provides a wide variety of services and capabilities including law enforcement and civil division (e.g., traffic control, drug enforcement, and civil calls), corrections, a K9 unit, SWAT team, emergency management, search and rescue, and marine patrol (Kittitas County Sheriff's Office 2018; EFSEC 2007). The Kittitas County Sheriff and Corrections are located in the Kittitas County Public Safety Building, at 205 W 5th Avenue in Ellensburg. The building was originally built in 1985, was remodeled from 2010 to 2012, and is 33,209 square feet. The Sheriff's Administration Office is located at 307 Umptanum Road in Ellensburg, was built in 2009, and is 11,880 square feet (Pless et al. 2015).

The Kittitas County Courthouse is located at 205 W 5th Avenue in Ellensburg. It was built in 1958, is 47,691 square feet, and is the location of the Assessor, Auditor, Clerk, Commissioners, Lower District Court, Human Resources, Information Services, Juvenile Probation, Maintenance, Prosecutor, Superior Court, and Treasurer. The Kittitas County Juvenile Detention Holding Facility is also located at 205 W 5th Avenue in Ellensburg. Public Health and Misdemeanant Probation functions are housed in the Sorenson Building, located at 507 N Nanum Street in Ellensburg, built in 1942, and 17,648 square feet (Pless et al. 2015).

The Sheriff's Department also has the Vantage Marine Storage Building in Vantage. The building was constructed in 2014, is 70 square feet, and has an associated boat launch (Pless et al. 2015).

Kittitas County also has substation facilities in Cle Elum. The Upper County Sheriff Office is located at 4240 Bullfrog Road, Suite 1, in Cle Elum, and is a 440-square-foot leased suite. The Upper District Court

Building is located at 700 E 1st Street in Cle Elum, it was remodeled in 2013, and it is 6,000 square feet (Pless et al. 2015).

4.4.9.3 City of Ellensburg Police Department

The Ellensburg Police Department provides law enforcement services within the city limits of Ellensburg. The department is located at 100 N Pearl Street, and the Animal Shelter is located at 1007 Industrial Way. The Ellensburg Police Department consists of Operations, which includes patrol, motorcycles, K9, the School Resource Officer and Reserves, and critical incident planning. The Administrative Division includes Criminal Investigations specializing in felony, crimes against persons, missing persons, and crime scene investigations, and anti-crime drug and narcotic investigations; Code Enforcement; Animal Control services; and evidence processing and evidence storage (City of Ellensburg 2015).

The police department has a total of 29 sworn full-time officers (27 full and two limited commissioned), or about one officer for every 627 citizens. The department has one police station and six patrol vehicles. The Animal Shelter has 16 dog kennels, 14 cat cages, and is the only shelter facility in Kittitas County (City of Ellensburg 2015).

Central Washington University also provides law enforcement services through the University Police and Parking Services Department. The department employs 17 law enforcement officers and other professionals for law enforcement services on campus.

4.4.10 Impacts to Police

A Draft Communication and Emergency Response Plan has been prepared, and is attached as new Appendix M. This plan will be finalized prior to construction.

4.4.10.1 Construction Impacts

Construction would have minimal impacts on state, county, or city law enforcement staff. The peak construction workforce would be 100 people, of which 80 would be hired locally and would be existing residents, and 20 would either commute to the Ellensburg area daily, or would stay at an RV park or motel. Thus, the size of the workforce should not result in any additional police calls and no impacts.

There might be minimal impacts if police have to respond to other potential project-related traffic issues, emergency medical calls, or if they would provide a coordination role in the unlikely event that a fire were to occur. These calls would be very infrequent and, thus, should not require the hiring of or additional shifts for state, county, or city law enforcement staff.

4.4.10.2 Operation Impacts

TUUSSO would take several measures (e.g., fencing, lighting, security cameras, and site security) to maintain security at the five Columbia Solar Project sites, and thus avoid placing additional burdens on state and county law enforcement. The solar project sites would be secured using 6- to 8-foot-high, perimeter, chain-link fencing, topped by razor wire, and surrounding the PV system and switchyard. The entrance gates for each of the solar sites would be about 8 feet high and 12 feet wide, to allow for fire department and maintenance access. “Warning High Voltage” signs would be placed on the fencing at about 100-foot intervals and at each gate.

In addition, lighting would be installed on metal poles, up to 20 feet tall, located around the periphery of each of the five Columbia Solar Project sites, as well as at the inverter pads, for nighttime security. Lighting would consist of modern, low-intensity, downward-shielded fixtures that are motion activated, and would be directed onto the immediate site. For each site, five to 10 lights would be installed and powered directly by buried underground electrical supply lines. TUUSSO might also install security cameras on those same light poles.

Finally, security staff may periodically drive along the site perimeter security fence. As a result of these measures, it is anticipated that operation of the five Columbia Solar Project sites should have no impacts on state or county law enforcement.

(c) Schools;

4.4.11 Affected Environment for Schools

Educational services in the vicinity of the five proposed solar project sites are provided by the Ellensburg School District, Kittitas School District, Thorp School District, Cle Elum/Roslyn School District, Easton School District, Central Washington University, and three private schools.

4.4.11.1 Primary and Secondary Education

The Ellensburg School District consists of three elementary schools, one middle school, one traditional high school, and one alternative high school, all located in Ellensburg (Table 4.4-20). The Ellensburg School District's 3,094 students attend Valley View, Mount Stuart, and Lincoln Elementary Schools (kindergarten through 5th grades); Morgan Middle School (6th to 8th grades); the Excel High School program (9th to 12th grades); Ellensburg High School (9th to 12th grades); and the Parent Partner Program (1st to 12th grades). The basic education offerings of the district are augmented by a Career and Technical Education (CTE) program, alternative programs, on-line credit retrieval, remediation programs, a Highly Capable program, and a special services department. Ellensburg School District also offers a full range of co-curricular programs including athletics, music, drama, and academic competitions (Pless et al. 2015).

The Damman Elementary School has 38 students and is located on Manastash Road south of Ellensburg.

Table 4.4-20. Public Education Facilities in the Ellensburg and Western Kittitas County Areas

Facility	Provider	Description	Size
Ellensburg Area			
Lincoln Elementary School	Ellensburg School District	• 200 S Sampson Street, Ellensburg • 26 classroom teachers	454 students
Mount Stuart Elementary School	Ellensburg School District	• 705 W 15th Avenue, Ellensburg • 27 classroom teachers	448 students
Valley View Elementary School	Ellensburg School District	• 1508 E 3rd Avenue, Ellensburg • 26 classroom teachers	450 students
Morgan Middle School	Ellensburg School District	• 400 E 1st Avenue, Ellensburg • 40 classroom teachers	690 students
Ellensburg High School	Ellensburg School District	• 1203 E Capitol Avenue, Ellensburg • 40 classroom teachers, of a total 67 professional staff	887 students

Facility	Provider	Description	Size
Damman Elementary School	Damman School District	• 3712 Umptanum Road, south of Ellensburg • Kindergarten to 6th grade • 1 school, 2 teachers	38 students
Kittitas Elementary School	Kittitas School District	• 7571 Kittitas Highway, Kittitas • Kindergarten to 5th grade	258 students
Kittitas High School	Kittitas School District	• 7571 Kittitas School Highway, Kittitas • 6th to 12th grades	282 students
Parke Creek Treatment Center	Kittitas School District	• 11042 Parke Creek Road	15 students
Western Kittitas County Area			
Thorp Elementary, Junior, and Senior High School	Thorp School District	• 10831 N Thorp Highway, Thorp • Kindergarten to 12th grade	164 students
Cle Elum/Roslyn High School	Cle Elum/Roslyn School District	• 2692 SR 903, Cle Elum • 9th to 12th grades	281 students
Cle Elum/Roslyn Elementary School	Cle Elum/Roslyn School District	• 2696 SR 903, Cle Elum • pre-school, and kindergarten to 5th grade	408 students
Cle Elum/Roslyn Alternative School	Cle Elum/Roslyn School District	• 200 W Oakes Street, Cle Elum • 3rd to 12th grades	38 students
Walter Strom Middle School	Cle Elum/Roslyn School District	• 2694 SR 903, Cle Elum • 6th to 8th grades	221 students
Easton Elementary, Junior, and Senior High School	Easton School District	• 1893 Railroad Street, Easton	127 students

Source: Pless et al. (2015).

The Kittitas School District has 555 students and consists of Kittitas Elementary and Kittitas Secondary School (high school). Both schools are located in the city of Kittitas. The Thorp School District has 164 students and consists of Thorp High School and is located in unincorporated Kittitas County (Pless et al. 2015).

Further west, the Cle Elum/Roslyn School District has 948 students and consists of Cle Elum/Roslyn Elementary School (Kindergarten to 5th grades), Cle Elum/Roslyn Alternative School (3rd to 12th grades), Walter Strom Middle School (6th to 8th grades), and Cle Elum/Roslyn High School (9th to 12th grades). Easton School District has 127 students in Easton Elementary, Junior, and Senior High School (Pless et al. 2015).

4.4.11.2 Post-Secondary Education

Central Washington University is located in Ellensburg and is the largest employer in Kittitas County (Pless et al. 2015). Enrollment at the university was 11,119 for the 2016–2017 school year, with over 8,000 students attending the Ellensburg campus and about 3,100 students as on-campus residents at any given time. It also has extended degree centers in Yakima, Wenatchee, Moses Lake, Lynnwood, Kent, Des Moines, and Pierce County (Pless et al. 2015 2015). The university offers more than 135 majors and university student housing includes 17 residence halls and five apartment complexes. Its continuing education department works with area businesses, schools, and interest groups to design workshops (Central Washington University 2017).

A local unit of the land-grant university in Washington State, Washington State University (WSU) Kittitas County Extension is a partnership of the U.S. Department of Agriculture (USDA), WSU, and Kittitas County. It has four county programs, including 4-H Youth Development, Agriculture, Gardening, and Forestry and Range (WSU Kittitas County Extension 2017).

4.4.11.3 Libraries

In addition to the schools in the county, there are four libraries available from which residents can obtain educational, reading, and other materials:

- Ellensburg Public Library – managed by the City of Ellensburg, located at 209 N Ruby Street, Ellensburg, and expanded in 2003
- Kittitas Public Library – managed by the City of Kittitas, and located at 2nd and Pierce Streets, Kittitas
- Cle Elum (Carpenter Memorial) Library – managed by Cle Elurn, and located at 302 Pennsylvania Avenue, Cle Elum
- Roslyn Public Library – managed by the City of Roslyn, located at 201 S First Street, Roslyn, and underwent a major to repair and update in 2009

4.4.12 Impacts to Schools

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to schools in Kittitas County or the Ellensburg area. The projects themselves will require electrical service from the local electrical utility (PSE for all but the Fumaria Solar Project, which is served by Kittitas County PUD), in order to meet the limited power needs of the solar projects when they are not operating.

(d) Parks or other recreational facilities;

For a detailed discussion about parks and recreational facilities in Kittitas County, Ellensburg, and other surrounding communities, please refer to Section 4.2.6, above.

4.4.13 Affected Environment for Parks and Other Recreational Facilities

4.4.13.1 General County

The Kittitas County Director of Public Works administers county-owned recreational facilities in Kittitas County, including Gladmar Park, Vantage Park, and Kid's Pond Park (Pless et al. 2015).

The Ellensburg Parks and Recreation Department operates and maintains 16 public parks, one public pool, and three recreation centers. Parks and recreation facilities that are in the vicinity of the proposed solar facilities are identified above in the recreation section (Section 4.2.6).

4.4.13.2 Solar Project Sites

As stated in Section 4.2.6, no recreational areas are located within or immediately adjacent to the proposed solar project sites. The recreation areas that are the nearest to each of the proposed solar project sites are identified below.

Camas Solar Project Site

The nearest designated potential recreation opportunity to the Camas Solar Project site is Olmstead Place State Park, located approximately 1.5 miles ("as the crow flies") northeast of the solar project site.

Fumaria Solar Project Site

The nearest designated potential recreation opportunity to the Fumaria Solar Project site is the Iron Horse Trail, also known as the John Wayne Pioneer Trail. The proposed generation tie line associated with this site would parallel the trail, approximately 550 feet away between U.S. Route 97 and an existing substation.

Penstemon Solar Project Site

Similar to the Camas Solar Project site, the nearest designated potential recreation opportunity to the Penstemon Solar Project site is Olmstead Place State Park, located approximately 0.75 mile ("as the crow flies") northeast of the solar project site.

Typha Solar Project Site

The closest recreation facility to the Typha Solar Project site is the Iron Horse Trail, across the Yakima River and I-90, approximately 1 mile ("as the crow flies") to the north of the proposed solar project site.

Urtica Solar Project Site

The closest recreation facility to the Urtica Solar Project site is Ellensburg's Irene Rinehart Riverside Park. The southernmost part of the park is located approximately 0.25 mile ("as the crow flies") northeast of the proposed solar project site, across the Yakima River on Umptanum Road.

4.4.14 Impacts to Parks and Other Recreational Facilities

As discussed in Section 4.2.6, overall there are no anticipated impacts on recreational facilities or dispersed recreational uses in Kittitas County or the Ellensburg area as a result of construction or operation of the five Columbia Solar Projects.

(e) Utilities;

4.4.15 Affected Environment for Utilities

The following sections describe the service providers for electricity and natural gas within Kittitas County and Ellensburg.

4.4.15.1 Kittitas County

Within Kittitas County, electricity services are provided by PSE and the Kittitas County PUD. PSE has been in business for 135 years and is headquartered in Bellevue, Washington. It serves approximately 4 million customers, including 1.1 million electric and 790,000 natural gas customers. Its service area includes about 6,000 square miles, primarily in the Puget Sound region of western Washington, and includes Kittitas (combined), Island (electric), King (combined), Kitsap (electric), Lewis (natural gas), Pierce (combined), Skagit (electric), Snohomish (natural gas), Thurston (combined), and Whatcom (electric) Counties. (PSE 2017a)

As shown in Table 4.4-21, PSE obtains equal amounts of its energy from hydroelectric and coal generation (36% and 35%, respectively), followed by natural gas generation (24%) (PSE 2017b).

Table 4.4-21. Puget Sound Energy 2014 Electricity Fuel Mix

Fuel Source	Percent
Hydroelectric	36
Coal	35
Natural Gas	24
Wind, Without Renewable Energy Credits (REC's)	3
Nuclear	1
Other[1]	1
Total	**100**

1. Biomass, landfill gas, petroleum, and waste.
Source: PSE (2017b).

The Kittitas County PUD is located at 1400 Vantage Highway in Ellensburg. As shown in Table 4.4-22, the PUD has over 4,500 electric customers using over 94,360,000 kilowatt hours (kWh) of electricity annually. Residential customers account for 56.5% of the load and large commercial customers account for 25.2% of the load. As shown in Table 4.4-23, large hydroelectric generation makes up the vast majority (86.2%) of the PUD's generation sources. (Kittitas PUD 2016)

Table 4.4-22. Kittitas County PUD Electricity Use and Costs by Customer Class

Class of Service	Number of Customers	Total kWh by Class of Service	Revenue/kWh Rate ($)	Percent of Utility Load
Residential	3,717	53,327,394	0.1048	56.51
Residential Net Meters	61	583,901	0.1156	0.62
Small Commercial	315	6,781,698	0.1017	7.19
Large Commercial	14	23,766,291	0.0688	25.19
Irrigation	196	8,147,718	0.0962	8.63
Commercial Wind	1	1,716,500	0.0598	1.82
Street Lights	213	40,302	0.7756	0.04
Totals	**4,517**	**94,363,804**	**–**	**100.0**

Source: Kittitas PUD (2016).

Table 4.4-23. Kittitas County PUD Electric Generation by Fuel Source Mix

Fuel Source	Percent
Large Hydroelectric	86.21
Nuclear	10.08
Non-specified Purchases	2.25
Natural Gas	1.33
Biomass and Waste	0.13
Small Hydroelectric	0.00
Wind, Without Renewable Energy Credits (REC's)	0.00
Total	**100.0**

Source: Kittitas PUD (2016).

4.4.15.2 City of Ellensburg

The Ellensburg Energy Services Department, located at 501 N Anderson Street in Ellensburg, provides electricity and natural gas services. It is the only city in the State of Washington that has a municipal electric and gas utility. The department's Electric Utility Division was originally formed as a municipal electric utility in 1891, making it the oldest municipal electric utility in Washington State. The utility serves about 10,000 customers within the city limits, delivering approximately 25 average MW (aMW) annually over 50 miles of overhead conductor and 38 miles of underground cable. The utility purchases almost all of its power from the Bonneville Power Administration, and owns a small community renewable energy generation facility. The utility offers energy efficiency programs, including rebates to its customers (City of Ellensburg 2015).

The Natural Gas Utility Division serves about 5,000 customers, delivering approximately 7.4 million hundred cubic feet (CCF) annually over 115 miles of underground piping. The utility's service territory was established by the Washington Utilities and Transportation Commission (WUTC) and includes the city limits and surrounding areas. The utility purchases all of its natural gas supply from Shell Oil, using the Williams Pipeline. The utility offers energy efficiency programs, including rebates to its customers (City of Ellensburg 2015).

4.4.16 Impacts to Utilities

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to utilities in Kittitas County or the Ellensburg area.

(f) Maintenance;

4.4.17 Affected Environment for Maintenance

The Kittitas County Public Works Department is located at 411 N Ruby Street in Ellensburg. It is one of Kittitas County's largest departments and maintains the county road system within unincorporated Kittitas County. The department is responsible for the engineering, construction, maintenance, and administration of the county road system, as defined in RCW 36.75–36.88. The county road system consists of approximately 565 miles of arterial roads and bridges (Kittitas County Public Works Department 2017).

The Ellensburg Public Works Department maintains approximately 80 miles of streets within city limits. The department has over 45 staff, including engineers, technicians, surveyors, draftsmen, heavy equipment operators, flaggers, mechanics, floodplain experts, traffic technicians, managers, accountants, planners, office assistants, and map specialists. For 2016, the department added a professional land surveyor (City of Ellensburg 2015).

4.4.18 Impacts to Maintenance

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to maintenance in Kittitas County or the Ellensburg area.

(g) Communications;

Communications services provided in Kittitas County and Ellensburg are described below, including telephone, cell phone, television, and internet services.

4.4.19 Affected Environment for Communications

Fairpoint Communications supplies telephone services to approximately 1,149 square miles of the county, as well as DSL internet, pager, and alarm services (Kittitas County 2002). Charter Communications provides cable television services, DSL internet, and phone services. Inland Internet provides phone services in Cle Elum, Roslyn, and Ronald (EFSEC 2007).

Cellular phone service is available in the county from a variety of providers, and is available at all five Columbia Solar Project sites. SWCA staff conducted a variety of natural and cultural resources field studies on each solar project site during April 3 to 17, 2017. During those studies they confirmed that cellular phone reception was available not only on each site, but also throughout each site, and were able to coordinate frequently with off-site staff.

4.4.20 Impacts to Communications

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to communications in Kittitas County or the Ellensburg area.

(h) Water/storm water;

4.4.21 Affected Environment for Water and Stormwater

4.4.21.1 Kittitas County

Table 4.4-24 summarizes the locations and characteristics of Group A water systems in Kittitas County. Five of those systems are in Ellensburg and the surrounding area, 14 systems are located in western Kittitas County, and two systems have unknown locations. However, the majority of water is provided by private wells for residential and agricultural uses throughout the county (Pless et al. 2015).

Table 4.4-24. Kittitas County Group A Water Systems

Facility	Provider	Description	Size
Ellensburg Area			
Grasslands Water System	Association Community Provider	• Eastern Ellensburg • Serves 260 residential persons with 75 total calculated connections • 81 total system connections • Effective system date of 1/1/1970	21,000 gallons
Millpond Mobile Manor	Investor Community Provider	• South of Ellensburg • Serves 245 residential persons with 105 total calculated connections • 105 total approved connections • Effective system date of 1/1/1970	N/A

Facility	Provider	Description	Size
Central Mobile Home Park	Private Community Provider	• Wilson Creek Road, north of Ellensburg • Serves 110 residential persons with 52 connections • 52 total approved connections • Effective since 1/1/1970	2,100 gallons
Vantage Water System	Investor Community Provider	• Serves 70 residential persons and 105 non-residential persons with 99 connections • 150 total approved connections • Effective since 1/1/1970	50,000 gallons
Thorp Water System	Kittitas County Water District No. 4, Special District Community Provider	• Serves 230 persons with 107 connections • 112 total approved connections • Effective since 7/1/1987	156,000 gallons
Western Kittitas County Area			
Evergreen Valley Water System	Evergreen Valley Utilities, Investor Community Provider	• Near or in Cle Elum • Serves 35 residential persons and 5 non-residential persons with 171 connections • 419 total approved connections • Effective since 3/2/2004	120,000 gallons
Elk Meadows Water System	Kittitas County Water District No. 5, Community Provider	• 141 Swallow Lane, Cle Elum • Serves 600 persons with 295 connections • 340 total approved connections • Effective since 1/1/1970	75,000 gallons
Sunlight Waters Water System	Kittitas County Water District No. 7, Special District Community Provider	• 1710 Sunlight Drive, Cle Elum • Serves 309 residential persons and 169 non-residential persons with 220 connections • 225 total approved connections • Effective since 1/1/1970	200,000 gallons
Reservoir Hill Water System	Reservoir Hill Maintenance Association, Private Community Provider	• South Cle Elum • Serves 33 residential persons with 21 connections • 25 total approved connections • Effective since 2/25/1999	20,000 gallons
Swiftwater Trailer Park	Private Community Provider	• South Cle Elum mobile home park • Serves 36 residential persons and 1 non-residential with 22 total calculated connections • 24 total approved connections • Effective system date of 1/1/1970	N/A
Sky Meadows Ranch Country Club WTR	Private Community Provider	• Southeast of Cle Elum • Serves 60 residential persons and 110 non-residential persons with 240 calculated connections • 360 total approved connections • Effective system date of 1/1/1970	160,000 gallons
Suncadia Resort	Investor Community Provider	• Northwest of Cle Elum and southwest of Ronald • Serves 70 residential persons and 903 non-residential persons with 666 total calculated connections • 3,785 total approved connections • Effective system date of 5/29/2008	1,070,000 gallons

Facility	Provider	Description	Size
Ronald Water System	Kittitas County Water District No. 2, Special District Community Provider	• Serves 225 persons with 117 connections • 150 total approved connections • Effective since 1/1/1970	125,000 gallons
Pine Loch Sun Beach Club Water System	Private Community Provider	• Northwest of Ronald • Serves 90 residential persons with 409 calculated connections • 439 total approved connections • Effective date of 1/1/1970	90,000 gallons
Driftwood Acres Maintenance Corporation	Association Community Provider	• Northwest of Ronald • Serves 60 residential persons with 117 total calculated connections • 120 total approved connections • Effective system date of 1/1/1970	100,000 gallons
Sun Island Maintenance Association	Association Community Provider	• Southeast of Easton • Serves 30 residential persons and 100 non-residential persons with 115 total calculated connections • an undetermined number of total connections • Effective system date of 1/1/1970	1,8000 gallons
Easton Water System	Easton Water District, Community Provider	• 141 Swallow Lane, Cle Elum • Serves 250 residential persons and 106 non-residential persons with 216 connections • 512 total approved connections • Effective since 1/1/1970	195,000 gallons
Snoqualmie Pass	Private – Snoqualmie Pass Utility District	• Well capacity of 385 gallons per minute • 3 reservoirs storing 565,000 gallons	1,361 acres
Sun Country Estates 1-2-3 Water System	Private Community Provider	• East of Yakima • Serves 215 residential persons and 16 non-residential persons with 215 total calculated connections • 300 total approved connections • Effective date of 1/1/1970	100,000 gallons
Location Unknown			
Grasslands Park	Private Community Provider	• Location Unknown • Serves 29 residential persons with 14 total calculated connections • 14 total approved connections • Effective system date of 12/20/2006	N/A
Wildwood 2 & 3 Water System	Private Community Provider	• Location unknown • Serves 45 residential persons and 48 non-residential persons with 37 total calculated connections • 78 total approved connections • Effective system date of 1/1/1970	45,000 gallons

Source: Pless et al. (2015).

Although it is not a publicly available water supply, the KRD provides water for agricultural irrigation throughout the Kittitas Valley, and its office is located in Ellensburg. Approximately two-thirds of all irrigated acreage in Kittitas County, approximately 60,000 acres, are serviced by the KRD's 330 miles of canals and laterals. It is the 6th largest irrigation district in Washington State. The canal starts at Lake

Easton Dam and flows east to its terminus on the Turbine Ditch, where it spills to the Yakima River. Thirty siphons, the longest being 3,325 feet, and 11 tunnels help the canal keep as much elevation as possible. The KRD experienced major water shortfalls in 2001, 2005, and 2015. The KRD is funded by landowner assessments. Recently, more and more farmland has been subdivided for new houses, resulting in the number of landowners with KRD-assessed acres increasing over 30% in the last 10 years (KRD 2017a).

The Kittitas County Public Works Department provides flood control services throughout the county.

4.4.21.2 City of Ellensburg

The Ellensburg Public Works Department consists of the Engineering, Street, Water, Sewer, Stormwater, and Shop divisions. The Ellensburg Water Utility Division is located at 607 Industrial Way, in Ellensburg, and is responsible for monitoring, testing, repairing, and upgrading of the city’s water sources and distribution system. The water utility serves over 4,700 customers, with 103 miles of underground pipe delivering over 1.4 billion gallons of water annually. The division maintains several deep wells and pump houses throughout the city and surrounding area. Reservoir facilities are located at Craig's Hill and the airport. Current capacity and plans for improvements would allow the city to accommodate future city water needs (City of Ellensburg 2015).

The Engineering and Stormwater Divisions are located at City Hall, 501 North Anderson Street, in Ellensburg. Stormwater is managed by approximately 2,400 catch basins and over 50 miles of underground pipe. The Ellensburg Stormwater Division/Utility permits the design and construction of public and private projects throughout the city, educates the public about water quality, performs maintenance on the public system, eliminates illicit discharges, holds public meetings, and meets the requirements of the National Pollutant Discharge Elimination System (NPDES) Stormwater Permit (City of Ellensburg 2015).

4.4.22 Impacts to Water and Stormwater

4.4.22.1 Water Use

Construction Impacts

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, soil compaction, and for dust control on access roads. In addition, non-toxic soil binding agents may be employed to help with soil stabilization during construction.

Construction activities for the five proposed Columbia Solar Projects are conservatively estimated to generate an average water demand of 100,000 gallons per day. The daily water demand estimate assumes that on an average construction day, 20 acres of the solar project sites are in active construction, requiring 10 continuous hours of water using five 4,000-gallon-capacity water trucks making five roundtrips to get water. A 4,000-gallon water truck, such as a Kenworth T440 with a Ledwell 4,000 Gallon Water Tank, would likely be used. Construction time for the Columbia Solar Projects would require approximately 6 months, or 156 work days (Monday to Saturday), to complete. Based upon these parameters, the construction water demand for the proposed Columbia Solar Projects is very conservatively estimated to total 15.6 million gallons, or 47.87 acre-feet (1 acre-foot is equal to 325,851 gallons), or approximately 10 acre-feet per project.

TUUSSO has considered a number of water supply alternatives for construction purposes. TUUSSO has explored using on-site existing water allocations for construction, but water restrictions prevent these uses. TUUSSO has also explored the use of greywater sources (including those in the Kittitas Valley) for construction, as water for construction activities can be of non-potable quality. However, greywater availability is limited in Kittitas County. Finally, TUUSSO has discussed with the City of Ellensburg the availability of municipal water for construction purposes. Based on this array of possible water sources, TUUSSO intends to use water trucked in from municipal water sources or from other off-site vendors with a valid water right for all of the projects. In particular, water needs related to construction would be procured by TUUSSO's construction contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks.

The distances of the five truck trips made by five water trucks each day would vary based on the site under active construction, and that site's proximity to the nearest filling station, as determined by TUUSSO's construction contractor. Table 4.4.22-1 identifies the site, a conservative estimate for the roundtrip distance to the nearest filling station, the number of days of construction water needed for the site, the number of roundtrips during the construction period, and the total miles traveled by 4,000-gallon-capacity water trucks. Overall, approximately 78,000 miles would be traveled by water trucks during the construction period.

Table 4.4.22-25. Estimated Distance Traveled by Water Trucks during Construction

Project Site	Estimated Roundtrip Distance (miles)	Days of Water	Total Roundtrips	Total Miles
Camas	20	35	875	17,500
Fumaria	20	16	400	8,000
Penstemon	20	35	875	17,500
Urtica	20	35	875	17,500
Typha	20	35	875	17,500

TUUSSO would also incorporate water conservation methods wherever possible. For example, water would not be used for concrete hydration on-site because the concrete is expected to be delivered to the site already hydrated. Less water-intensive methods of dust suppression are also under review, including use of soil stabilizers, tightly phasing construction activities, staging grading and other dust-creating activities, and/or compressing the entire construction schedule to reduce the time period over which dust-suppression measures would be required.

Operation Impacts

On an ongoing basis, water would be used for cleaning PV panels and controlling dust (less than 1 acre-foot per year per project site). Water would also be necessary to establish the tree/shrub visual buffers along portions of the Columbia Solar Project sites, as described above, as well as the native plant species throughout the solar project sites. Project landscaping would consist of native and drought-tolerant species. Once established, the species would not require ongoing irrigation. The irrigation needs for landscaping establishment are assumed to last for 3 consecutive years following installation.

Based on feedback from farmers familiar with growing conditions in Kittitas Valley (including landowners familiar with the conditions on the five Columbia Solar Project sites), assuming periodic irrigation for establishment purposes over a 3-year period, it is estimated that approximately 400 acre-feet of water per site per year would be needed at a maximum over this period to ensure plant establishment on the solar project sites. These water needs are the same as the current water needs on the actively farmed project sites.

With respect to operational water supply, as with the construction water supply, TUUSSO has considered a number of alternatives. Each of the Columbia Solar Project sites, except for the Fumaria Solar Project site, has on-site existing water allocations that TUUSSO would be able to use during operation for irrigation purposes. Given the costs of trucking water from an external source to each of the sites, TUUSSO would only pursue such a water source for the very limited irrigation needs for the Fumaria Solar Project site. Given the limited water needed for cleaning PV panels, TUUSSO will likely truck in water from municipal water sources or from other off-site vendors with a valid water right for all of the solar projects for this purpose. In particular, water needs related to operation would be procured by TUUSSO's O&M contractor (not yet selected) from a municipal water source or other off-site vendor with a valid water right and transported to the site in water trucks. As described above, a 4,000-gallon water truck, such as a Kenworth T440 with a Ledwell 4,000 Gallon Water Tank, would likely be used for water that will be trucked to the sites during operation.

The water needs for each of the five solar project sites during operation, the source of the water, the total truck trips during the year needed to meet these needs, a conservative estimate for the roundtrip distance to the nearest filling station, as well as the total mileage traveled are given in Table 4.4.22-2. As shown in the table, approximately 5,000 total miles would be traveled by 4,000-gallon water trucks to meet the water needs during the first 3 years of the projects' operation, after which approximately 1,000 miles per year would be traveled.

Table 4.4.22-26. Estimated Distance Traveled by Water Trucks during Operation

Project Site	Water Use	Source of Water	Estimated Roundtrip Distance	Annual Water Needs (Roundtrips)	Total Miles
Camas	Irrigation[1]	On-site: Bull Ditch Irrigation Company and Town Ditch[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Fumaria	Irrigation	Off-site vendor	20	800,000 gallons (200)	4,000
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Penstemon	Irrigation	On-site: Town Ditch[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Urtica	Irrigation	On-site: Westside Ditch Company[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site vendor	20	40,000 gallons (10)	200
Typha	Irrigation	On-site: Packwood Canal[2]	N/A	400 acre-feet (N/A)	N/A
	Panel Washing	Off-site Vendor	20	40,000 gallons (10)	200

1. Note that irrigation will only be required for the first 3 years.
2. The on-site water sources are based on existing water allocations held by the site lessors.

TUUSSO has incorporated water conservation methods into its operational water plan as well. Where feasible, TUUSSO would work with the current landowners to incorporate more efficient irrigation systems, such as drip lines, to water the trees and shrubs forming the visual buffers. TUUSSO has used native and drought-tolerant species to ensure that the landscaping can be established quickly with water needs similar to or below current water usage, and once established, would not require any further watering except in extreme drought conditions. TUUSSO would also investigate using sprinkler systems on the Columbia Solar Project sites to irrigate the native ground cover (instead of the current flood irrigation methods used on the solar project sites).

4.4.22.2 Stormwater

Construction Impacts

Construction of the five Columbia Solar Projects has the potential to generate water pollutants during the construction phase unless best management practices (BMPs) are implemented. Stormwater runoff from the solar project sites could contain pollutants such as soils and sediments that are released during grading activities, as well as chemical and petroleum-related pollutants due to spills or leaks from heavy equipment and machinery. Other common pollutants that may result from construction activities include solid or liquid chemical spills; concrete and related cutting or curing residues; wastes from paints, sealants, solvents, detergents, glues, acids, lime, plaster, and cleaning agents; and heavy metals from equipment.

Hazardous materials (such as fuels, solvents, and coatings, among others) associated with the Columbia Solar Projects construction activities would be stored and used in accordance with the manufacturer's specifications and applicable hazardous material regulations. In addition, spill kits would be required for all construction equipment in order to immediately manage any spills from fueling or equipment breakdown. However, soil disturbances (from construction activities associated with the limited site grading, mounting of the solar panels, equipment installation, electrical conduit trenching, and scraping for the all-weather access roads) could cause soil erosion and the eventual release of sediment into stormwater runoff.

The preliminary Stormwater Pollution Prevention Plan (SWPPP) describes a number of BMPs to assure compliance with state water quality standards, including the following:

- Preserving natural vegetation.
- Establishing buffer zones to protect existing wetlands and to relieve potential downstream impacts.
- Providing a single, stabilized construction entrance to prevent soil and sediment from tracking off the site.
- Controlling flow rates leaving the site via full on-site dispersion.
- Installing a silt fence at all areas downslope of disturbed areas, and upslope of existing waterbodies.
- Stabilizing soils when necessary, including the use of plastic covering to protect soil stockpiles.
- If necessary, utilizing a wheel wash at the site exit if sediment may be tracked off-site.

The installed BMPs would be visually monitored at least once per week, and within 24 hours of any stormwater or non-stormwater discharge from the site. Turbidity sampling would also be required at least once per week as applicable to ensure that the Columbia Solar Projects do not exceed 25 nephelometric turbidity units and a transparency of less than 33 cm.

Obtaining coverage under, and ensuring compliance with, the Construction General Permit requirements (including implementation of appropriate BMPs and consistent record keeping of the SWPPP) would ensure that temporary water quality impacts associated with construction activities would not cause any significant downstream or off-site impacts.

Operation Impacts

Operation of the five proposed Columbia Solar Projects would include infrequent site visits for inspection and maintenance. Maintenance activities would include washing the PV panels to remove accumulated airborne dust and debris using a truck with a water tank and sprayer, and mowing or otherwise managing the native vegetation to maintain buffers around the site and vegetation height within the site. Panel washing would occur one to four times per year, depending on the accumulation of dust on the surfaces of the panels, and vegetation management would occur at a similar frequency based on rainfall and yearly plant growth.

Due to annual maintenance activities, pollutants such as pesticides, trash, and oil/grease are anticipated to be generated from project operation. However, because the project sites would be unmanned and would only be subject to maintenance a couple of times per year, the potential for pollutants would be greatly reduced when compared to a typical commercial or industrial land use. No Columbia Solar Projects–generated pollutants are expected to impact downstream receiving waters, and project flows would not discharge to any receiving waterbody that is listed for water quality impairment.

As the five Columbia Solar Projects would not generate any pollutants of concern, impacts would be less than significant. However, BMPs are incorporated into the projects to address water quality impacts on site and at downstream receiving waters. The five proposed solar projects would include vegetation throughout the sites, such that full dispersion and infiltration would treat and control the runoff for the area within the panel arrays.

Other water quality BMPs include: 1) protecting slopes and channels through the preservation of existing site drainage patterns; 2) the absence of chemical storage and pollution generating surfaces on-site; 3) maintaining BMPs regularly, including annual inspections of the entire site and maintenance of inspection records; 4) regular maintenance of any bare soil or gravel surfaces, such as the all-weather access roads, to ensure that they are properly stabilized; and 5) training for Columbia Solar Projects operators and contractors, and the provision of educational materials for project personnel, regarding housekeeping practices that prevent pollutant loading in on-site runoff and BMP maintenance.

Further, any cleaning agents or additives used to clean the PV panels would be biodegradable, non-toxic, and non-hazardous to plants, animals, and groundwater. Therefore, the use of water to clean the PV panels would have a less than significant impact on surface water and groundwater quality.

(i) Sewer/solid waste;

4.4.23 Affected Environment for Sewer and Solid Waste

This section describes the sanitary sewer and solid waste facilities in Kittitas County and Ellensburg.

4.4.23.1 Sanitary Sewer

Kittitas County

As shown in Table 4.4-25, there are three central sanitary sewer facilities in Kittitas County, one each in Vantage, Ronald, and Snoqualmie (Pless et al. 2015). However, most of the residential and other sewerage is treated on-site with private septic systems.

Table 4.4-27. Kittitas County Sanitary Sewer Facilities

Facility	Provider	Description	Size
Vantage Wastewater Collection and Treatment System	Vantage Water District No. 6	• Serves Vantage LAMIRD, wastewater collection and treatment system • capacity of about 87,000 gallons per day • Major upgrades completed in 2013	80 residences
Ronald Treatment Facilities	Kittitas County Water District No. 2	• Single lift station that conveys wastewater flows from the Water District area to the City of Roslyn sewer system	37 acres

Snoqualmie Pass Utility District .	Snoqualmie Pass Utility District	• Average daily flow approximately 0.18 million gallons per day (mgd) • Permitted treatment and discharge capacity of 0.868 mgd • Storage of excess flows of about 30 million gallons	1,361 acres

Source: Pless et al. (2015).

City of Ellensburg

The Ellensburg Public Works Department provides sewer and solid waste services within city limits. The Wastewater Utility Division is responsible for processing, testing, and final discharge of wastewater produced within Ellensburg and serves over 3,900 customers. Approximately 3.85 million gallons per day of sewer and wastewater are delivered via 79 miles of underground pipe within the city. A wastewater treatment plant is located at 2415 Canyon Road, in Ellensburg. The plant has a lab, which maintains compliance with all Ecology regulations. Current capacity and plans for improvements would allow the city accommodate future sanitary sewer needs (City of Ellensburg 2015).

4.4.23.2 Solid Waste and Recycling

Table 4.4-26 summarizes the solid waste and recycling facilities and services that are provided by Kittitas County Solid Waste, Waste Management of Ellensburg, and the city of Kittitas Solid Waste Service. Kittitas County Solid Waste provides solid waste services for unincorporated areas within the county. It operates several transfer stations, a construction and demolition debris landfill (CDL), and has one closed landfill (Pless et al. 2015).

Kittitas County manages Ryegrass Landfill, the only municipal landfill in the county located on a 640-acre parcel approximately 18 miles east of Ellensburg. Ryegrass Landfill does not accept general solid waste, only construction and demolition debris. Municipal solid waste is transferred from the county transfer stations to the Greater Wenatchee Regional Landfill, a privately owned and operated facility located in East Wenatchee in Douglas County (Kittitas County Solid Waste Department 2011).

In addition to the facilities located within Kittitas County, waste from Kittitas County is transported to other facilities throughout Washington and Oregon. Additional waste has been transported to:

- Columbia Ridge Landfill - a 2,000-acre regional landfill that is owned and operated by Waste Management, Inc., and located in Arlington, Oregon.
- Roosevelt Regional Landfill - the largest private landfill in the state covering 2,545 acres, owned and operated by Regional Disposal Company, with a 120-million ton capacity and sufficient capacity for the County's 2010 – 2030 planning period, and located in Klickitat County, Washington.
- Graham Road Limited Purpose Landfill - owned and operated by Waste Management of Washington, Inc.; that accepts construction, demolition, and other debris; and is located in Spokane County, Washington.
- Anderson Limited Purpose Landfill - a privately-owned facility located in Yakima, Washington.
- Caton Limited Purpose Landfill - a privately-owned facility; that accepts construction, demolition, and other debris; and is located in Naches, Washington. (Kittitas County Solid Waste Department 2011)

Kittitas County last updated its solid waste Management Plan in 2011. Per Washington State requirements, the plan is for a 20-year planning period (i.e., 2010 – 2030). As stated in the plan, "For now, the Greater Wenatchee Landfill has capacity well beyond the timeframe addressed by this plan." (Kittitas County Solid Waste Department 2011)

Table 4.4-27 summarizes the quantities of waste and recyclables managed in the county in 2014. Ellensburg facilities managed 21,823 tons of solid waste in 2014 and Cle Elum facilities managed 6,681 tons (Pless et al. 2015). Most of the municipal solid waste is transported to the Greater Wenatchee Regional Landfill, owned by Waste Management of Washington, and located in Douglas County, Washington (Kittitas County Solid Waste Department 2011).

In 2009, Kittitas County started yard waste and compost facility operations. Yard waste is accepted at each of the county-owned transfer stations, at a reduced fee if the yard waste is separated from other wastes. This material is then ground up and placed into wind rolls. After heat, moisture, and microorganisms break down the organic material into compost, the compost is screened and ready for use as a fertilizer and soil amendment (Pless et al. 2015).

Table 4.4-28. Kittitas County Waste and Recycling Facilities (2014)

Facility	Location
Ellensburg Area	
Ellensburg Scale House (Storage)	801 Industrial Way, Ellensburg
Transfer Station:	
• Transfer Station Building	1001 Industrial Way, Ellensburg
• Scale House Building	1001 Industrial Way, Ellensburg
Ellensburg Transfer Station and Compost Facility:	
• Transfer Station Office	925 Industrial Way, Ellensburg
• Transfer Station Shop	925 Industrial Way, Ellensburg
Solid Waste Buildings:	
• Ryegrass Equipment Storage	25900 Vantage Highway, Ellensburg
• SW 400-square-foot building	25900 Vantage Highway, Ellensburg
Cle Elum Area	
Solid Waste Buildings:	
• Cle Elum Scale House	Highway 903, Cle Elum
• Cle Elum Bunker Building	Highway 903, Cle Elum
• Cle Elum Storage	Highway 903, Cle Elum
Transfer Station – Cle Elum:	
• MRW – Cle Elum	50 No. 5 Mine Road, Cle Elum
• MRW – Ellensburg	50 No. 5 Mine Road, Cle Elum
• Office/Administration Building	50 No. 5 Mine Road, Cle Elum
• Cle Elum Scale House	50 No. 5 Mine Road, Cle Elum
Construction and Demolition Debris	
Ellensburg CDL	
Cle Elum CDL	
Ryegrass CDL	
Yard Waste	
Ellensburg Yard Waste	
Cle Elum Yard Waste	

Source: Pless et al. (2015).

Table 4.4-29. Kittitas County Waste and Recycling Facilities and Quantities (2014)

Type of Facility	Units Managed	Unit of Measurement
Solid Waste		
Ellensburg Garbage	21,823	Tons
Cle Elum Garbage	6,681	Tons
Construction and Demolition Debris		
Ellensburg CDL	1,529	Tons
Cle Elum CDL	1,125	Tons
Ryegrass CDL	9,779	Cubic Yards
Yard Waste and Other		
Ellensburg Yard Waste	1,847	Tons
Cle Elum Yard Waste	276	Tons
Compost Sold	1,125	Tons
Septage	375,398	Gallons

Source: Pless et al. (2015).

4.4.24 Impacts to Sewer and Solid Waste

None of the five Columbia Solar Project facilities would have on-site toilet and septic or sewer system connections. The projects would follow the applicable state and/or county guidelines with respect to relief stations for employees, when employees are on-site, via the use of portable lavatories.

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to sewer in Kittitas County or the Ellensburg area.

Construction of the five Columbia Solar Project facilities would generate very little solid waste: approximately 12 tons per site during construction. Operation of the five Columbia Solar Project facilities would not generate any regular solid waste, although occasionally equipment may be replaced and recycled or disposed of. Because this quantity is minimal compared to the capacities for landfills where Kittitas County waste is transported to, no impacts would occur to solid waste facilities or landfills.

(j) Other governmental services.

Other governmental services described below include hospitals and other medical centers, and other general county and city governmental services.

4.4.25 Affected Environment for Other Governmental Services

4.4.25.1 Hospitals and Health Care

Kittitas Valley Community Hospital is located at 603 South Chestnut Street and East Manitoba, in Ellensburg, and is managed by Hospital District No. 1. It provides Level IV trauma service; 24-hour emergency care; and inpatient and outpatient surgical services, critical care, a family birthing center, cardiopulmonary services, laboratory services, and imaging services. A heliport is located on the roof of the hospital (Kittitas Valley Healthcare [KVH] 2018; Pless et al. 2015).

The hospital has 25 beds and over 250 full-time equivalent staff, including (Hospital-Data 2017):

- Physicians – 8.50
- Registered professional nurses – 60.00
- Nurse practitioners – 2.00
- Physician assistants – 2.25
- Diagnostic radiology technicians – 7.70
- Medical laboratory technologists – 6.45
- Dieticians – 10.00
- Physical therapists – 4.00
- Registered pharmacists – 2.00
- Respiratory therapists – 4.70
- Other salaried personnel – 142.00
- Miscellaneous other staff positions

KVH Urgent Care – Cle Elum (also known as the Cle Elum Medical Center and Urgent Care Facility) is located at 201 Alpha Way, in Cle Elum. It is managed by KVH, with support from Kittitas County Public Hospital District No. 2. The urgent care center is staffed by licensed clinicians that provide the following non-emergency healthcare services on a walk-in basis (Pless et al. 2015; KVH 2017):

- Fever, earache, sore throat
- Flu-like symptoms, colds
- Vomiting, nausea, diarrhea
- Simple or suspected bone fractures, strains, and sprains
- Cuts that may need stitches, other simple wounds
- Rashes, minor allergic reactions
- Painful or burning urination
- Non-severe asthma attacks

Patients with head injuries, severe burns, or trauma are transported to other facilities, such as Harborview Medical Center (Harborview) in Seattle. Harborview is the only designated Level I adult and pediatric trauma and burn center in the state of Washington (Harborview 2018). Victims of less severe accidents may be transported to Yakima, to Virginia Mason Memorial (formerly Yakima Valley Memorial Hospital) or Yakima Regional Medical Center (a 214-bed facility), for hospitalization and treatment.

The Camas, Fumaria, Penstemon, and Urtica Solar Project sites are served by Kittitas Valley Fire and Rescue/Fire District 2 (at 400 E Mountain View Avenue, Ellensburg). The Typha Solar Project site is served by Kittitas County Fire District 1 (at 10700 North Thorp Highway, Thorp) (Kittitas County Assessor 2018). KVFR provides fire suppression; technical rescue; advanced life support (ALS) and basic life support (BLS) response and ambulance transport (including inter-facility transport); fire prevention; code enforcement; hazardous material response; and fire investigations. Its service area includes 278 square miles for fire suppression and 1,200 square miles for EMS coverage (KVFR 2017).

Medical air transport is provided by Life Flight Network, with rotor-wing transport provided from its Moses Lake base and rotor-wing and fixed-wing transport provided from its Tri-Cities base in Richland, Washington (Life Flight 2018).

A Draft Communication and Emergency Response Plan has been prepared, and is attached as new Appendix M. This plan will be finalized prior to construction.

4.4.25.2 Other Governmental Services

Kittitas County provides governmental services additional to those described above, including and assessor's office, community development services, coroner (including prosecutor and public defender), courts, noxious weed control, other administrative functions (e.g., human resources and information technology), and public health. The county also has an emergency animal shelter at 901 East 7th Avenue, in Ellensburg. The shelter is managed by the county Facilities and Maintenance Department (Pless et al. 2015). As described previously, Kittitas County also manages the Kittitas County Fair that is held annually on Labor Day weekend.

In addition to the city of Ellensburg governmental services identified above, the city also provides community development and other, finance, and human resources services.

4.4.26 Impacts to Other Governmental Services

During construction, there could be some injuries of the types that commonly occur on construction sites. Such injuries could require visits to the hospital for treatment. Because of the size and type of construction, it is assumed that the number of injuries would be small and easily treated with existing emergency response teams and hospitals and, thus, that there would be no impacts to emergency and medical services.

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to other governmental services in Kittitas County or the Ellensburg area.

(5) The application shall compare local government revenues generated by the project (e.g., property tax, sales tax, business and occupation tax, payroll taxes) with their additional service expenditures resulting from the project; and identify any potential gaps in expenditures and revenues during both construction and operation of the project. This discussion should also address potential temporal gaps in revenues and expenditures.

4.4.27 Affected Environment for Local Government Revenues

The following sections summarize the overall budgets, including revenues and expenditures, for Kittitas County and Ellensburg. The types and rates of taxation are described above in Section 4.4.5.

4.4.27.1 Kittitas County Annual Budget

The total Kittitas County budget was $91,778,331 for 2016. The two biggest funds were the General Fund with $31,843,159 (35%) and County Roads with $25,623,120 (32%) (Pless et al. 2015).

As shown in Table 4.4-28, the biggest source of revenues in the county are taxes, at $21,733,363 or 24% of the total county budget. The next biggest revenue source was Intergovernmental Revenues at $13,845,040 or 15% of the total budget. The Intergovernmental Revenues are funds received from other governments for grants, charges for services, and payment in lieu of taxes (Pless et al. 2015).

The total Kittitas County expense budget was 27% or $25,183,661 Personnel Services, which are salary and benefits for county employees in the entire county. The Services and Charges was 25% of the budget or $23,027,370 (Pless et al. 2015).

Table 4.4-30. Kittitas County 2016 Annual Budget Summary

	General Fund	Special Revenue Funds	Debt Service Funds	Capital Project Funds	Proprietary Funds	Trust Funds	Totals
Beginning Fund Balance	9,882,217	22,454,097	323,427	500,000	6,341,243	7,175	39,508,159
Plus Operating Revenue							
• Taxes	13,106,215	8,027,148	–	600,000	–	–	21,733,363
• Licenses and Permits	142,500	454,551	–	–	1,223,000	–	1,820,051
• Intergovernmental	3,354,057	9,576,716	–	–	914,267	–	13,845,040
• Charges and Fees	1,974,333	1,320,300	–	–	4,067,801	–	7,362,434
• Fines and Penalties	1,563,400	20,000	–	–	10,000	–	1,593,400
• Miscellaneous	1,638,937	386,434	1,000	500	2,073,535	3	4,100,409
Total Operating Revenue	**21,779,442**	**19,785,149**	**1,000**	**600,500**	**8,288,603**	**3**	**50,454,697**
Less Operating Expenses							
• Personnel Services	14,791,944	8,160,823	–	–	2,230,894	–	25,183,661
• Supplies	936,287	3,279,289	–	–	889,793	500	5,105,869
• Services	5,045,304	13,326,465	–	–	4,655,601	–	23,027,370
• Intergovernmental	443,251	2,337,370	–	–	22,861	–	2,803,482
• Capital Outlay	529,915	541,869	–	–	1,584,000	–	2,655,784
Total Operating Expenses	**21,746,701**	**27,645,816**	**–**	**–**	**9,383,149**	**500**	**58,776,166**
Plus Non-Operating Revenues	181,500	596,642	722,333	–	315,000	–	1,815,475
Less Non-Operating Expenses	1,907,805	523,255	822,833	513,595	627,574	–	4,395,062
Ending Fund Balance	8,188,653	14,666,817	223,927	586,905	4,934,123	6,678	28,607,103

Source: Pless et al. (2015).

As shown in Table 4.4-29, the Kittitas County General Fund is made up of 36 different departments. Most of those departments are not self-supporting (i.e., they don't generate enough income to cover their expenses).

Table 4.4-31. Kittitas County General Fund – Revenue by Department (2016)

Account/Department	2016 Adopted Budget ($)	Percent of General Fund Total
0 Fund Balance	9,882,217	31.0
10 Assessor	195	0.0
11 Auditor	546,975	1.7
12 Board of Equalization	–	0.0
13 Fire Marshal	164,020	0.5

Account/Department	2016 Adopted Budget ($)	Percent of General Fund Total
15 Clerk	245,195	0.8
16 Commissioners	6,775	0.0
17 Information Technology	1,327	0.0
18 WSU Extension	505	0.0
20 Communications	102,000	0.3
21 Judge – Superior Court	44,255	0.1
22 Juvenile	125,220	0.4
23 Law Library	13,900	0.0
24 Lower District Court	1,014,850	3.2
25 Facilities Maintenance	333,437	1.0
26 Non-Departmental	848,939	2.7
27 Coroner	15,210	0.0
29 Prosecutor	232,837	0.7
30 Sheriff	698,937	2.2
31 Treasurer	14,183,179	44.5
32 Upper District Court	654,203	2.1
33 Pest and Disease Control	45,000	0.1
34 Conference of Governments	150	0.0
35 Flood Control	–	0.0
37 Emergency Management Services	67,301	0.2
38 Human Resources	5,100	0.0
39 Admissions Tax	100,000	0.3
40 Criminal Justice/Law Justice-	1,658,235	5.2
43 Declaration of Emergency	–	0.0
45 Historical Document Program	11,404	0.0
46 Current Use (Open Space)	1,600	0.0
47 Upper County Groundwater Study	–	0.0
60 Computer Equipment Replacement	–	0.0
109 Event Center	840,193	2.6
Totals	**31,843,159**	**100.0**

Source: Pless et al. (2015).

4.4.27.2 City of Ellensburg Biennial Budget

The Ellensburg's total budget was $102,136,167 in 2015 and $86,433,266 in 2016. Excluding the fund balance, Ellensburg's 2015–2016 biennial budget totaled $76,496,321 for 2015 and $62,918,697 for 2016. As shown in Table 4.4-30, the greatest sources of revenue in 2016 were charges for services ($38,562,972), taxes ($11,644,406), and miscellaneous ($4,004,422). The greatest sources of expenditures were supplies ($15,219,063), services ($12,856,451), and salaries ($11,900,118). However, combined salaries and benefits totaled $17,420,119 (City of Ellensburg 2015).

Table 4.4-32. City of Ellensburg 2016 Annual Budget Summary

Revenues and Expenditures	Totals
Revenues:	
• Taxes	11,644,406
• Licenses and Permits	380,750

Revenues and Expenditures	Totals
• Intergovernmental	824,629
• Charges for Services	38,562,972
• Fines and Penalties	289,400
• Miscellaneous	4,004,422
Total Revenues	**55,706,579**
Expenditures:	
• Salaries	11,900,118
• Benefits	5,520,001
• Supplies	15,219,063
• Services	12,856,451
• Intergovernmental	1,452,668
• Capital Outlay	3,841,022
• Debt Services	2,424,545
• Interfund Payments	5,556,988
Total Expenditures	**58,770,856**
Total Other Sources (Uses)	$939,000
Total Sources Less Uses	-2,125,277

Source: City of Ellensburg (2015).

Table 4.4-31 summarizes the city budget by fund for 2016. The funds with the highest budgets included the Lights Division with $22,319,153 or 25.8% of the total budget, the General Fund with $15,943,266 or 18.4%, and the Natural Gas Utility Division with $9,904,400 or 11.5% of the budget (City of Ellensburg 2015).

Table 4.4-33. City of Ellensburg City Budget by Fund (2016)

Fund	2016 Adopted Budget ($)	Percent of Total Budget
General Fund	15,943,266	18.4
Street Fund	1,926,189	2.2
Arterial Street	1,313,059	1.5
Traffic Impact	228,700	0.3
Ellensburg Transit	253,954	0.3
Criminal Justice	985,679	1.1
Drug Fund	9,745	0.0
Sales Tax	4,634,383	5.4
CATV Operations	127,536	0.1
CATV Capital	47,603	0.1
Police Equipment	57,077	0.1
Park Acquisition	231,205	0.3
Lodging Taxes	756,913	0.9
Geddis	142,979	0.2
Special Projects	4,205	0.0
Maintenance Debt	255,555	0.3

Fund	2016 Adopted Budget ($)	Percent of Total Budget
Library Bond	201,084	0.2
LID Guarantee	45,497	0.1
2010 Maintenance Bond	50	0.0
Capital Projects	33,471	0.0
Sidewalk	451,659	0.5
Stormwater	1,095,701	1.3
Telecommunications	216,426	0.3
Gas	9,904,400	11.5
Light	22,319,153	25.8
Water	5,927,371	6.9
Sewer	6,573,944	7.6
Shop	6,705,920	7.8
IT	1,390,049	1.6
Health Insurance	2,780,550	3.2
Risk Management	1,156,122	1.3
Library Trust	295,849	0.3
Hal Holmes	0	0.0
Fire Relief and Pension	417,972	0.5
Totals	**86,433,266**	**100.0**

Source: City of Ellensburg (2015).

Ellensburg's General Fund revenues were projected to increase slightly from 2014, including up to $14,603,822 for 2015 and $13,213,933 for 2016. Total projected tax revenues (e.g., property taxes, sales taxes, business and occupation taxes, and utility taxes) in the General Fund were $6,223,288 for 2015 and $6,386,684 for 2016. Combined with the projected carryover from 2014, the total available resources in the General Fund were projected to be $17,610,524 for 2015 and $15,943,266 for 2016 (City of Ellensburg 2015).

(6) To the degree that a project will have a primary or secondary negative impact on any element of the socioeconomic environment, the applicant is encouraged to work with local governments to avoid, minimize, or compensate for the negative impact. The term "local government" is defined to include cities, counties, school districts, fire districts, sewer districts, water districts, irrigation districts, or other special purpose districts.

4.4.28 Impacts to Local Government Revenues

Impacts to tax revenues are discussed in Section 4.4.6. Because of the benign nature of solar project facilities, they do not impose noticeable additional demands on local government services. Thus, property, sales, and other tax revenues generated by the five Columbia Solar Projects would meet or exceed any additional demands that the projects would put on government services in Kittitas County or the Ellensburg area and there would be no impacts.

As discussed in Section 4.4.4, it is not anticipated that construction of the five Columbia Solar Projects would result in the permanent relocation or in-migration of any of the direct or indirect construction or operational workforces. Thus, there would be no impacts to local government revenues in Kittitas County or the Ellensburg area.

4.5 References – Chapter 4

Airbnb. 2017. Available at: www.airbnb.com. Accessed July 2017.

Akers, John, and Fennelle Miller. 2008. Washington Archaeological Site Inventory Form, 45KT2866, Ellensburg's Old City Water Reservoir. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

Amara, Mark. 2004a. *EQIP Projects in Kittitas County, Washington: OAHP Log no: 102003-23-NRCS (Graaff, Hanson), OAHP Log no: 022304-08-NRCS (Mellegaard, Brunson)*. U. S. Department of Agriculture, Natural Resources Conservation Service.

———. 2004b. *EQIP Projects in Kittitas County, Washington: Katzele; Laub Farm; Jack Wheatley/Level Best Farms; Cooke Coleman LLC, Gardinier, Kayser, and Morgan; Davis, Duncan, Hunter & Titus; Anderson, Edwards, Gregerich, Mason, Mihelich and Poulsens*. OAHP Log Nos: 102003-23-NRCS, 042S04-0S-NRCS, 050704-09-NRCS, 022304-08-NRCS, 060304-06-NRCS, 062404-0-NRCS. Natural Resources Conservation Service.

———. 2005a. *NRCS Don Rinehart EQIP 2005 Site Identification Survey in Kittitas County, Ellensburg, Washington*. NRCS EQIP Contract No: 7405465A141. Natural Resources Conservation Service.

———. 2005b. *NRCS Extreme Farms LLC EQIP 2005 Cultural Resources Site Identification Survey in Kittitas County, Washington*. NRCS Contract No: 7405463A116. Natural Resources Conservation Service.

———. 2005c. *NRCS John Smith EQIP 2005 Site Identification Survey in Kittitas County, Washington*. NRCS Contract No: 7405465A052. Natural Resources Conservation Service.

———. 2006a. *NRCS Jeff Brunson Farm EQIP 2006 Cultural Resources Site Identification Survey in Kittitas County, Ellensburg, Washington.* U. S. Department of Agriculture, Natural Resources Conservation Service.

———. 2006b. *NRCS Double DJ Farms EQIP 2006 Cultural Resources Site Identification Survey in Kittitas County, Washington*. NRCS EQIP Contract No: 7405466A105. Natural Resources Conservation Service.

———. 2015. *NRCS Bland Environmental Quality Incentives Program Cultural Resources Site Identification Survey in Kittitas County, Washington*. NRCS EQIP Contract No: 740546150VS. Natural Resources Conservation Service.

———. 2016. *KCCD Three Bar G Ranch Sprinkler Conversion Cultural Resources Site Identification Survey in Kittitas County, Washington*. DAHP Number: 121415-08-WSCC. Natural Resources Conservation Service.

Ames, K. M., D. E. Dumond, L. R. Galm, and R. Minor. 1998. Prehistory of the Southern Plateau. In *Handbook of North American Indians*, *Volume 12: Plateau*, edited by Deward E. Walker, pp. 103–119. Washington, D.C.: Smithsonian Institute.

Ames, Kenneth M., and Alan G. Marshall. 1980–1981. Villages, Demography and Subsistence Intensification on the Southern Columbia Plateau. *North American Archaeologist* 2:25–52.

Anderson, Frederick C., and Bill R. Roulette. 2008. *Letter Report: Results of an Archaeological Survey of the Ellensburg-Columbia No.1 Transmission Line, Kittitas County, Washington*. Report No. 692b. Prepared for Bonneville Power Administration. Portland, Oregon: Applied Archaeological Research, Inc.

Babcock, William, Timothy E. Eckert, and Gary D. Williams. 1986. *Yakima River Basin Water Enhancement Project Historical Resource Survey (Class I); Volume I: Overview and Management Recommendations, Volume II: Site and Survey Compilation*. Prepared for U.S. Department of the Interior. Missoula, Montana: Heritage Research Center.

Becker, Anisa Q., and Emily K. Ragsdale. 2010. *Results of Archaeological Investigations of the Wenatchee Facilities Modification Project – Plymouth to Zillah and Yakima to Wenatchee, Yakima, Benton, Kittitas, and Chelan Counties, Washington.* Prepared for Williams Gas Pipeline. Historical Research Associates, Inc.

Becker, Paula. 2005. Kittitas County -- Thumbnail History. HistoryLink.org Essay 7484. Available at: http://www.historylink.org/index.cfm?displaypage=output.cfm&file_id=7484. Accessed March 2017.

Bicchieri, Barbara. 1994. *Olmstead Place State Park Survey Report*. Ellensburg, Washington: Central Washington University.

Binford, Lewis R. 1980. Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. *American Antiquity* 45:4–20.

Boening, Rose M. 1919. History of Irrigation in Washington State: The State Epoch of Canal Building. *Washington Historical Quarterly* 10(1):21–45.

Bowden, Bradley, and Derek Shaw. 2009. *Olmstead Place State Park Pioneer Cabin Site Archaeological Investigation: Addendum to the Olmstead Place State Park Pioneer Cabin Historic Structures Report*. Prepared for Washington State Parks and Recreation Commission. Seattle, Washington: Historical Research Associates, Inc.

Central Washington University. 2017. Quick Facts. Available at: http://www.cwu.edu/about/quick-facts. Accessed August 14, 2017.

Chapman, Judith S., and John L. Fagan. 1999. *Cultural Resources Survey of Irrigation Features Within the Proposed Level 3 Fiber Optic Line in Kittitas and Yakima Counties, Washington*. Letter Report No. 326. Prepared for Parsons Brinckerhoff Quade & Douglas, Inc. Portland, Oregon: Archaeological Investigations Northwest, Inc.

City of Ellensburg. 2015. 2015 – 2016 Biennial Budget, City of Ellensburg, Washington. Available at: https://ci.ellensburg.wa.us/DocumentCenter/View/4329. January 30.

Cleveland, Greg, and Hank Fraser. 2000. *Safe Access for Salmonids on Lower Wilson Creek*. Toppenish, Washington: Yakama Nation Department of Natural Resources and Yakama Nation Fisheries Program.

Cohen, Fay G. 1986. *Treaties on Trial: The Continuing Controversy over Northwest Indian Fishing Rights.* Seattle: University of Washington Press.

CountyOffice. 2017. Kittitas County RV Parks. Available at: http://www.countyoffice.org/wa-kittitas-county-rv-park/. Accessed May 24, 2017.

Curtis, Edward S. 1911. *The North American Indian*. Vol. 7. Norwood, Massachusetts: Plimpton Press.

Daugherty, Richard. 1956. Archaeology of the Lind Coulee Site, Washington. *Proceedings of the American Philosophical Society* 100(3):374–386.

DePuydt, Raymond. 1990. *A Cultural Resources Survey Along Puget Sound Power and Light's Proposed Upgrade of the Wanapum-Hyak Electrical Transmission Line.* Eastern Washington University Reports in Archaeology and History 100-73. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Emerson, Stephen. 1995. *Cultural Resources Surveys of Nine Yakima Fish Production Project Phase II Fish Screen Sites, Kittitas and Yakima Counties, Washington*. Short Report 502. Prepared for Bonneville Power Administration. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

———. 2014. *Cultural Resources Survey for the Kittitas County No. 6 Road Improvements Project, Kittitas County, Washington*. Short Report 1207. Prepared for J-U-B Engineers. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Fagan, John L., Terry L. Ozbun, Julie Schablitsky, Judith S. Chapman, Jo Reese, David A. Ball, and Bonnie J. Mills. 1999. *Cultural Resources Survey of Level 3's Proposed Fiber Optic Line from Seattle to Boise: Washington Segment, Non-Federal Lands*. Report No. 172. Prepared for Parsons Brinckerhoff Quade & Douglas Inc. Portland, Oregon: Archaeological Investigations Northwest, Inc.

Federal Transit Administration (FTA). 2006. *Transit Noise and Vibration Impact Assessment.* Washington, D.C.: Office of Planning and Environment. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf.

Flenniken, J. Jeffrey, and Pam Trautman. 2004. *Archaeological Survey of the Wild Horse Wind Project Area, Kittitas County, Washington*. Prepared for Sagebrush Power Partners, Inc. Pullman, Washington: Lithic Analysts.

Galm, Jerry R., and Stan Gough. 2000. Site 45KT1362, a c. 10,000 Yr BP Occupation in Central Washington. *Current Research in the Pleistocene* 17:29–31.

Galm, Jerry R., Glenn D. Hartmann, Ruth A. Masten, and Garry Owen Stephenson. 1981. *A Cultural Resources Overview of the Bonneville Power Administration's Mid-Columbia Project, Central Washington*. Bonneville Cultural Resources Group, Eastern Washington University Reports in Archaeology and History 100-16. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

General Land Office (GLO). 1884. *Township 17 North, Range 18 East, Willamette Meridian, Cadastral Survey*. Washington, D.C.: Bureau of Land Management, United Stated Department of the Interior.

———. 1884. *Township 17 North, Range 19 East, Willamette Meridian, Cadastral Survey*. Washington, D.C.: Bureau of Land Management, United Stated Department of the Interior.

———. 1884. *Township 18 North, Range 18 East, Willamette Meridian, Cadastral Survey*. Washington, D.C.: Bureau of Land Management, United Stated Department of the Interior.

GolfNow. 2017. Suncadia Resort - Rope Rider Golf Course. Website. https://www.golfnow.com/courses/1504475-suncadia-resort-rope-rider-golf-course-details. Accessed June 20, 2017.

Grant County Public Utility District (PUD). 2017. Vantage Boat Launch. Available at: http://www.grantpud.org/recreation/river-access/vantage. Accessed June 20, 2017.

Green, Kellie. 2007. *NRCS Taylor Ranches LLC Environmental Quality Incentives Program EQIP 2005 Site Identification Survey in Kittitas County, Washington*. NRCS Contract No. 7405465A609. Natural Resources Conservation Service.

Harborview Medical Center (Harborview). 2018. About Harborview Medical Center. Available at: http://www.uwmedicine.org/harborview/about. Accessed January 18, 2018.

Hartmann, Glenn D. 1997. *Cultural Resources Surveys of the Fogarty Fishscreen and John Cox Fishscreen Facilities, Kittitas and Yakima Counties, Washington*. Short Report 577. Prepared for Bonneville Power Administration. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Hartt, Jack. 1989. *Olmstead Place State Park Interpretive Master Plan*. Olympia, Washington: Washington State Parks and Recreation Commission.

Hollenbeck, Jan L., and Susan L. Carter. 1986. *A Cultural Resource Overview: Prehistory and Ethnography, Wenatchee National Forest*. U.S. Department of Agriculture, Wenatchee National Forest, Wenatchee, Washington.

Holstine, Craig (editor). 1994. *An Historical Overview of the Wenatchee National Forest, Washington.* Report Number: 100-80. Prepared for Wenatchee National Forest. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Hospital-Data. 2017. Kittitas Valley Community Hospital - Ellensburg, WA. Available at: http://www.hospital-data.com/hospitals/KITTITAS-VALLEY-COMMUNITY-HOSPITAL-E396.html. Accessed June 24, 2017.

Hoyt, Bryan, Katherine F. Wilson, and Paula Johnson. 2011. *City of Ellensburg Hayward and Route 10 Water Wells Cultural Resources Assessment Project, Kittitas County, Washington*. Prepared for City of Ellensburg. Seattle, Washington: Paragon Research Associates.

International Organization for Standardization (ISO). 1996. ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. December 2006.

Juell, Kenneth. 2000. *Cultural Resources Inventory of the proposed Washington Light Lanes Project Regeneration Station Surveys Associated with the Route 3 Backbone (I-90) and the Route 4 Backbone (I-82).* Project WA00-3. Prepared for Universal Communications Networks, Inc. and David Evans and Associates. Seattle, Washington: Northwest Archaeological Associates, Inc.

Kittitas County. 2002. Kittitas County Comprehensive Plan. December.

———. 2016. Kittitas County Comprehensive Plan, December 2016. Adopted by Ordinance No. 2016-023. Available at: https://www.co.kittitas.wa.us/uploads/documents/cds/comp-plan/2016/2016%201206%20Comp%20Plan%20per%20Kittitas%20Co%20Ord%202016-023.pdf.

———. 2017. Kittitas Valley Event Center, Kittitas County Fair, Labor Day Weekend. Available at: https://www.co.kittitas.wa.us/kvec/fair.aspx. Accessed May 24, 2017.

Kittitas County Assessor. 2018. Property Search. Available at: http://www.co.kittitas.wa.us/property.aspx. Accessed January 19, 2018.

Kittitas County Chamber of Commerce. 2017a. Live Life in Color, Hotels / Motels. Available at: http://www.centralwashingtoncolor.com/stay/hotels-motels/. Accessed May 24, 2017.

———. 2017b. Live Life in Color, Parks. Available at: http://www.centralwashingtoncolor.com/things-to-do/parks/. Accessed May 24, 2017.

Kittitas County Public Utility District. 2015. Customer Information Report 2016. Available at: http://www.kittitaspud.com/DocumentCenter/View/664. Accessed June 9, 2017.

Kittitas County Public Works Department. 2008. Kittitas County Long Range Transportation. Available at: https://www.co.kittitas.wa.us/public-works/engineering/longRangeTP/Kittitas%20County%20Long%20Range%20Transportation%20Plan.pdf. Accessed July 28, 2017.

———. 2017. Kittitas County Road Average Daily Traffic Counts: 2015–2017. Provided by Kelee Hodges, Kittitas County Public Works, to Joy Potter, Potter Consulting Group, LLC., July 18, 2017.

Kittitas County Sheriff's Office. 2018. Sheriff's Office. Available at: http://www.co.kittitas.wa.us/sheriff/default.aspx. Accessed January 18, 2018.

Kittitas County Solid Waste Department. 2011. Final Draft, Kittitas County 2010 Solid Waste and Moderate Risk Waste Management Plan Update. Available at: http://www.co.kittitas.wa.us/solid-waste/documents/kittitas-county-solid-waste-management-plan.pdf.

Kittitas Reclamation District (KRD). 2017a. Kittitas Reclamation District. Available at: http://krdistrict.org/. Accessed June 23, 2017.

———. 2017b. Maps of the District. Available at: http://krdistrict.org/maps.htm. Accessed May 2017.

Kittitas Valley Fire & Rescue (KVFR). 2017. About Kittitas Valley Fire & Rescue. Website: http://kvfr.org/About_KVFR.aspx. Accessed August 14, 2017.

Kittitas Valley Healthcare (KVH). 2017. KVH Urgent Care - Cle Elum. Available at: http://www.kvhealthcare.org/clinics-and-specialty-services/kvh-urgent-care-cle-elum/. Accessed June 24, 2017.

———. 2018. Hospital Services. Available at: http://www.kvhealthcare.org/hospital-services/. Accessed January 18. 2018.

Landreau, Christopher. 2008. *An Archaeological Review and Inventory of the Proposed Gregerich Rill Irrigation Modification Project, Kittitas County, Washington*. Report 2008-136-26. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

———. 2009. *A Section 106 Archaeological Review and Inventory of Six Proposed Installation/Upgrade Irrigation Sites Along the Menastash Ditch, Kittitas County, Washington*. Report 2008-2009-148-07. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

———. 2014. *A 05-05 Archaeological Review and Inventory of the Bland Family Farm Sprinkler Conversion Project, Kittitas County, Washington*. Report 2014-335-32. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

———. 2015. *A Section 106 Archaeological Review and Inventory of the David Rinehart Sprinkler Conversion Project, Kittitas County, Washington*. Report No. 2015-344-01. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research LLC.

———. 2016a. *A Section 106 Archaeological Review and Inventory of the Naneum Creek-Valley Land Company Diversion and Fish Screen project, Kittitas County, Washington*. Report No. 2012-265-30. Prepared for Kittitas County Conservation District and Bonneville Power Administration. Yakima, Washington: Reiss-Landreau Research.

———. 2016b. *An Archaeological Review and Inventory of the Broadmoor Farm, Berry Road Sprinkler Conversion Project, Kittitas County, Washington*. Report No. 2016-370-11. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research LLC.

———. 2016c. Washington Archaeological Isolate Inventory Form, 45KT3808. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

Landreau, Christopher, Joel Geffen, and Ian Cain. 2007. *An Archaeological Review and Inventory of the Proposed Coleman and Cherry Creek Irrigation Projects, Kittitas County, Washington*. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

Landreau, Christopher, and William D. Schroeder. 2012. *Section 106 Archaeological Review and Inventory of the Mellergaard Sprinkler Conversion Project, Kittitas County, Washington*. Report 2012-241-06. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

———. 2014. *Archaeological Review and Inventory of the Circle Lazy H Sprinkler Conversion #2 Project, Kittitas County, Washington*. Report 2014-308-05. Prepared for Kittitas County Conservation District. Yakima, Washington: Reiss-Landreau Research.

Leonhardy, Frank, and David G. Rice. 1970. A Proposed Culture Typology for the Lower Snake River Region, Southeastern Washington. *Northwest Anthropological Research Notes* 4:1–29.

Life Flight Network (Life Flight). 2018. Life Flight Network Air Medical Transport Service Area. Available at: https://www.lifeflight.org/service-area/. Accessed January 18, 2018.

Luttrell, Charles T. 2009. *Letter Report: Olmstead Place State Park - Coleman Creek Bridge Removal Project Letter Report, Kittitas County, Washington*. Prepared for Department of Archaeology and Historic Preservation, Olympia, Washington. Olympia, Washington: Washington State Parks and Recreation Commission.

———. 2011a. State of Washington Archaeological Site Inventory Form, 45KT543, Olmstead Place State Park. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

———. 2011b. *Letter Report: Olmstead Place State Park – Culvert Replacement Project, Kittitas County, Washington*. Olympia, Washington: Washington State Parks and Recreation Commission.

———. 2011c. *Letter Report: Olmstead Place State Park – Coleman Creek Increased Riparian Buffer Project, Kittitas County, Washington*. Prepared for Department of Archaeology and Historic Preservation. Olympia, Washington: Washington State Parks and Recreation Commission.

Luttrell, Charles, Stan Gough, and Stephen Emerson. 1999. *An Archaeological and Historical Overview for the Washington State Parks and Recreation Commission's John Wayne Pioneer Trail Project, Kittitas and King Counties, Washington, Volume I.* Short Report 620. Prepared for Washington State Parks and Recreation Commission. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Luttrell, Charles, and Pamela McKenney. 1999. *An Archaeological and Historical Overview for the Washington State Parks and Recreation Commission's John Wayne Pioneer Trail Project, Kittitas and King Counties, Washington, Volume II.* Short Report 620. Prepared for Washington State Parks and Recreation Commission. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

McFarland, D. P., J. D. Ferry, D. J. Sheldon, and J. E. Brown. 2015. *Cultural Resources Review for the Non-Bureau of Reclamation Owned Portion of the Schaake Property Habitat Improvement Project, Kittitas County, Washington*. CH2M.

McLean, Jamy, Michael Pitts, and William Schroeder. 2010. State of Washington Archaeological Site Inventory Form, 45KT3515. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

Mehringer, Peter J., Jr. 1989 . *Age of the Clovis Cache at East Wenatchee, Washington*. Prepared for Washington State Historic Preservation Office for Studies. Pullman, Washington: Department of Anthropology, Washington State University.

Metsker Maps. 1956. Metskers Atlas of Kittitas County, Washington. Seattle, Washington: Metsker Map Company.

Middleton, Jessica, and Steve Hackenberger. 2004a. *Coleman Creek – Hernandez/Ringer Project Archaeological Monitoring Report*. Ellensburg, Washington: Central Washington University.

———. 2004b. *Cultural Resource Pedestrian Survey for Ludwick Diversion Replacement/Redesign Project, Kittitas County, Washington*. Prepared for Kittitas County Conservation District. Ellensburg, Washington: Central Washington University.

———. 2005. *Naneum Creek/Bull Canal Project Archaeological Monitoring Report*. Prepared for Kittitas County Conservation District. Ellensburg, Washington: Central Washington University.

Miller, Fennelle, and Flo Lentz. 2002. *From Native American Trails to the Inland Empire Highway: A Cultural Resources Inventory of Tile Canyon Road Improvement Project, Kittitas County, Washington*. Prepared for Kittitas County Public Works. Ellensburg, Washington: Fennell deforest Miller Archaeological Consultants and Florence K. Lentz Cultural Resource Consulting.

Miller, Fennelle. 2003. *Archaeological and Historic Resources Inventory of Kittitas County's Proposed Faust Road Improvement Project Kittitas County, Washington*. Prepared for Kittitas County Public Works. Ellensburg, Washington: Fennelle deForest Miller Archaeological Consultants.

MyEllensburg. 2017. MyEllensburg.com: Golf. Available at: https://www.myellensburg.com/play/outdoor-activities/golf/. Accessed May 24, 2017.

Natural Resources Conservation Service (NRCS). 2017. Web Soil Survey. Available at: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed July 26, 2017.

Nesbit, Robert C., and Charles M. Gates. 1946. Agriculture in Eastern Washington, 1890-1910. *Pacific Northwest Quarterly* 37:279–302.

Oliphant, J. O. 1932 . The Cattle Trade From the Far Northwest to Montana. *Agricultural History* 6:69–83.

Orvald, Tucker O., and Bryan R. Hoyt. 2006. *Cultural Resource Inventory for Bonneville Power Administration's Proposed Lyle Creek Barrier Removal and Restoration Project, Kittitas County, Washington*. Prepared for Bonneville Power Administration. Ellensburg, Washington: Anthropology Department, Central Washington University.

Orvald, Tucker. 2003a. *Dry/Cabin Creek Fish Access and Protection Project Kittitas County, Washington*. Ellensburg, Washington: Earth Imaging Associates Inc.

———. 2003b. State of Washington Archaeological Site Inventory Form, 45KT2318, Cabin Creek Diversion. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

———. 2005. *Cultural Resource Inventory for Proposed Fogarty Ditch Diversion Redesign Project, Kittitas County, Washington*. Prepared for Bonneville Power Administration. Ellensburg, Washington: Anthropology Department, Central Washington University.

———. 2006. *Cultural Resource Inventory for the Proposed Durand-Fagalde Diversion Redesign Project, Lower Reecer Creek, Kittitas County, Washington*. Prepared for Kittitas County Conservation District, Ellensburg, Washington and Bonneville Power Administration. Ellensburg, Washington: Anthropology Department, Central Washington University.

Pitts, Michael. 2012a. State of Washington Archaeological Site Inventory Form, 45KT3514. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

———. 2012b. State of Washington Archaeological Site Inventory Form, 45KT3516. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

Pless, Judy, Dora Van Epps, Heidi Childs, Kay Kresge, Lisa Bugni, and Sue Patterson. 2015. Kittitas County, Washington, 2016 Annual Budget. Prepared for Jerald V. Pettit, Kittitas County Auditor. Kittitas County. Available at: http://www.co.kittitas.wa.us/uploads/auditor/accounting/budget/annual-budget/2016%20Annual%20Budget.pdf. Accessed July 28, 2017

Property Tax 101. 2017. Kittitas County Washington Property Tax. Available at: https://www.propertytax101.org/washington/kittitascounty. Accessed August 15, 2017.

Puget Sound Energy (PSE). 2017a. PSE Primer. Available at: https://pse.com/aboutpse/CorporateInfo/Pages/PSE-Primer.aspx. Accessed June 9, 2017.

———. 2017b. Electric Supply. Available at: https://pse.com/aboutpse/EnergySupply/Pages/Electric-Supply.aspx. Accessed June 9, 2017.

———. 2017c. Wild Horse Wind and Solar Facility & Renewable Energy Center. Available at: https://pse.com/inyourcommunity/ToursandRecreation/WildHorse/Pages/default.aspx. Accessed June 20, 2017.

Ray, V. F. 1936. Native Villages and Groupings of the Columbia Basin. *Pacific Northwest Quarterly* 27:99–152.

Reid, Kenneth C. 1991. *An Overview of Cultural Resources in the Snake River Basin: Prehistory and Paleoenvironments.* Project Report No. 13. Pullman, Washington: Center for Northwest Anthropology, Washington State University.

Responsive Management. 2012. Results of General Population Survey in Support of the Development of the Washington State Comprehensive Outdoor Recreation Plan. Conducted for the Washington Recreation and Conservation Office. Available at: https://data.wa.gov/api/assets/DFA7D6A8-43F4-4D90-A933-15B4FF955FB1?download=true.

Rudeen, Ralph H. 1970. National Register of Historic Places Inventory - Nomination Form, 45KT543, Olmstead Place State Park. On file, Department of Archaeology and Historic Preservation, Olympia, Washington.

Rutan, Pam, and Rebecca Stevens. 1982. *A Survey for Cultural Resources at Quarry Site QS-S-234 and Pit Site PS-S-226, Kittitas County, Washington (F-520)*. Prepared for Washington State Department of Transportation. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

RVParkStore. 2017. RV Parks, Campgrounds, Marinas, and Resorts in Kittitas County, WA. Available at: http://www.rvparkstore.com/rv-park-directory/washington/county/kittitas. Accessed May 24, 2017.

Schablitsky, Julie, Judith S. Chapman, David A. Ball, Bonnie J. Mills, and John L. Fagan. 1999. *Cultural Resources Survey of Route Modifications and Shovel Testing of Sites for Level 3's Proposed Fiber Optic Line from Seattle to Boise: Washington Segment, Non-Federal Lands, Addendum*. Report No. 325. Prepared for Parsons Brinckerhoff Quade & Douglas Inc. Portland, Oregon: Archaeological Investigations Northwest, Inc.

Schalk, Randall (editor). 1990. *Cultural Resources Reconnaissance in Washington State Parks Biennial Summary for 1987–1989.* Prepared for Washington State Parks and Recreation Commission. Pullman, Washington: Center for Northwest Anthropology, Washington State University.

Schroeder, William D. 2013. *A Section 106 Archaeological Review and Inventory of the Cherry Creek Tributaries Sprinkler Conversion, Fish Screening and Passage Project, Kittitas County,* *Washington.* Prepared for Kittitas County Conservation District and Bonneville Power Administration*.* Yakima, Washington: Reiss-Landreau Research.

Schroeder, William D., and Christopher Landreau. 2013a. *A Section 106 Archaeological Review and Inventory of the YTAHP–Coleman Creek Poulsen/Hanson Project, Kittitas County, Washington*. Prepared for Kittitas County Conservation District and Bonneville Power Administration. Yakima, Washington: Reiss-Landreau Research.

———. 2013b. *A Section 106 Archaeological Review and Inventory of the Bland Sprinkler Conversion Project, Kittitas County, Washington*. Report 2013-299-31. Prepared for Kittitas County Conservation District Ellensburg, Washington. Yakima, Washington: Reiss-Landreau Research.

Schuster, Helen H. 1990. *The Yakima*. New York: Chelsea House Publishers.

———. 1998. Yakima and Neighboring Groups. In *Handbook of North American Indians*, *Volume 12: Plateau*, edited by Deward E. Walker, pp. 327–351. Washington D.C.: Smithsonian Institute.

Sharley, Ann. 2005. *A Cultural Resources Survey of the Bonneville Power Administration's Proposed Fogarty Ditch Fish Screen Project, Kittitas County, Washington*. Short Report 847. Prepared for Bonneville Power Administration. Cheney, Washington: Archaeological and Historical Services, Eastern Washington University.

Spier, L. 1936. *Tribal Distribution in Washington*. General Studies in Anthropology No.3. Menasha, Wisconsin.

SunCountry Golf. 2017. Sun Country Golf Course. Available at: https://www.golfsuncountry.com/. Accessed June 20, 2017.

U.S. Air Force. 2011. *Final Environmental Assessment Outgrant for Construction and Operation of a Solar Photovoltaic System in Area I, Nellis Air Force Base, Clark County, Nevada*. Available at: http://energy.nv.gov/uploadedFiles/energynvgov/content/Programs/NV%20Energy%20Attachment%203-%20Nellis%20Final%20Environmental%20Assessment.pdf. Accessed August 4, 2017.

U.S. Bureau of Labor Statistics (BLS). 2016. May 2016 State Occupational Employment and Wage Estimates in Washington. Available at: https://www.bls.gov/oes/current/oes_wa.htm. Accessed August 16, 2017.

U.S. Census Bureau. 2000. 2000 Decennial, Census Profile of General Demographic Characteristics: 2000, Census 2000 Summary File 1 (SF 1) 100-Percent Data. Available at: https://www.census.gov/census2000/sumfile1.html.

U.S. Census Bureau. 2015. American FactFinder, 2011-2015 American Community Survey 5-Year Estimates 2011-2015 American Community Survey 5-year Estimates. Available at: https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2015/.

U.S. Census Bureau. 2010. 2010 Census. Available at: https://www.census.gov/2010census/. Accessed July 28, 2017.

U.S. Department of Agriculture. 2012. U.S. Census of Agriculture, Washington County Summary Highlights. , National Agricultural Statistics Service. Available at: https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/Washington/st53_2_001_001.pdf.

U.S. Environmental Protection Agency (EPA). 1974. Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety. Available at: http://www.nonoise.org/library/levels/levels.htm#levelsof. Accessed August 4, 2017.

Vacasa Rentals. 2017. Available at: www.vacasa.com. Accessed July 28, 2017.

Valentine, Nicholas. 1998. *U.S. Fish and Wildlife Service Archaeological and Historical Resources Identification Report: Naneum Creek*. U.S. Fish and Wildlife Service.

Vaughn, Kevin, and William Schroeder. 2012. *2012 Pedestrian Survey and Subsurface Reconnaissance of the Schaake Parcels, Kittitas County*. Prepared for United States Bureau of Reclamation and Washington State Department of Archaeology and Historic Preservation. Ellensburg, Washington: Central Washington University, Office of Continuing Education.

Waitt, R. B., and D. B. Swanson. 1987. Geomorphic Evolution of the Columbia Plain and River. In *Geomorphic Systems of North America,* edited by William L. Graf, pp. 403–416. Boulder, Colorado: Geological Society of America.

Walker, Deward E. (editor). 1990. *Handbook of North American Indians, Volume 12: Plateau*. Washington, D.C.: Smithsonian Institute.

Washington Energy Facility Site Evaluation Council (EFSEC). 2007. Kittitas Valley Wind Power Project Final EIS, Section 3.13 Public Services and Utilities. Available at: http://www.efsec.wa.gov/kittitaswind/FEIS/Vol%201%20Text/3.13%20Public%20Services%20final.pdf. February.

Washington State Department of Ecology (Ecology). 2018. Spill Preparedness & Response. Available at: https://ecology.wa.gov/Spills-Cleanup/Spills/Spill-preparedness-response. Accessed January 18, 2018.

Washington State Department of Revenue. 2017a. Local Sales and Use Tax Rates by City/County Tax Rates, Effective July 1 - September 30, 2017. Available at: http://dor.wa.gov/Docs/forms/ExcsTx/LocSalUseTx/LocalSlsUseFlyer_17_Q3_alpha.pdf. May 4.

———. 2017b. Major Business and Occupation (B&O) Tax Rate Classifications. Available at: http://dor.wa.gov/Content/FindTaxesAndRates/BAndOTax/BandOrates.aspx. Accessed June 22, 2017.

———. 2017c. Public Utility Tax Rates. Available at: http://dor.wa.gov/Content/FindTaxesAndRates/OtherTaxes/tax_pubutil.aspx. Accessed June 22, 2017.

Washington State Department of Transportation (WSDOT). 2016. Annual Traffic Report 2016. Available at: https://www.wsdot.wa.gov/mapsdata/travel/pdf/Annual_Traffic_Report_2016.pdf. Accessed July 28, 2017.

Washington State Horse Park. 2017. Washington State Horse Park Facilities. Available at: http://www.wahorsepark.org/p/getconnected/281. Accessed June 20, 2017.

Washington State Parks. 2017a. Olmstead Place Historical State Park. Available at: http://parks.state.wa.us/556/Olmstead-Place. Accessed June 20, 2017.

———. 2017b. Lake Easton State Park. Available at: http://parks.state.wa.us/532/Lake-Easton. Accessed June 20, 2017.

———. 2017c. Ginkgo Petrified Forest State Park / Wanapum Recreation Area. Available at: http://parks.state.wa.us/288/Ginkgo-Petrified-Forest. Accessed June 20, 2017.

Washington State Patrol (WSP). 2017. Washington State Patrol Field Operations - District 6. Available at: http://www.wsp.wa.gov/traveler/district6.htm. Accessed June 23, 2017.

Washington State University (WSU) Kittitas County Extension. 2017. Washington State University - Kittitas County. Available at: http://extension.wsu.edu/kittitas/. Accessed June 23, 2017.

Whitley, Edward C. 1949 . Agricultural Geography of the Kittitas Valley. Master's Thesis. University of Washington, Seattle, Washington.

Windsor, H. H. 1956. Golfers Mobilize. *Popular Mechanics Magazine* 105(4):103.

Woody, Dave. 2014. *Cultural Resources Identification Survey of the Lynn Brown 2014 NRCS EQIP Project*. NRCS EQIP Contract No: 740546140P4. Natural Resources Conservation Service.

———. 2015a. *Cultural Resources Identification Survey of the Circle Lazy H Farm 2015 NRCS EQIP Project*. NRCS EQIP Contract No: 7405461407X. Natural Resources Conservation Service.

———. 2015b. State of Washington Archaeological Site Inventory Form, 45KT3786, Lazy H Historic Debris. On file, Washington State Department of Archaeology and Historic Preservation, Olympia, Washington.

5 APPLICATIONS FOR PERMITS AND AUTHORIZATIONS

5.1 Air Emissions Permits and Authorizations 463-60-536

(1) The application for site certification shall include a completed prevention of significant deterioration permit (PSD) application and a notice of construction application pursuant to the requirements of chapter 463-78 WAC.

Per Washington Administrative Code (WAC) 463-60-536, a Prevention of Significant Deterioration (PSD) Permit application is required to be submitted with the Washington Energy Facility Site Evaluation Council (EFSEC) Application for Site Certification (ASC). However, the proposed Columbia Solar Projects would only have minimal dust and vehicular air emissions during construction, and no air emissions during operation. Therefore, the potential air emissions can be adequately addressed in the EFSEC ASC and the Washington State Environmental Policy Act Environmental Checklist, and that a PSD Permit will not be required as part of the EFSEC ASC.

Per WAC 173-400-110 a notice of construction application must be submitted for new and stationary sources of air emissions. WAC 173-400-110(4) exempts certain emission units and activities from new source review and the filing of a notice of construction application. Construction activities that do not result in new or modified stationary sources or portable stationary sources are one of the exemptions (WAC 173-400-110[4][x]). The five proposed Columbia Solar Projects would only have minimal dust and vehicular air emissions during construction, and no air emissions during operation. Thus, the Columbia Solar Projects would not result in new sources of air emissions. Per WAC 173-400-110(4)(x), the projects are exempt from new source review and filing a notice of construction application.

(2) The application shall include requests for authorization for any emissions otherwise regulated by local air agencies as identified in WAC 463-60-297 Pertinent federal, state and local requirements.

The five proposed Columbia Solar Projects would only have minimal dust and vehicular air emissions during construction, and no air emissions during operation. No air permit authorizations are required for the proposed solar projects.

5.2 Wastewater/Stormwater Discharge Permit Applications 463-60-537

The application for site certification shall include:

(1) A completed National Pollutant Discharge Elimination System (NPDES) permit application, for any proposed discharge to surface waters of the state of Washington, pursuant to the requirements of WAC 463-76-031; or

Per WAC 463-60-537, a National Pollutant Discharge Elimination System (NPDES) Permit application for any proposed discharge to surface waters and a State of Washington Application for General Permit to Discharge Stormwater Associated with Construction Activity has been included with this application. The EFSEC stormwater pollution control program is based, in part, on federal regulations and the implementation of the federal Clean Water Act. The goals of these federal regulations are to reduce or eliminate stormwater pollution from construction activity. Because TUUSSO Energy, LLC (TUUSSO), plans to clear, grade, or excavate 1 or more acres as part of the development of the five proposed

Columbia Solar Project sites, TUUSSO is required to seek coverage under an NPDES permit and the state general permit. A stormwater pollution prevention plan (SWPPP) has been developed as part of this permitting process.

NPDES permit applications and notice of intents (NOIs) have been included in Appendices G through K for each site. TUUSSO would adhere to all requirements under WAC 463-76-031.

(2) For any proposed discharge to publicly owned treatment works (POTW) and/or groundwater of the state of Washington, a state waste discharge application;

No waste discharge is proposed either on-site or off-site for any of the Columbia Solar Projects.

(3) A notice of intent to be covered under any applicable statewide general permit for storm water discharge.

Per response to Item (1) above, NPDES permit applications and NOIs are include for each site in Appendices G through K.

5.3 Other Permit Applications 463-60-540

The application for site certification shall include:

(1) A completed joint aquatic resource permit application (JARPA) for any proposed activities that would require the issuance of a water quality certification under section 401 of the Federal Water Pollution Control Act, or would otherwise require the issuance of a hydraulic permit approval;

The only potential impact to wetlands would occur on the Typha Solar Project site, to Typha Wetland 03 (TW03). The proposed Typha Solar Project would be located on approximately 54.29 acres of private land zoned as Commercial Agriculture, formerly used as agricultural land, and currently used for grazing. All construction activities associated with the Typha Solar Project would avoid impacts to all wetlands and waters, with the exception of 630 square feet of fill in wetland TW03 for the proposed road improvements to an existing farm road to allow for year-round site access at the entrance to the Typha Solar Project site.

TUUSSO submitted a Joint Aquatic Resources Permit Application (JARPA) to EFSEC on December 21, 2017.

(2) A notice of intent to be covered under a statewide general permit for sand and gravel issued by ecology; and

The Ecology Sand and Gravel General Permit regulates discharges of process water, stormwater, and water from mine dewatering into waters of the state associated with sand and gravel operations, rock quarries, and similar mining operations. The permit also covers concrete batch operations and hot mix asphalt operations. (Washington State Department of Ecology [Ecology] 2018) A Sand and Gravel General Permit may be needed if a facility:

- Discharges process water, stormwater, or mine dewatering water into waters of the state.
- Is associated with sand and gravel operations, concrete batch plants, or asphalt batch plants.

A portable operation permit may be needed if a facility moves from site to site to (Ecology 2018):

- Crush rock
- Make concrete
- Make asphalt

TUUSSO will not be developing or operating a sand or gravel pit or concrete or asphalt batch plants for construction or operation of any of the five Columbia Solar Projects. Any sand or gravel would be purchased from existing commercial businesses, as described in Section 3.6. Thus, a Notice of Intent for an Ecology Sand and Gravel State General Permit is not applicable to development of these solar projects.

(3) A notice of intent to be covered under other permits that are otherwise issued by state agencies.

Section 2.23 and Table 2.23-1 summarize the state codes, ordinances, statutes, rules, regulations, and permits that would have to be complied with or required for each of the five Columbia Solar Projects. Within that summary, only two permits would be required in addition to the JARPA listed above, the Electrical Construction Permit and an Archaeological and Historic Preservation. The status of those permits are summarized below.

Electrical Construction Permit

WAC 296-46B-901, General—Electrical Work Permits and Fees, requires that:

> (1) When an electrical work permit is required by RCW 19.28 or this chapter, inspections may not be made, equipment must not be energized, or services connected unless:
>
> (a) A valid electrical work permit is obtained and posted per subsection (5) of this section;
> (b) The classification or type of facility to be inspected and the exact scope and location of the electrical work to be performed are clearly shown on the electrical work permit;
> (c) The address where the inspection is to be made is clearly identifiable from the street, road or highway that serves the premises; and
> (d) Driving directions are provided for the inspectors' use.
>
> (2) Except as allowed for annual permits and two-family dwellings, an electrical work permit is valid for only one specific job site address.

TUUSSO will prepare the Electrical Construction Permit and pay the associated fees prior to initiation of construction of each of the five Columbia Solar Projects. It will also obtain the required inspections and approvals prior to initiating the operation of each solar project.

Archaeological Excavation Permit

All five Columbia Solar Projects are subject to the State Environmental Policy Act (SEPA), which requires project proponents to consider effects to places or objects listed on or proposed for national, state, or local preservation registers. In addition, excavations within the site boundary are subject to the Washington State Archaeological Sites and Resources Act (Revised Code of Washington 27.53), which requires an excavation permit from the Washington State Department of Archaeology and Historic Preservation (DAHP) prior to any ground disturbance within a known archaeological site. The only Columbia Solar Project site requiring an Archaeological Excavation Permit Application for an archaeological survey at this time is the Penstemon Solar Project archaeological site 45KT4012, a multi-component archaeological site.

This permit application was submitted to EFSEC and DAHP on January 17, 2018.

5.4 References – Chapter 5

Washington State Department of Ecology (Ecology). 2018. Sand & Gravel General Permit. Available at: https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Sand-Gravel-General-Permit#Needapermit. Accessed January 18, 2018.

APPENDICES AND ATTACHMENTS

Appendix A: Washington SEPA Environmental Checklist

Appendix B: Vegetation Management Plan

Appendix C: Habitat, Vegetation, Fish, and Wildlife Assessment Report

Appendix D: Visual/Aesthetic Assessment Report

Appendix E: Solar Glare Hazard Analysis Report

Appendix F: Decommissioning Plan

Appendix G: Camas Solar Project Site Reports and Permit Applications

G-1: Camas Solar Project Critical Areas Report

G-2: Camas Solar Project Cultural Resources Report

G-3: Camas Solar Project Permit Applications

G-4: Camas Solar Project Geotechnical Engineering Study

G-5: Camas Solar Project Drainage Report

Appendix H: Fumaria Solar Project Site Reports and Permit Applications

H-1: Fumaria Solar Project Critical Areas Report

H-2: Fumaria Solar Project Cultural Resources Report

H-3: Fumaria Solar Project Permit Applications

H-4: Fumaria Solar Project Geotechnical Engineering Study

H-5: Fumaria Solar Project Drainage Report

Appendix I: Penstemon Solar Project Site Reports and Permit Applications

I-1: Penstemon Solar Project Critical Areas Report

I-2: Penstemon Solar Project Cultural Resources Report

I-3: Penstemon Solar Project Permit Applications

I-4: Penstemon Solar Project Geotechnical Engineering Study

I-5: Penstemon Solar Project Drainage Report

I-6: Archaeological Excavation Permit Application for Archaeological Survey, Site 45KT4012

Appendix J: Typha Solar Project Site Reports and Permit Applications

J-1: Typha Solar Project Critical Areas Report

J-2: Typha Solar Project Cultural Resources Report

J-3: Typha Permit Applications

J-4: Typha Solar Project Geotechnical Engineering Study

J-5: Typha Solar Project Drainage Report

Appendix K: Urtica Solar Project Site Reports and Permit Applications

K-1: Urtica Solar Project Critical Areas Report

K-2: Urtica Solar Project Cultural Resources Report

K-3: Urtica Solar Project Permit Applications

K-4: Urtica Solar Project Geotechnical Engineering Study

K-5: Urtica Solar Project Drainage Report

Appendix L: TUUSSO Solar Project Site Plans and Designs

Appendix M: Draft Communication and Emergency Response Plan

Appendix N: Noise Impact Calculations