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. Thus, the majority of the analysis area would be expected to have background noise L_{dn} of about 40 dBA or less. This noise level would occasionally increase due to passing vehicular traffic from Interstate 90 (I-90) 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.

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 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 RCNM assumes that the maximum sound level for the project (L_{max}) is the maximum sound level for the loudest piece of equipment. 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
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 ten SGI 500XTM inverters per project site.

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)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Nearest Receptor[2]	84.2	86.4	85.8	37.0

1. ANSI S12.9-1993/Part 3
2. 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.

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 2.6 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_{max} (dBA)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level [1]	–	–	43.0	37.0
Noise Level at Property Boundary	67.6	67.6	67.6	37.0
Noise Level at Nearest Commercial Receptor [2]	48.2	50.2	51.0	37.0
Noise Level at Nearest Residential Receptor [3]	40.3	42.9	46.0	37.0

1. ANSI S12.9-1993/Part 3
2. The nearest sensitive receptor is a commercial facility located 155 feet from the property boundary.
3. The nearest residential sensitive receptor is located 284 feet from the property boundary.

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)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Nearest Receptor[2]	76.4	78.7	78.0	37.0

1. ANSI S12.9-1993/Part 3
2. 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.

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_{max} (dBA)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Property Boundary	37.3	42.1	45.6	37.0
Noise Level at Nearest Receptor[2]	37.3	42.1	45.6	37.0

1. ANSI S12.9-1993/Part 3
2. The nearest sensitive receptor is located 378 feet from the property boundary.

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)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Nearest Receptor[2]	80.5	82.8	82.1	37.0

1. ANSI S12.9-1993/Part 3
2. 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 236 feet from the property boundary.

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_{max} (dBA)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Property Boundary	45.9	50.1	50.9	37.0
Noise Level at Nearest Receptor[2]	40.3	45.4	47.4	37.0

1. ANSI S12.9-1993/Part 3
2. The nearest sensitive receptor is located 236 feet from the property boundary.

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)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Nearest Receptor[2]	79.5	81.7	81.1	37.0

1. ANSI S12.9-1993/Part 3
2. 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.

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_{max} (dBA)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Property Boundary	56.1	56.4	56.6	37.0
Noise Level at Nearest Sensitive Receptor[2]	46.3	47.9	49.1	37.0

1. ANSI S12.9-1993/Part 3
2. The nearest sensitive receptor is a residence located 266 feet from the property boundary.

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)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Nearest Receptor[2]	83.5	85.7	85.1	37.0

1. ANSI S12.9-1993/Part 3
2. 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.

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_{max} (dBA)	Calculated L_{eq} Total (dBA)	Community Noise Level (dBA)	
			L_{day}	L_{night}
Estimated Ambient Noise Level[1]	–	–	43.0	37.0
Noise Level at Property Boundary	46.9	48.4	49.8	37.0
Noise Level at Nearest Receptor[2]	40.9	43.9	46.5	37.0

1. ANSI S12.9-1993/Part 3
2. The nearest sensitive receptor is located 168 feet from the property boundary.

(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, water would be available on-site that could be applied to the fire. For the Camas, Penstemon, Typha, and Urtica Solar Project sites the water sources are already available on-site. For the Fumaria Solar Project site, water would be trucked onto the site from the Ellensburg area.

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction. If a fire were to occur, that water could be diverted for firefighting purposes.

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 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. 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.

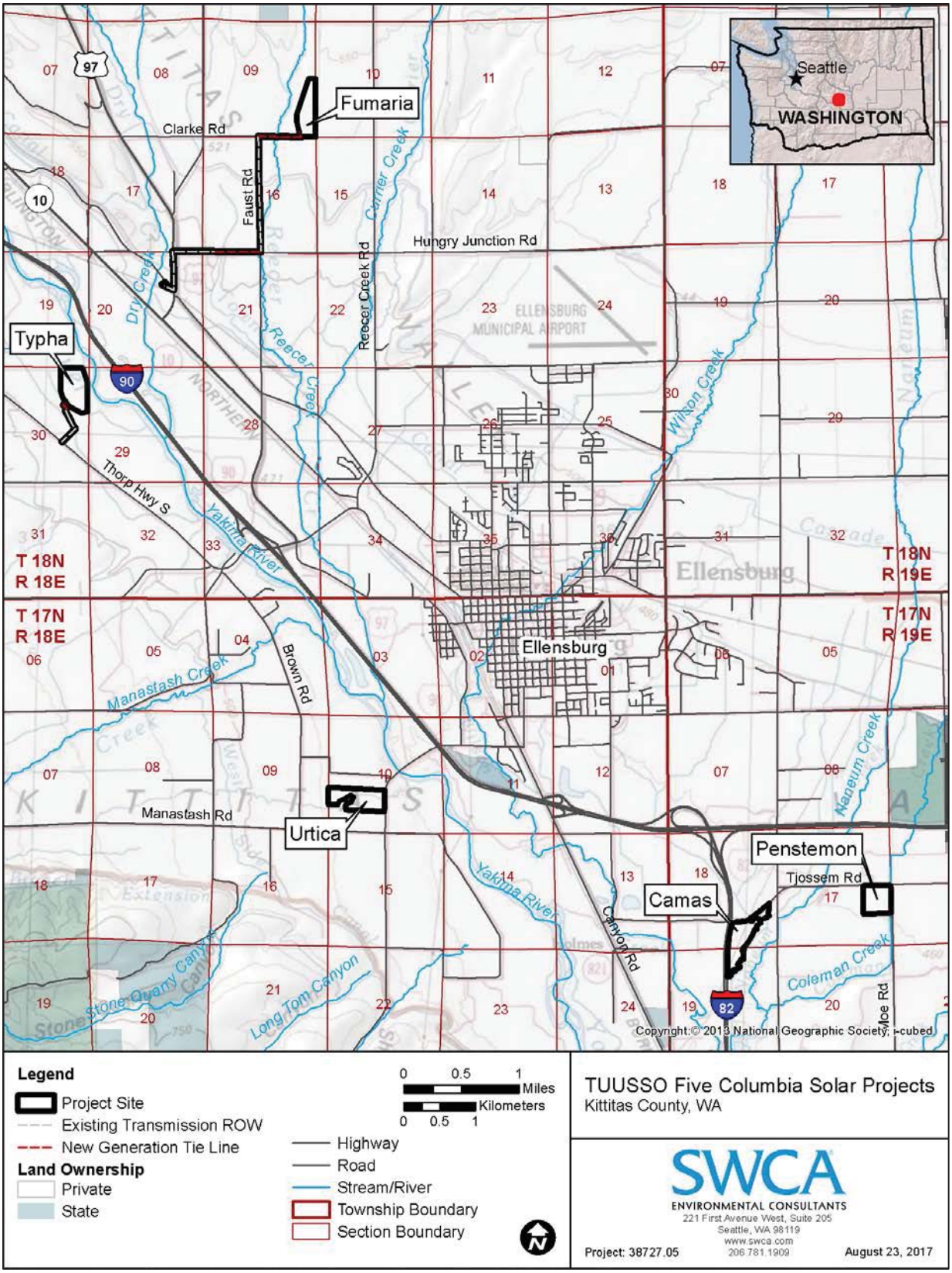

Figure 4.2-1. Columbia Solar Project site locations.

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.

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.

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.

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.

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.

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 address a culvert replacement. 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 0.01 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.

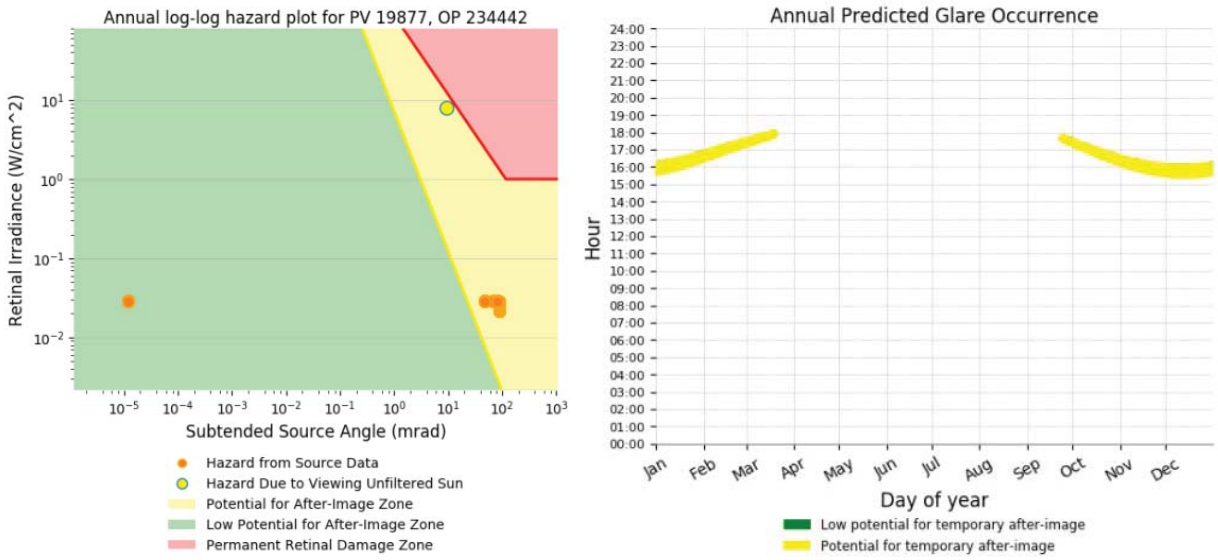

Figure 4.2-2. SGHAT tool results example.

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 4.2-2. 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 4.2-3. 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 4.2-4. 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

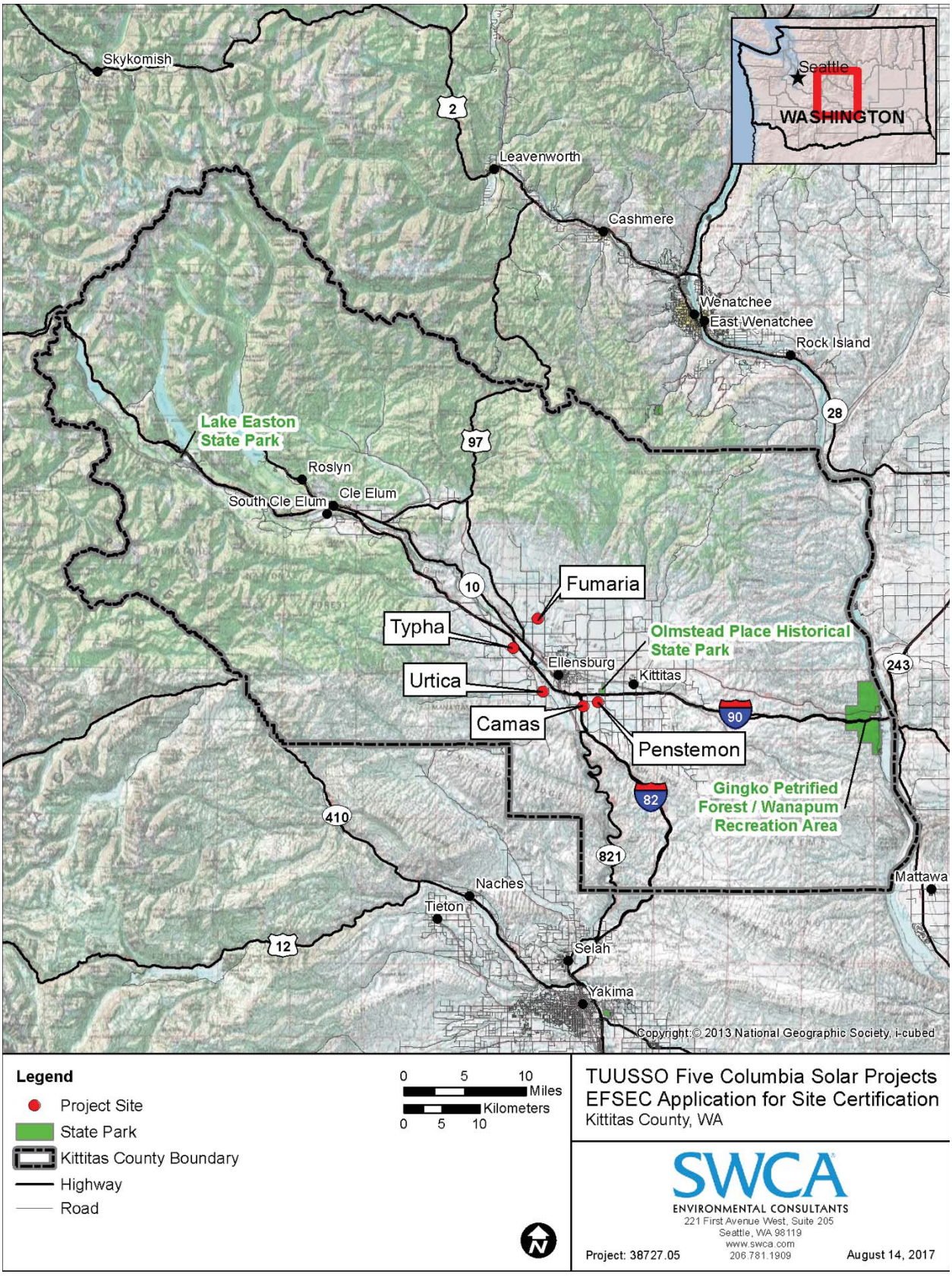

Figure 4.2-3. Kittitas County selected major state recreational parks.

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 Course is a nine-hole semi-private golf club located on Thorp Highway South in 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 4.2-5. 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 4.2-5. 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 4.2-5. 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 4.2-6. 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] (GLO 1884b). 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.

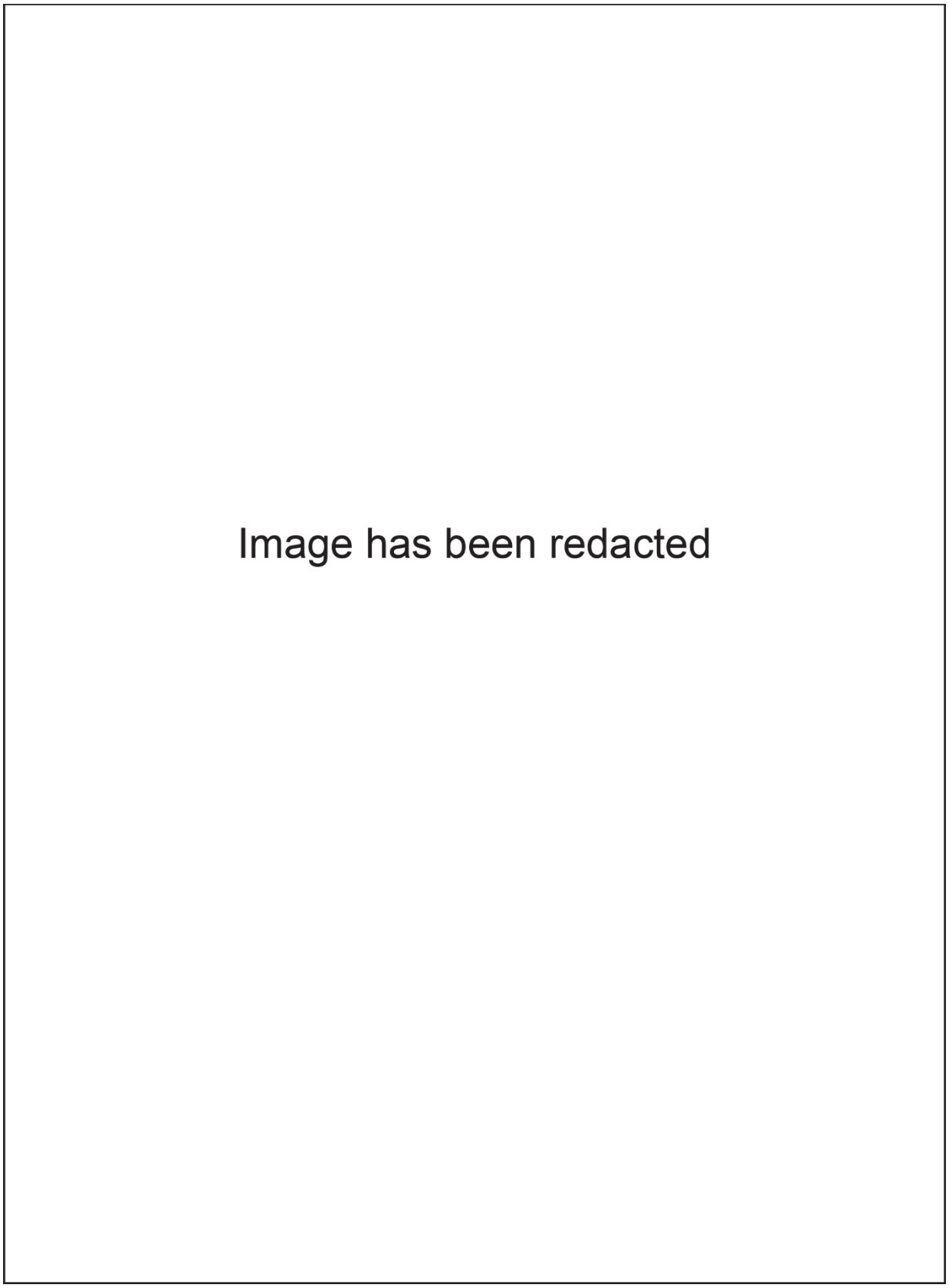

Figure 4.2-4. Camas Solar Project cultural and built environment resources, north portion.

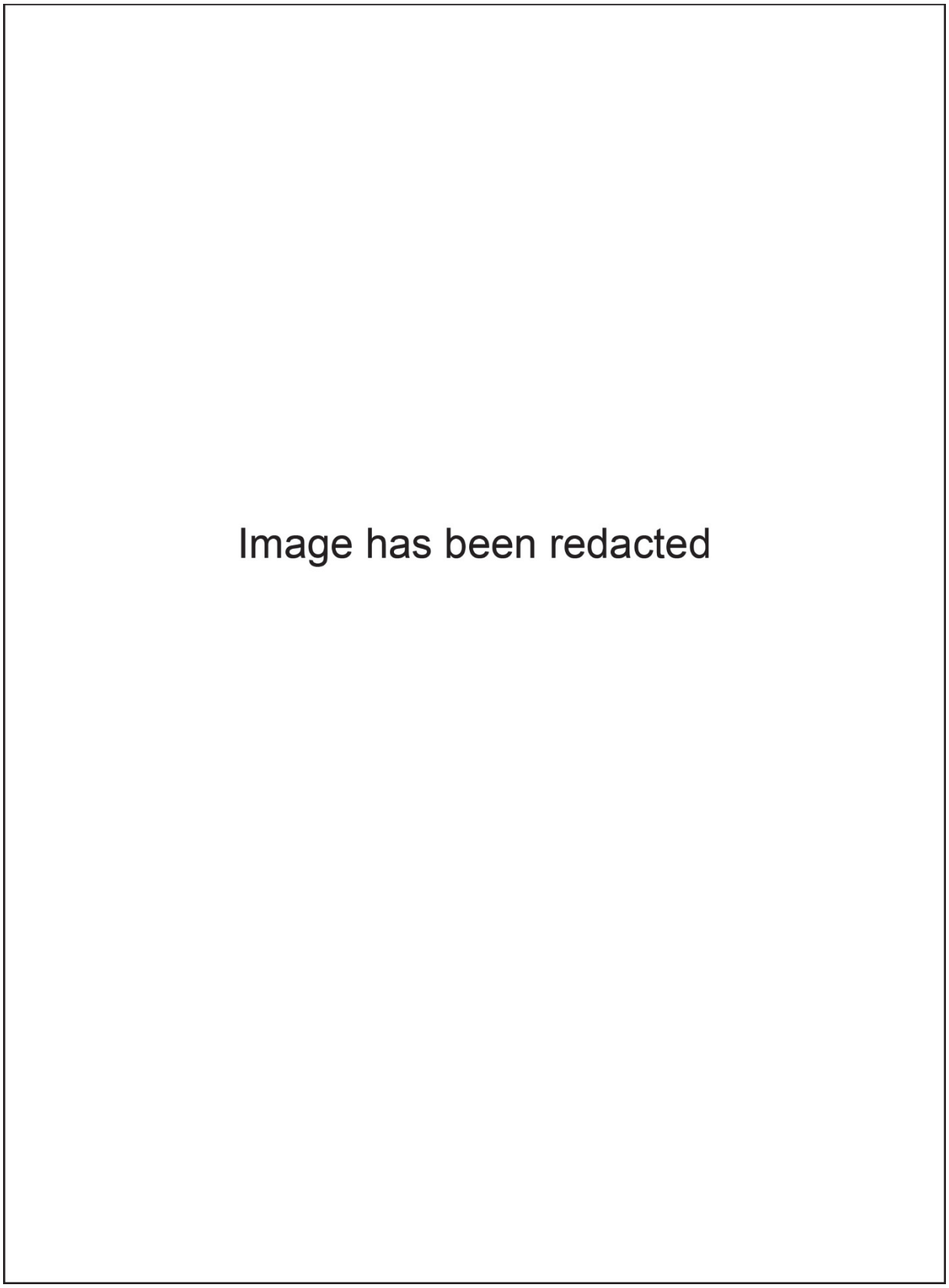

Figure 4.2-5. Camas Solar Project cultural and built environment resources, south portion.

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.

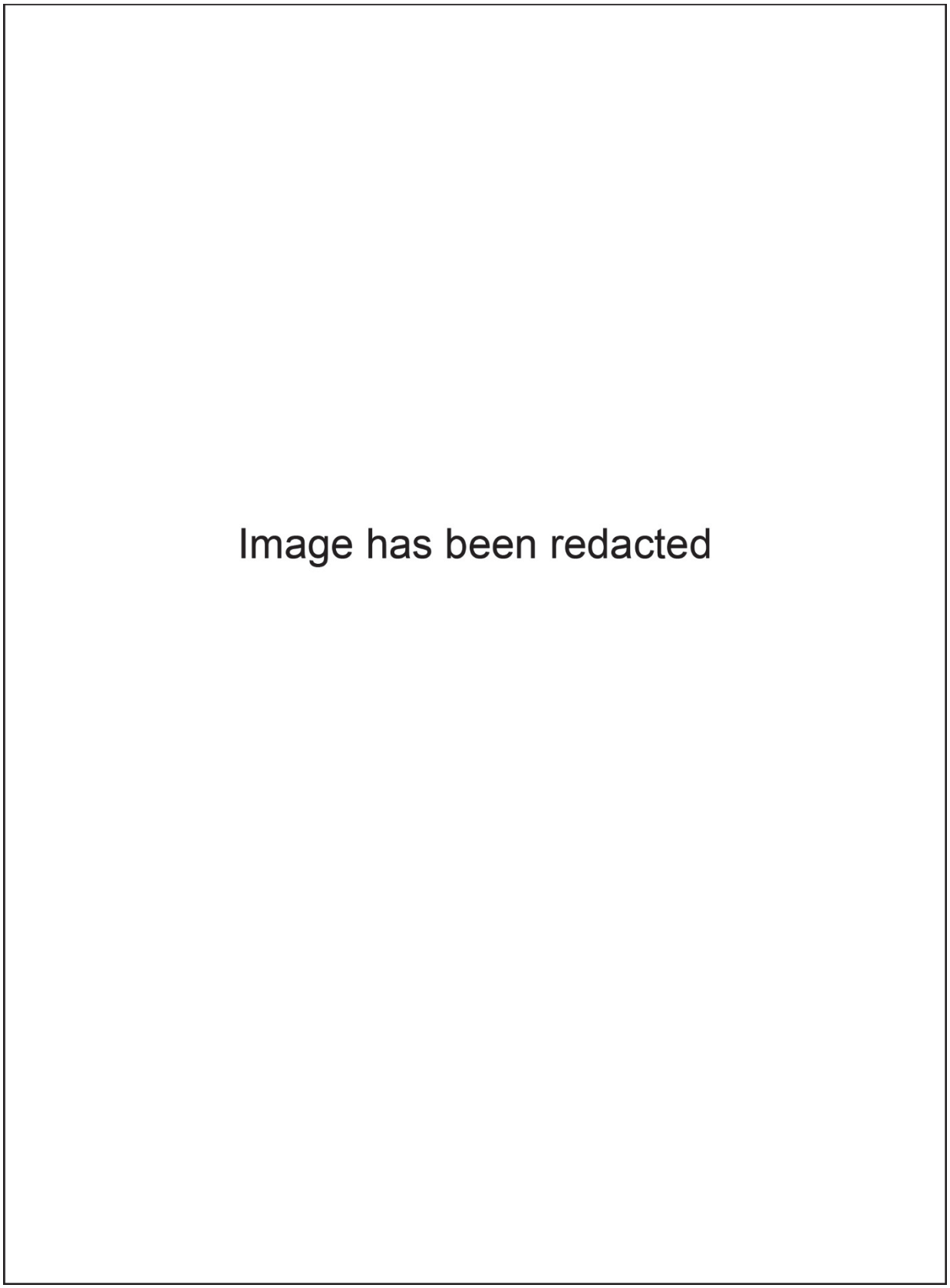

Figure 4.2-6. Fumaria Solar Project cultural and built environment resources, Map 1 of 7.

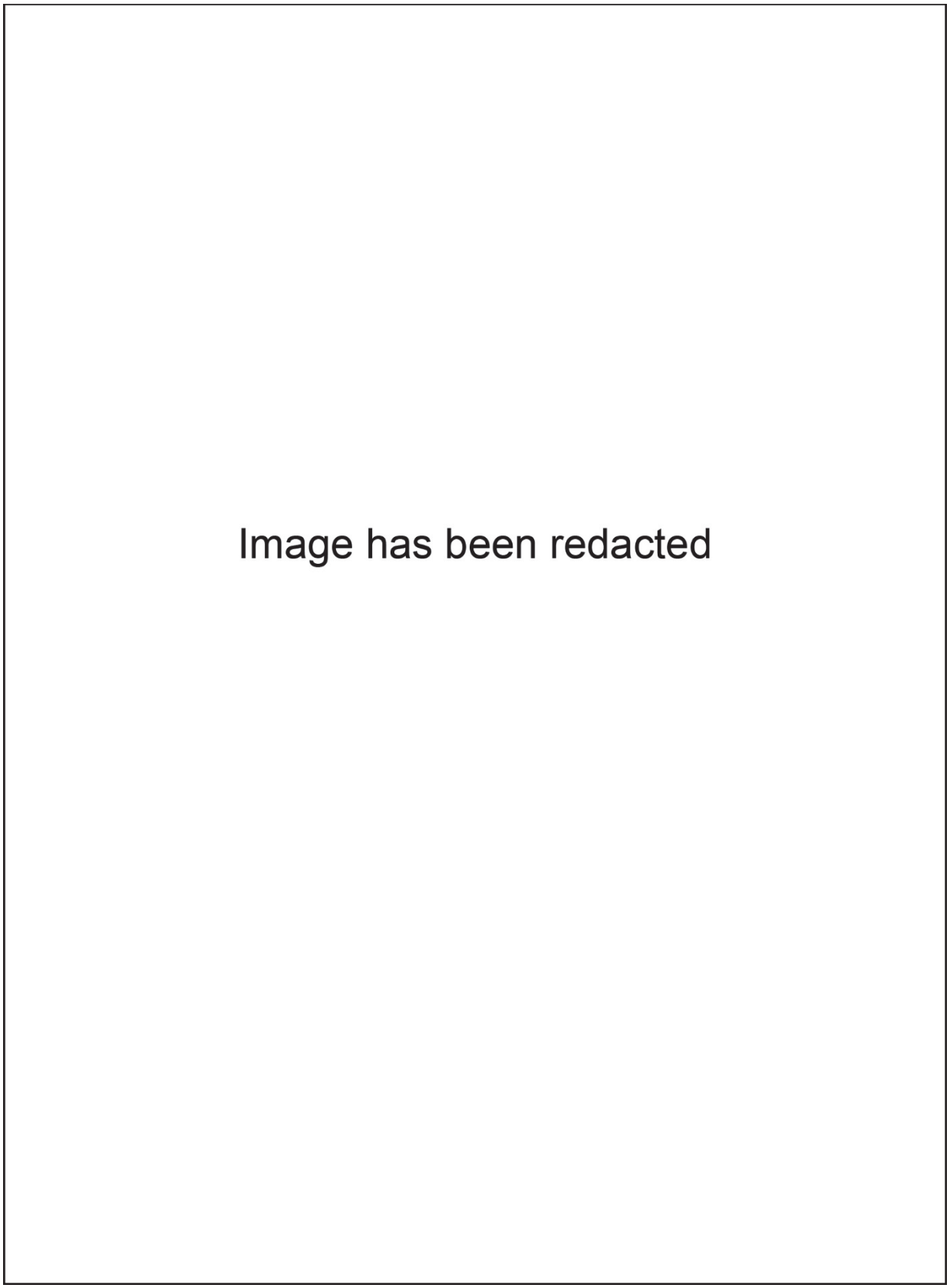

Figure 4.2-7. Fumaria Solar Project cultural and built environment resources, Map 2 of 7.

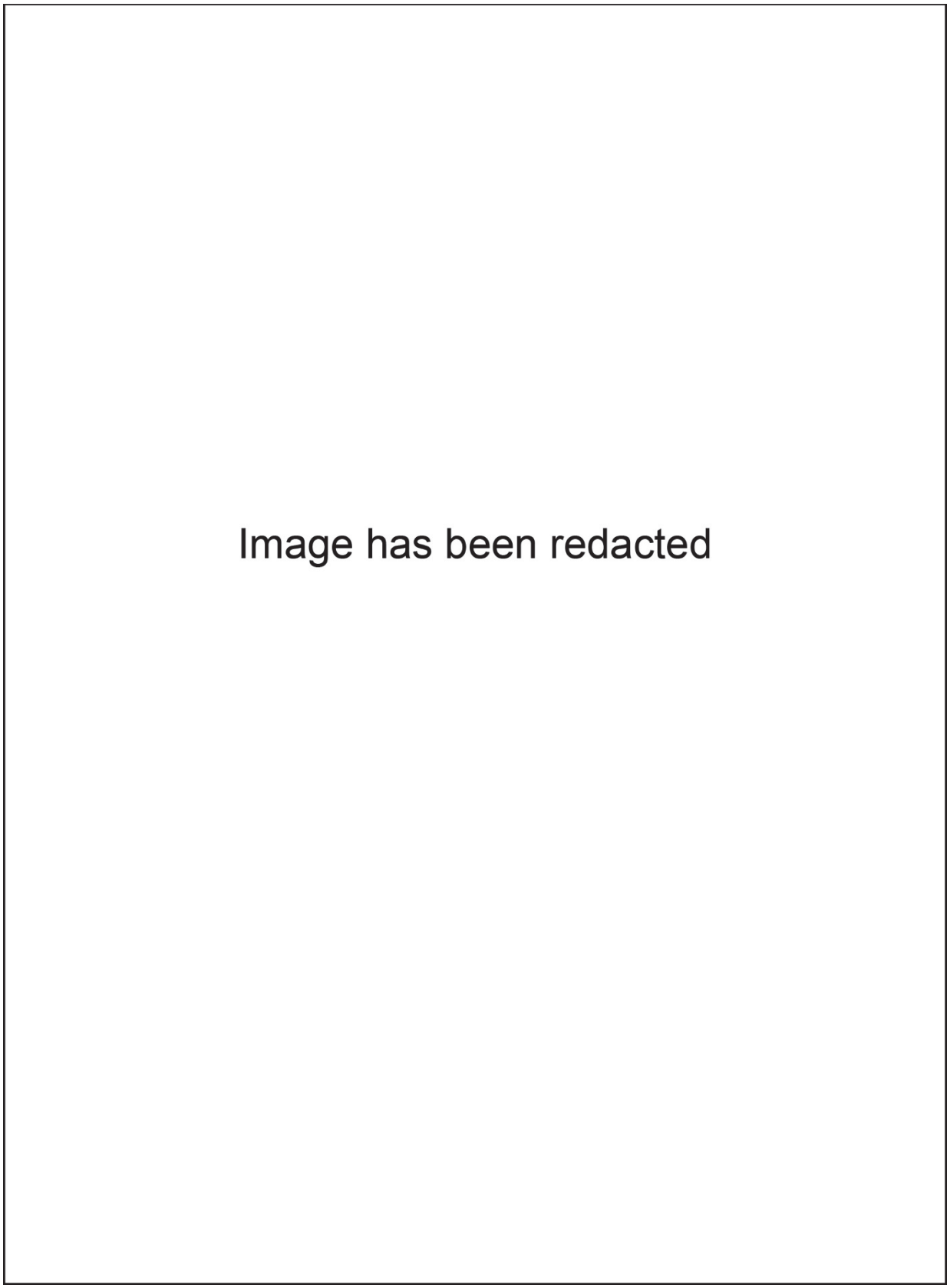

Figure 4.2-8. Fumaria Solar Project cultural and built environment resources, Map 3 of 7.

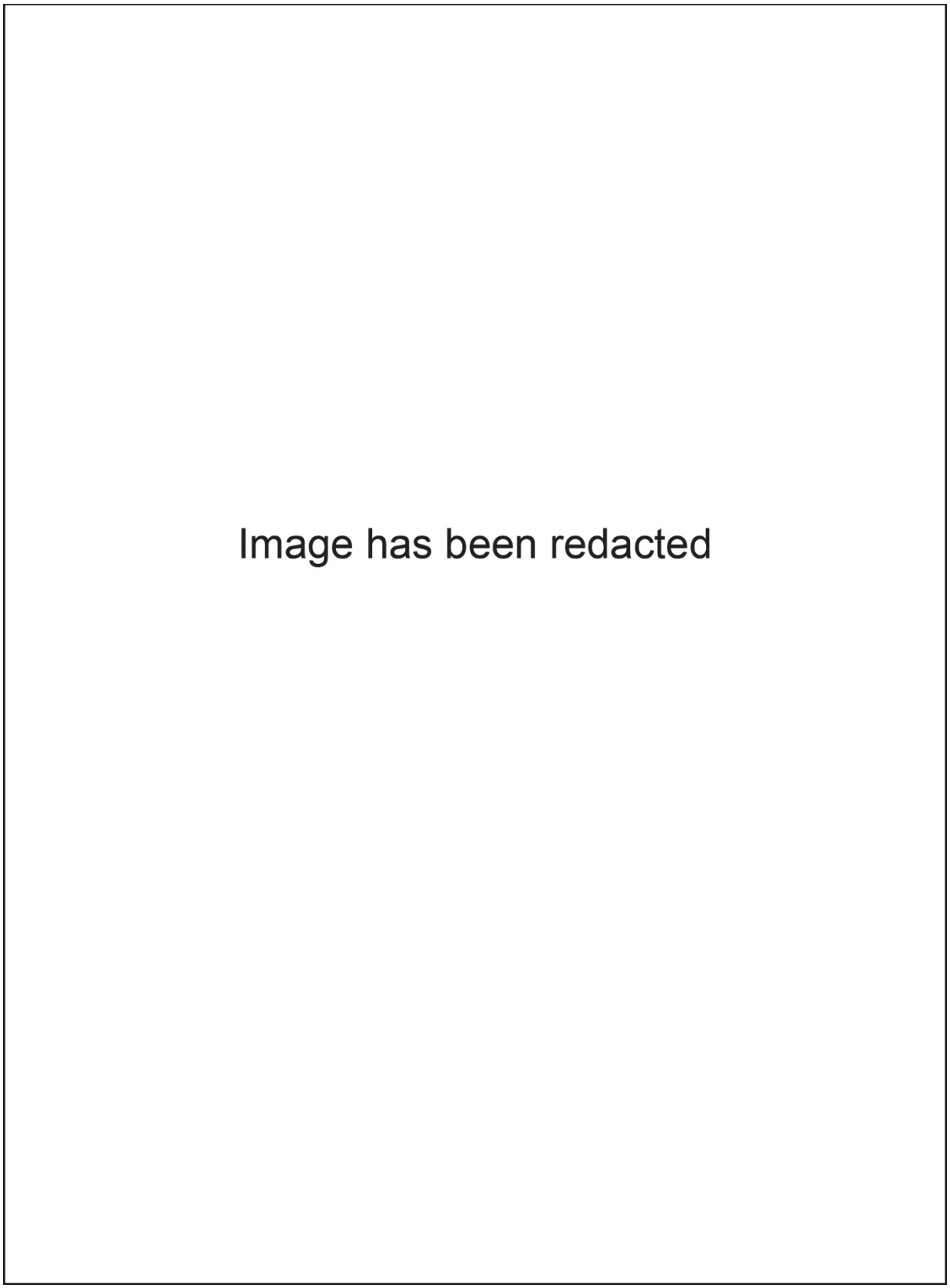

Figure 4.2-9. Fumaria Solar Project cultural and built environment resources, Map 4 of 7.

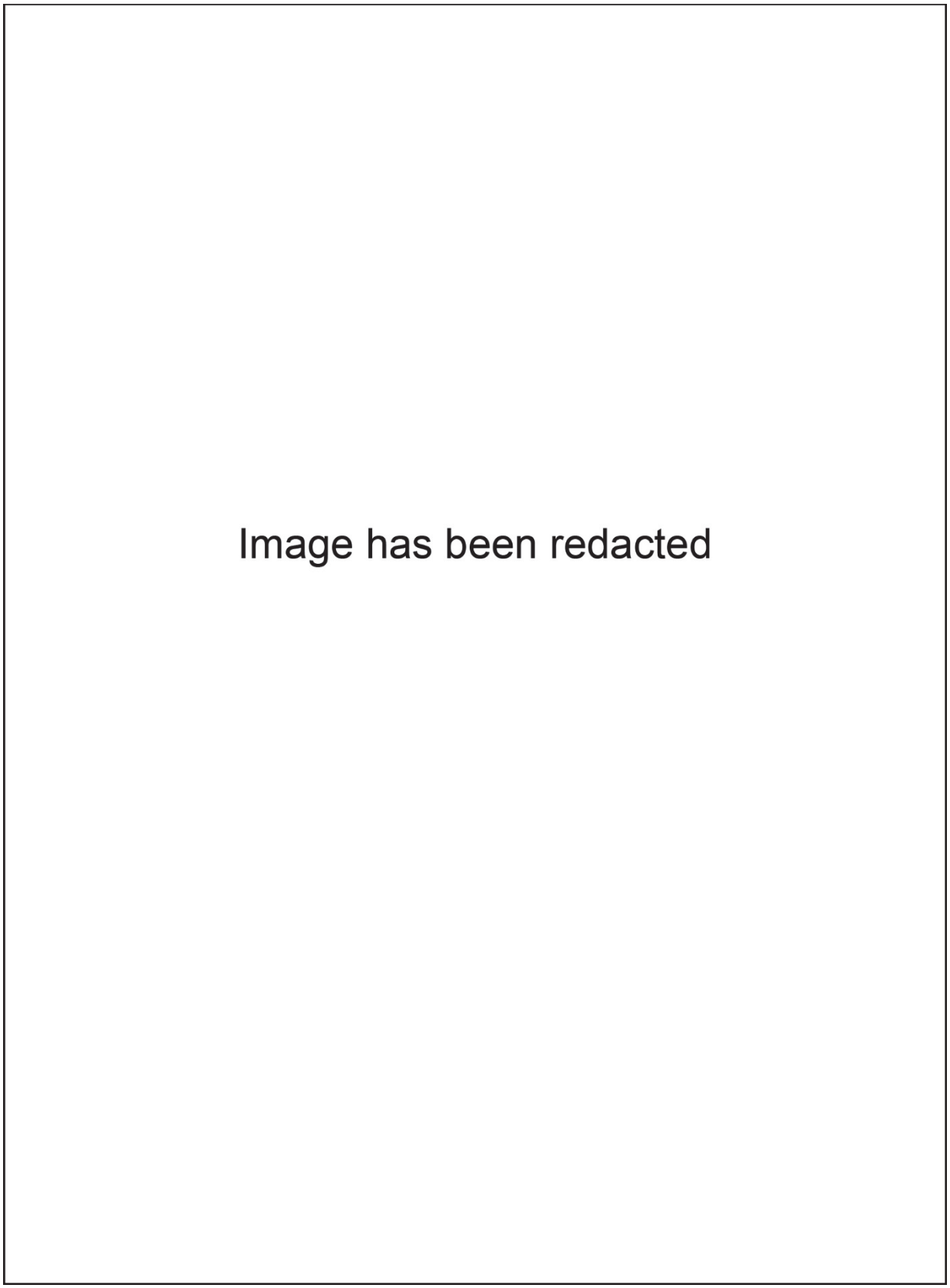

Figure 4.2-10. Fumaria Solar Project cultural and built environment resources, Map 5 of 7.

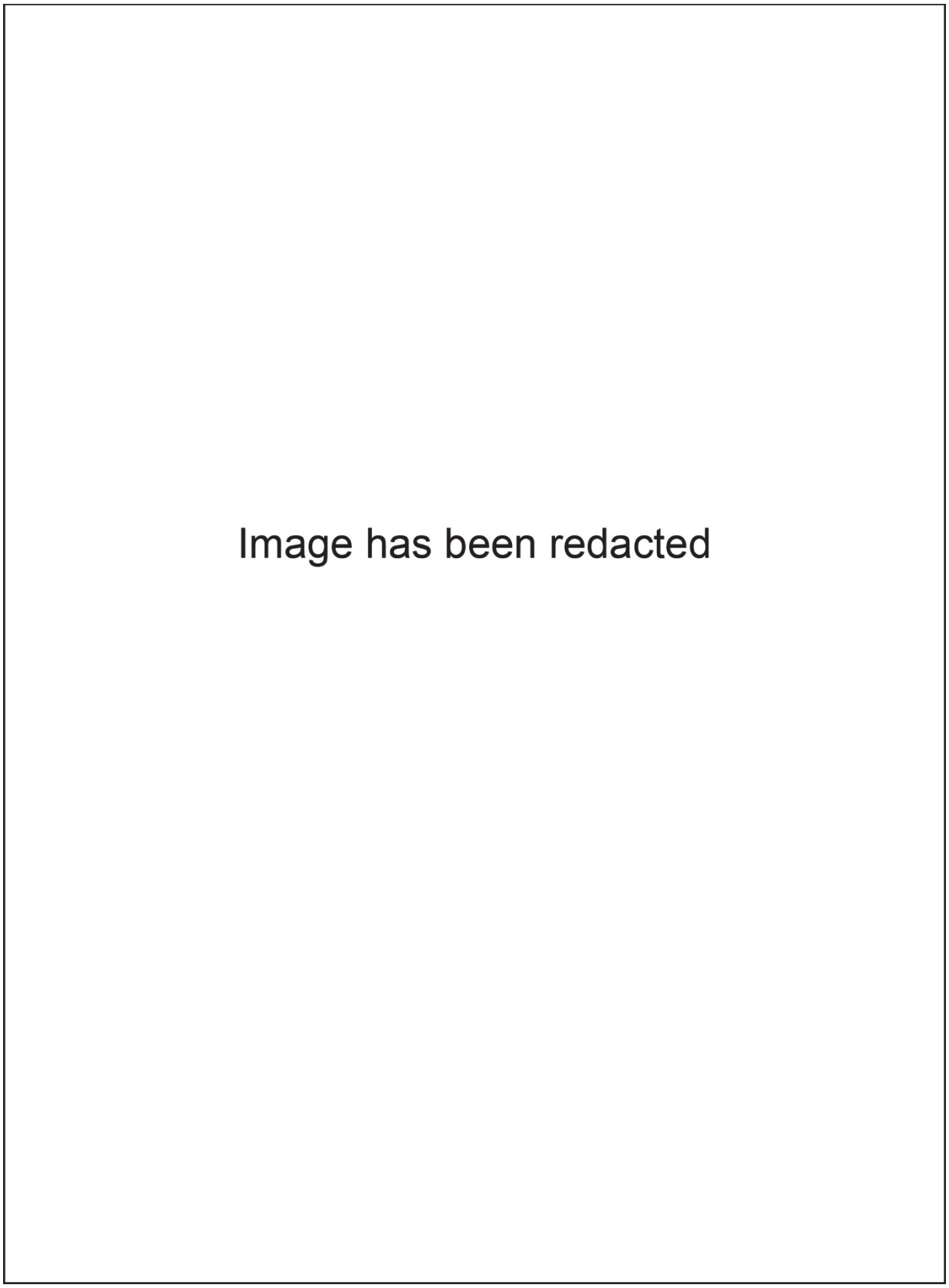

Figure 4.2-11. Fumaria Solar Project cultural and built environment resources, Map 6 of 7.

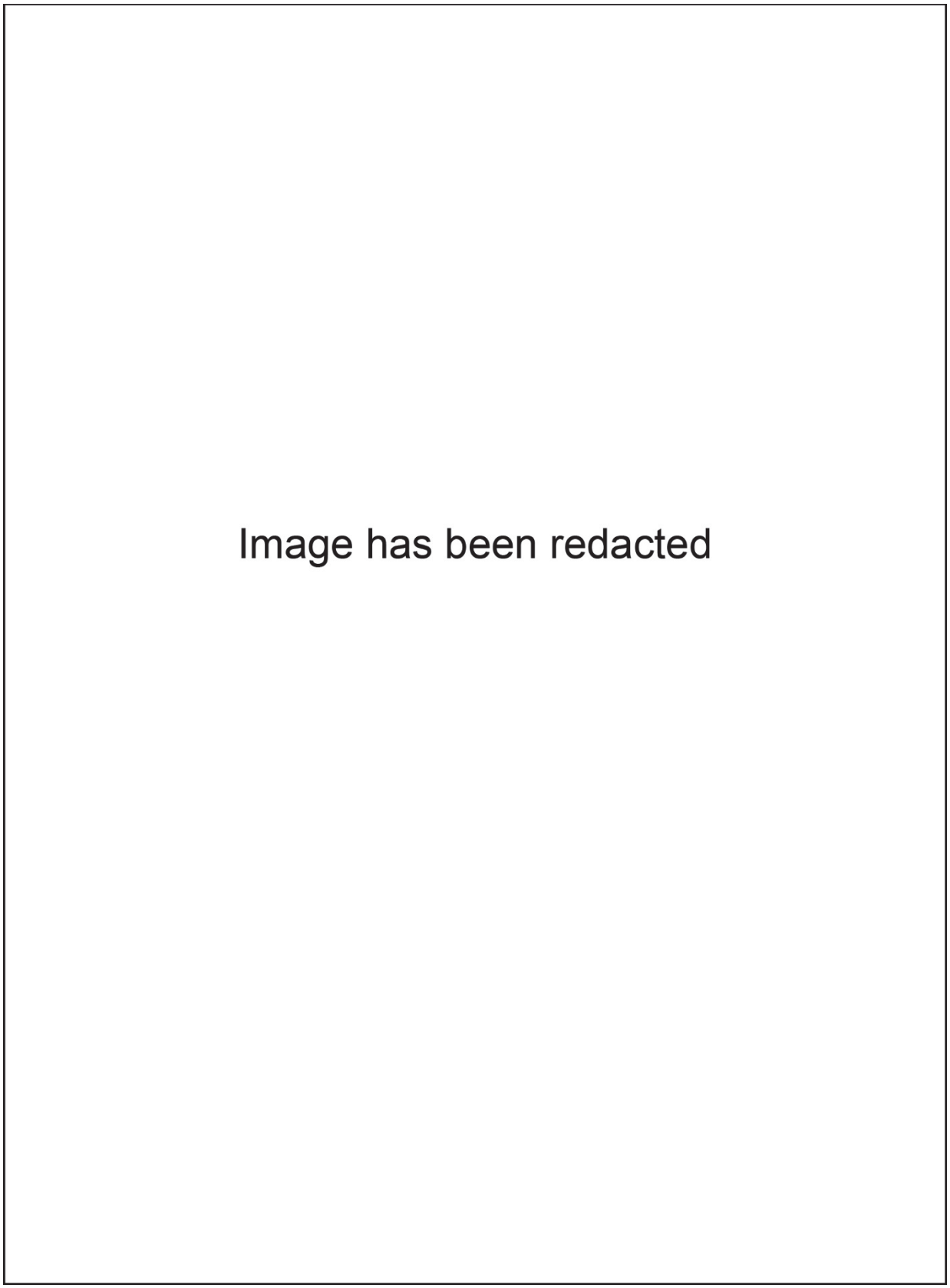

Figure 4.2-12. Fumaria Solar Project cultural and built environment resources, Map 7 of 7.

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 ran [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.

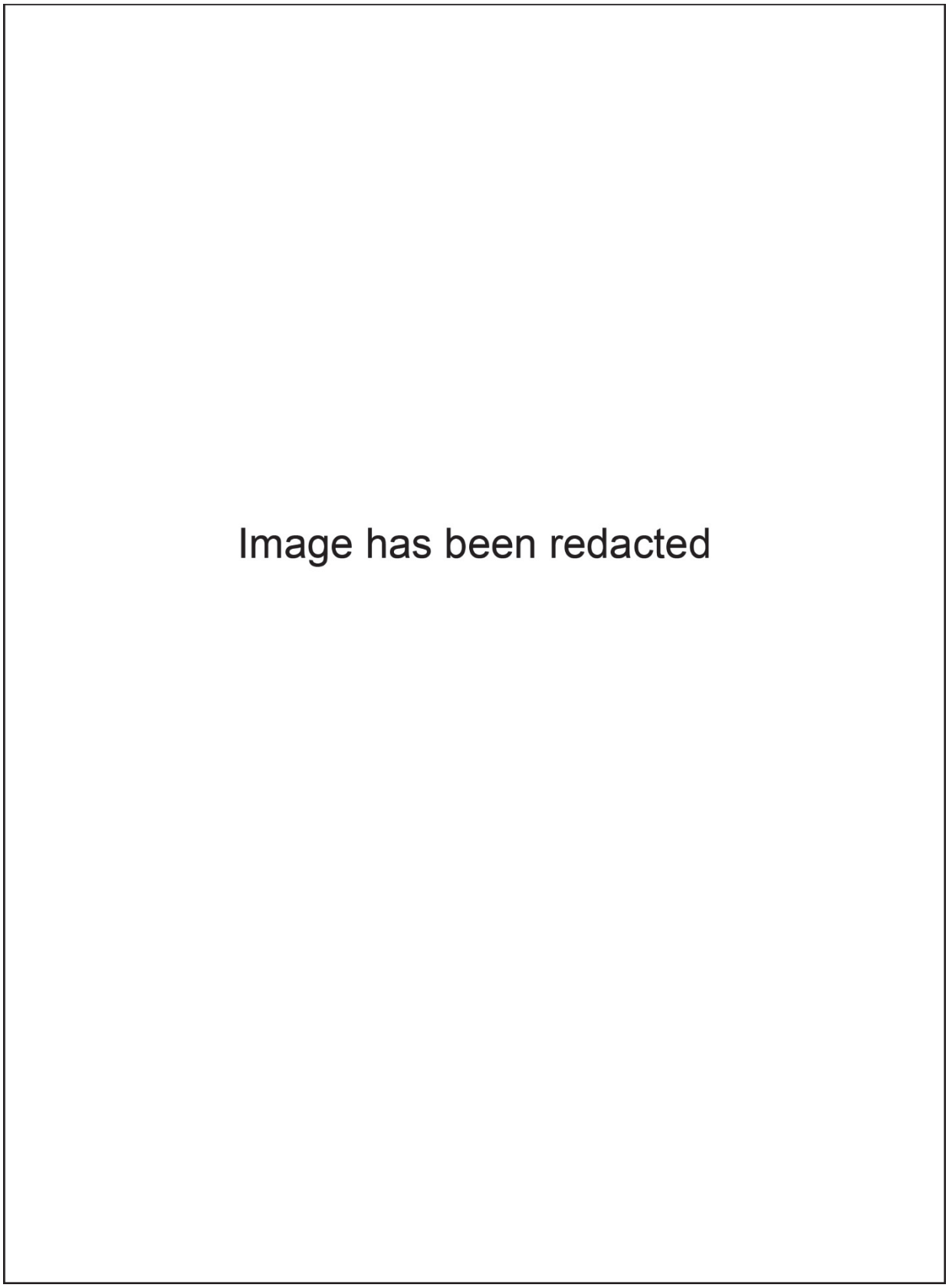

Figure 4.2-13. Penstemon Solar Project cultural and built environment resources.

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 [redacted] The flake measures 1.5 × 1.0 × 0.2 cm. [redacted]

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.

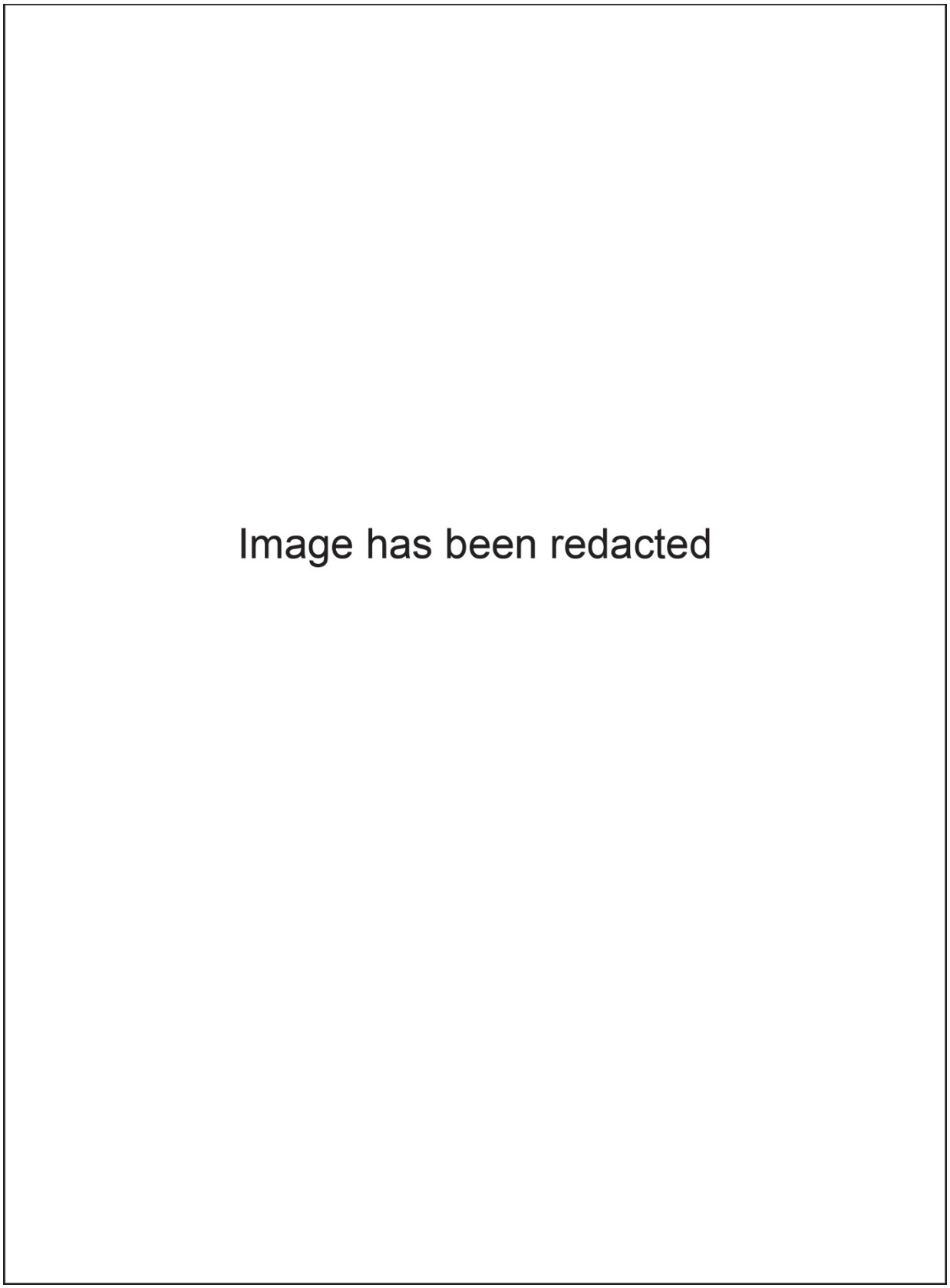

Figure 4.2-14. Typha Solar Project cultural and built environment resources, north portion.

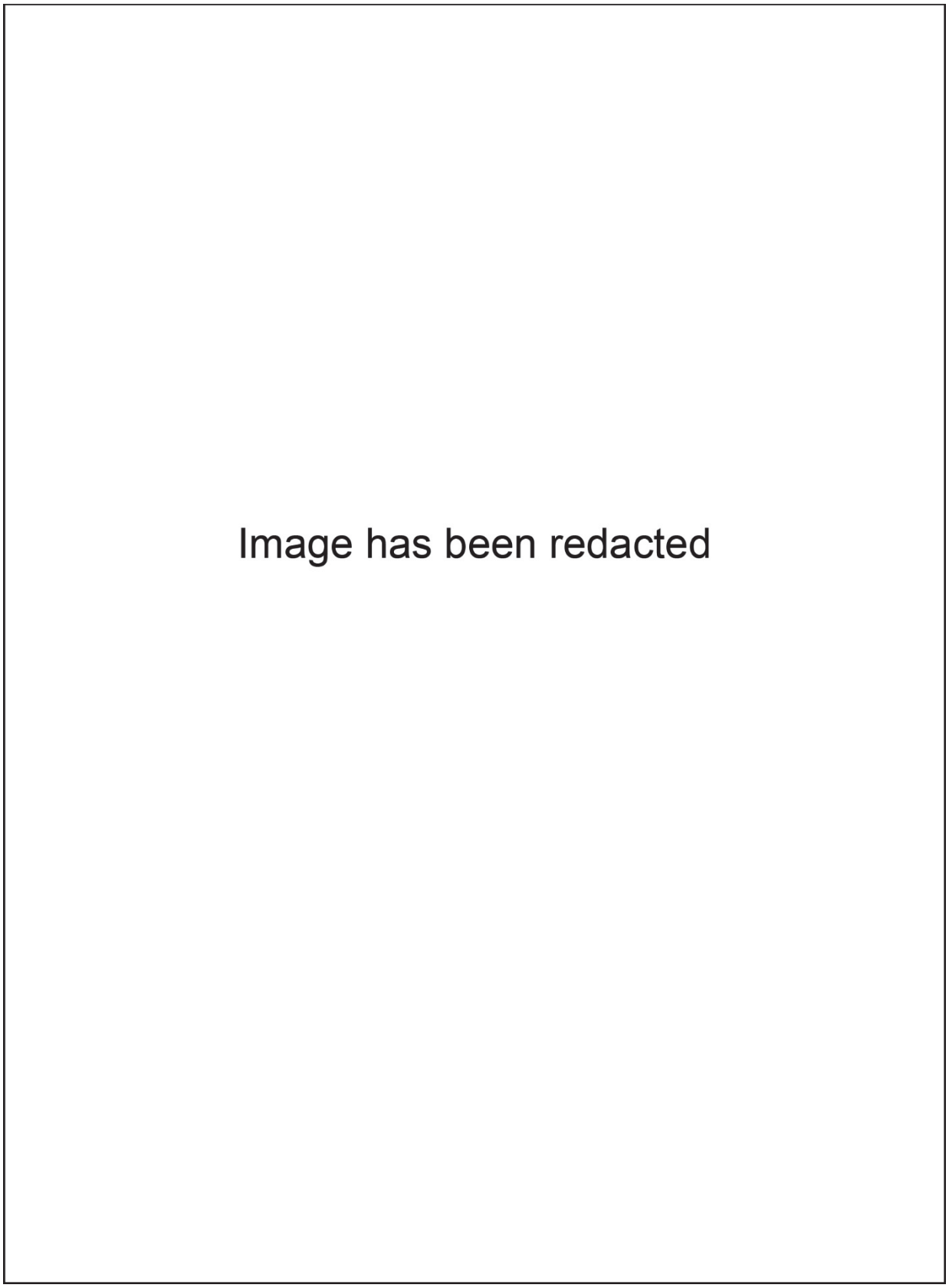

Figure 4.2-15. Typha Solar Project cultural and built environment resources, south portion.

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 another shovel probe [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.

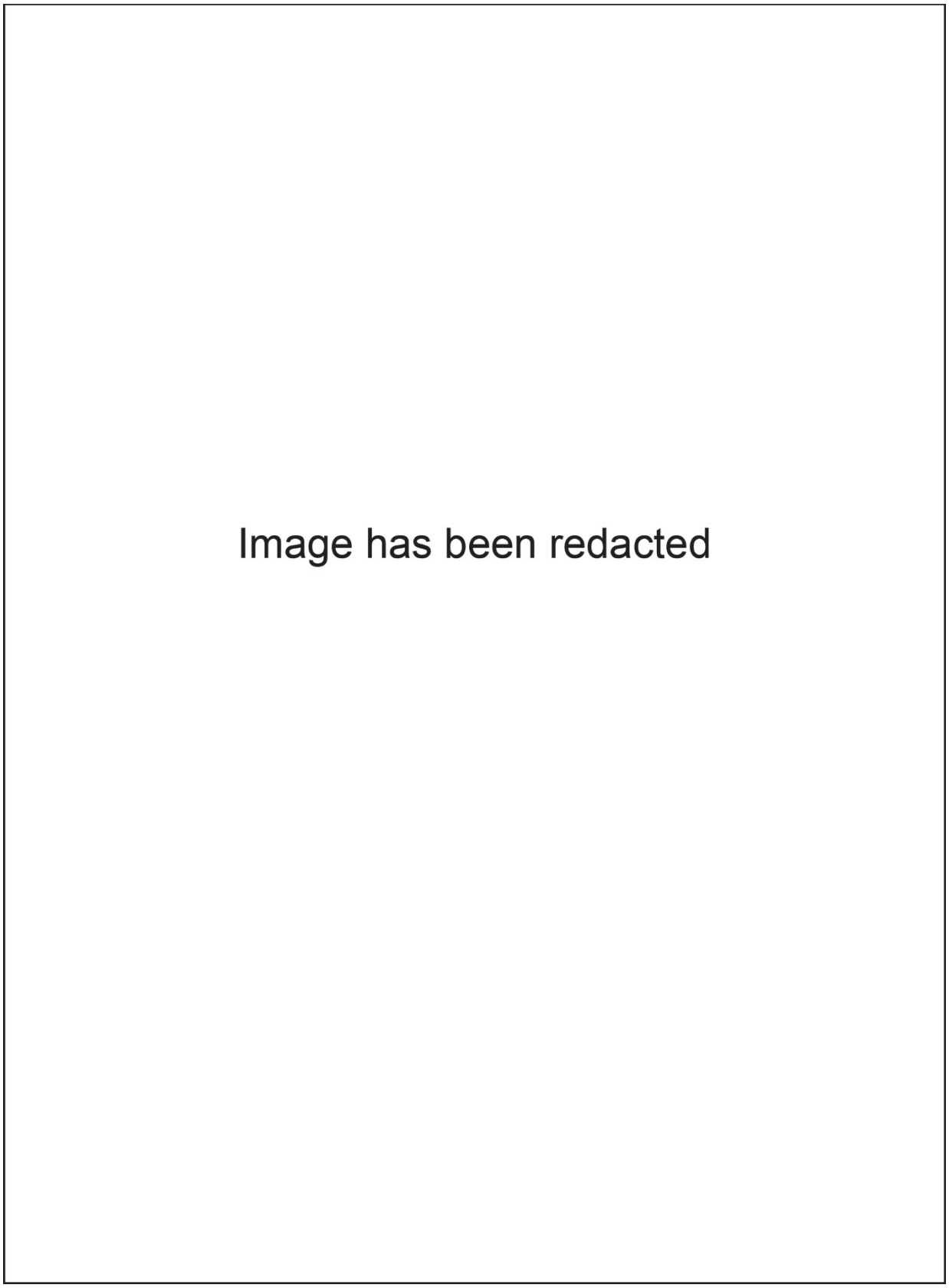

Figure 4.2-16. Urtica Solar Project cultural and built environment resources, east portion.

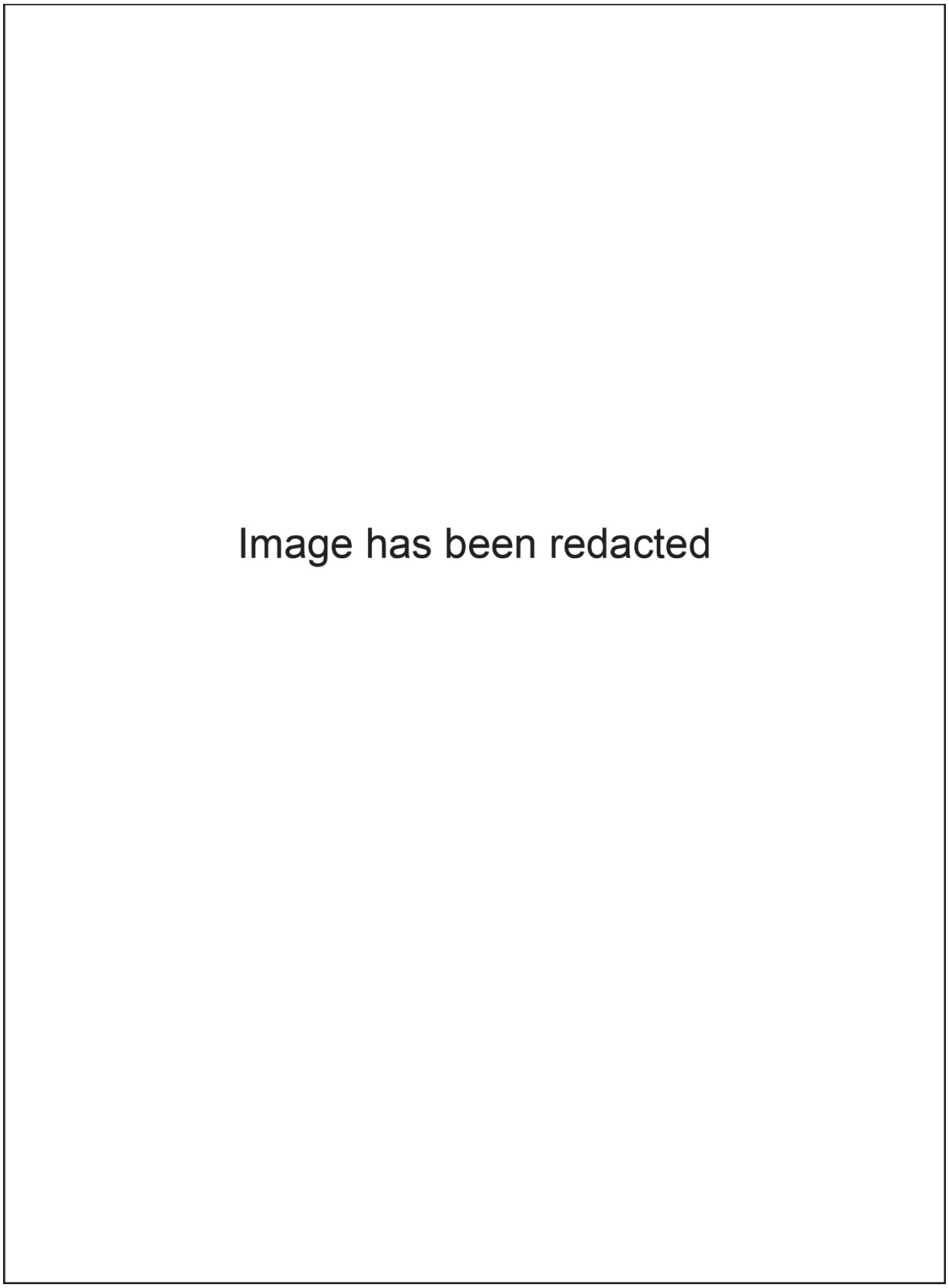

Figure 4.2-17. Urtica Solar Project cultural and built environment resources, west portion.

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 4.2-7. 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.

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
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

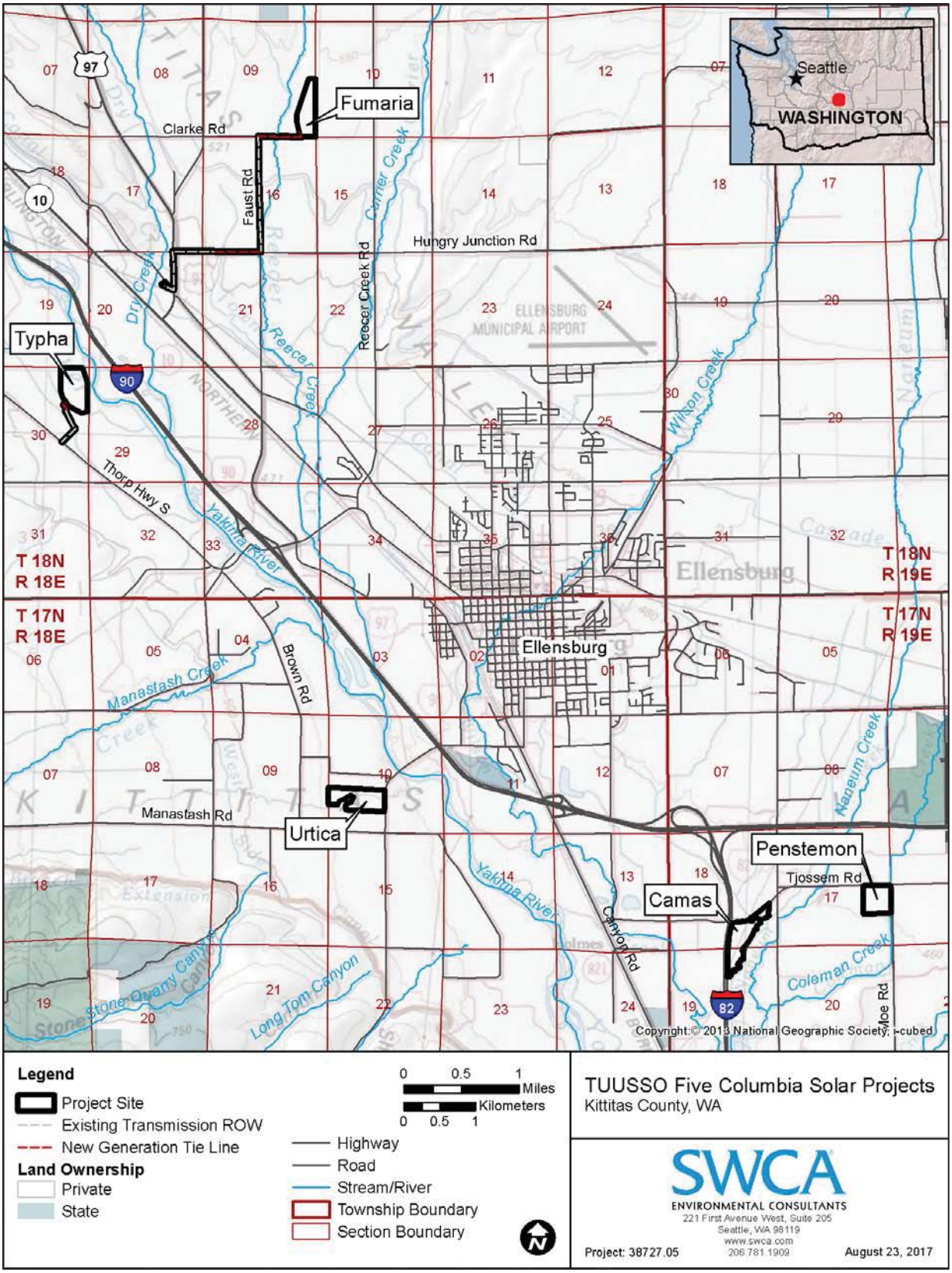

Figure 4.3-1. Columbia Solar Project locations, highways, and roads.

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).

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).

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).

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

Access Highway/Road	Sites Involved	Existing Average Daily Traffic (ADT)	Construction ADT	Percent Change in ADT
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
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.

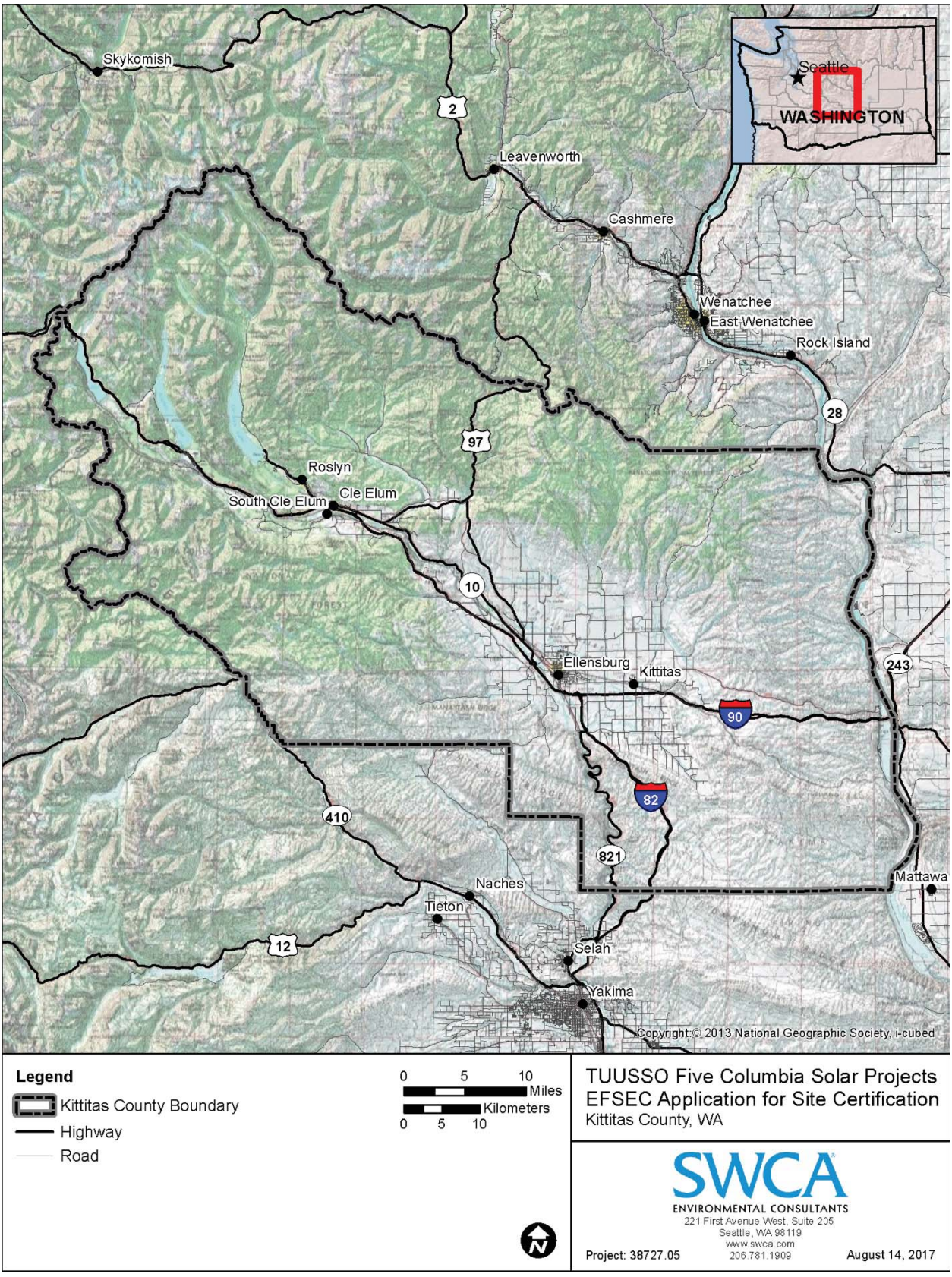

Figure 4.4-1. Kittitas County and cities overview map.

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) include (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. Fire District No. 2/Kittitas Valley Fire and Rescue has Basic Life Support (BLS) services. All rural county fire districts have mutual aid agreements with neighboring districts and with Kittitas Valley Fire and Rescue (EFSEC 2007).

4.4.7.2 Solar Project Sites

Fire District No. 2/Kittitas Valley Fire and Rescue and Fire District No. 1 provide fire protection and emergency services to the five proposed Columbia Solar Project sites. Please refer to Table 4.4-19 for additional information about these districts.

4.4.8 Impacts to Fire Protection and Safety Services

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. 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.

During construction, water would be used to suppress fugitive dust during grubbing, clearing, grading, trenching, and soil compaction. If a fire were to occur, that water could be diverted for firefighting purposes. For the Camas, Penstemon, Typha, and Urtica Solar Project sites the water sources are already available on-site. For the Fumaria Solar Project site, water would be trucked onto the site from the Ellensburg area.

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 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 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.

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 (EFSEC 2007).

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. 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 (EFSEC 2007).

The Ecology facilities in Yakima, approximately 35 miles south of Ellensburg, provide a HAZMAT response team.

4.4.9.2 Kittitas County Sheriff's Department

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 (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

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
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

Facility	Provider	Description	Size
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.

(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. Cellular phone service is available from a variety of providers. Inland Internet provides phone services in Cle Elum, Roslyn, and Ronald (EFSEC 2007).

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
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

Facility	Provider	Description	Size
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
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

Facility	Provider	Description	Size
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, and soil compaction. 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 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 (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. Each of the solar project sites, except for the Fumaria Solar Project site, has on-site existing water allocations that TUUSSO may be able to use during construction. 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 either on-site water or trucked in water from municipal water sources for all projects except the Fumaria Solar Project, and intends to truck in water for the Fumaria Solar Project from a municipal water source.

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 Projects, as well as the native vegetation throughout the 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 three 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 acre per year would be needed over this period to assure plant establishment on the 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 may 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 likely only pursue such a water source for 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 for all of the project sites for this purpose.

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 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 Project sites to irrigate the native ground cover (instead of the current flood irrigation methods used on the project sites). Any water services, whether on-site or off-site, utilized for the operation of the Columbia Solar Project sites would provide sufficient capacity to provide legally certificated water for the use and purpose of these project, without compromise to other users.

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 4.4-25. 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 (EFSEC 2007).

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).

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 4.4-26. 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 4.4-27. 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 or solid waste in Kittitas County or the Ellensburg area.

(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, with a limited number of specialists available, and 24-hour emergency care (Pless et al. 2015). Patients with head injuries, severe burns, or trauma are transported to other facilities, such as Harborview Medical Center in Seattle. 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. A heliport is located on the roof of the hospital, and a helicopter is available for emergency responses (EFSEC 2007).

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

Kittitas Valley Healthcare (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

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 4.4-28. 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

	General Fund	Special Revenue Funds	Debt Service Funds	Capital Project Funds	Proprietary Funds	Trust Funds	Totals
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 4.4-29. 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
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

Account/Department	2016 Adopted Budget ($)	Percent of General Fund Total
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 4.4-30. City of Ellensburg 2016 Annual Budget Summary

Revenues and Expenditures	Totals
Revenues:	
• Taxes	11,644,406
• Licenses and Permits	380,750
• 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 4.4-31. 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
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.

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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.