3.8 Public Health and Safety

This Programmatic Environmental Impact Statement (EIS) considers the adverse environmental impacts on public health and safety that would result from the types of facilities described in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations. This section addresses the following topics related to the new construction, operation and maintenance, upgrade, and modification of high-voltage electric transmission facilities (transmission facilities) in Washington:

- Section 3.8.1 identifies regulatory, siting, and design considerations.
- Section 3.8.2 describes the affected environment.
- Section 3.8.3 describes the adverse environmental impacts.
- Section 3.8.4 describes Mitigation Measures.
- Section 3.8.5 identifies probable significant adverse environmental impacts on public health and safety.

3.8.1 Regulatory, Siting, and Design Considerations

This Programmatic EIS establishes a broad framework for compliance, outlining general laws, regulations, best management practices (BMPs), and design considerations. It is assumed that project-specific applications would be developed within this pre-established regulatory context and comply with existing laws and regulations. Any projects not complying with applicable laws and regulations or failing to adhere to design considerations or BMPs would require additional project-specific environmental analysis and mitigation. The federal, state, and local laws and regulations that apply to public health and safety are summarized in **Table 3.8-1**.

Table 3.8-1: Laws and Regulations for Public Health and Safety

Applicable Legislation	Agency	Summary Information
42 USC § 7401 – Clean Air Act	U.S. Environmental Protection Agency	This federal law regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the EPA to establish National Ambient Air Quality Standards to protect public health and public welfare and to regulate emissions of hazardous air pollutants. This law outlines requirements for Risk Management Plans to improve chemical accident prevention at facilities.
42 USC § 9601 et seq. – Comprehensive Environmental Response, Compensation, and Liability Act	U.S. Environmental Protection Agency	This act provides a framework for identifying, assessing, and addressing environmental contamination; holding responsible parties accountable; and involving communities in the cleanup process. The EPA enforces requirements regarding the safe handling, treatment, storage, and disposal of hazardous waste through a compliance monitoring program.
Title III of SARA; 40 CFR §§ 302–313 – Emergency Planning and Community Right-to-Know Act	U.S. Environmental Protection Agency	This act aims to enhance community safety and environmental protection by promoting emergency planning, increasing transparency about chemical hazards, and improving public access to information regarding hazardous substances in their communities.
29 CFR – Labor	Occupational Safety and Health Administration	This law establishes workplace safety and health standards across various industries to protect workers from occupational hazards.
40 CFR §§ 239–282 – Resource Conservation and Recovery Act	U.S. Environmental Protection Agency	This act aims to manage the treatment, storage, and disposal of hazardous and non-hazardous waste to protect human health and the environment by promoting waste minimization, resource conservation, and proper waste management practices.
49 CFR – Transportation	U.S. Department of Transportation	This law addresses the requirements for the safe transportation of hazardous materials like lithium batteries and combustible liquids, as well as for packaging, labeling, and documentation.
RCW 70.105D, Model Toxics Control Act	Washington State Department of Ecology[(a)]	This act establishes regulations for the identification, investigation, cleanup, and management of contaminated sites to protect human health and the environment in Washington. Specific regulations outline requirements for site hazard assessments and implementation of clean-up plans (Ecology 2013).

Applicable Legislation	Agency	Summary Information
RCW 90.48, Water Pollution Control Act	Washington State Department of Ecology[a]	This chapter establishes the legal framework for protecting water quality in Washington. This policy aims to maintain the highest standard for Waters of the State to protect public health, public enjoyment, wildlife, birds, fish, and aquatic life, as well as support industrial development.
WAC 296-24, General Safety and Health Standards	Washington State Department of Labor and Industries[a]	This legislation outlines a variety of safety regulations across general industries, primarily focusing on occupational safety and health standards.
WAC 296-45, Electric Power Generation, Transmission, and Distribution	Washington State Department of Labor and Industries[a]	This legislation provides a framework for ensuring safety in electrical operations, including the management of overhead transmission facilities.
WAC 296-800, Safety and Health Core Rules	Washington State Department of Labor and Industries[a]	This legislation aims to improve workplace safety and health standards by updating regulations, enhancing enforcement mechanisms, and addressing emerging safety issues.
WAC 296-809, Safety Standards for Confined Spaces	Washington State Department of Labor and Industries[a]	This legislation provides safety requirements for entering and working in confined spaces to protect workers from associated hazards.
WAC 296-901, Globally Harmonized System for Hazard Communication	Washington State Department of Labor and Industries[a]	This legislation establishes general safety and health requirements for hazard communication that apply across various industries.
WAC 332-24, Forest Protection	Washington State Department of Natural Resources[a]	This legislation provides guidelines and requirements for protecting forest lands from fire and other threats.
WAC 480-100, Electric Companies	Washington Utilities and Transportation Commission[a]	This legislation establishes standards for the reliability and quality of electric service. This law requires that utilities meet certain performance criteria regarding the frequency and duration of outages.
Washington State Environmental Policy Act	▪ Washington State Agencies ▪ Local governments	This act is a process that identifies and analyzes environmental impacts that can be related to issuing permits. SEPA helps permit applicants and decision-makers understand how a proposed project will impact the environment. Certain projects, as defined in the SEPA Rules (WAC 197-11-704) and that are not exempt, are required to go through the SEPA process.

Table 3.8-1 Notes:

[a] The agency responsible for administering most permits or authorizations for the identified regulation. However, if EFSEC is determined to be the agency responsible for approving a proposal, EFSEC can administer several types of permits at the state and local levels. EFSEC provides a streamlined process for siting and licensing major energy facilities, including transmission facilities in Washington State. EFSEC coordinates all evaluation and licensing steps, specifies the conditions for new construction and operation, and issues a Site Certification Agreement, which assumes the responsibility for issuing individual state or local permits. By consolidating these permits into a single Site Certification Agreement, EFSEC can simplify the regulatory process for energy facility developers. While EFSEC itself does not directly administer federal permits, it works closely with federal agencies to ensure that all necessary federal requirements are met during the evaluation and licensing of energy facilities.

CFR = Code of Federal Regulations; **EFSEC** = Energy Facility Site Evaluation Council; **EPA** = U.S. Environmental Protection Agency; **RCW** = Revised Code of Washington; **SARA** = Superfund Amendments and Reauthorization Act; **SEPA** = State Environmental Policy Act; **USC** = United States Code; **WAC** = Washington Administrative Code

The siting of transmission facilities is determined by engineering, technical, environmental, and socioeconomic factors. **Table 3.8-2** summarizes guidance documents and management plans that outline the design considerations and BMPs generally used to avoid or minimize adverse environmental impacts on public health and safety.

Table 3.8-2: Siting and Design Considerations for Public Health and Safety

Siting and Design Consideration	Description
National Electrical Code	Also known as National Fire Protection Association 70, the NEC is a standard for the safe installation of electrical wiring and equipment in the United States. This code sets the minimum requirements for safe electrical installations to protect people and property from electrical hazards.
Institute of Electrical and Electronics Engineers Standards	The IEEE and internal committees publish various standards relevant to electrical transmission, including the NESC, a crucial set of standards for ensuring the safety of electrical and communication systems. Sections of the NESC cover the following: ▪ General requirements ▪ Rules for the safe design, construction, and maintenance of electrical substations ▪ Guidelines for the installation and maintenance of overhead electric supply and communication lines ▪ Safety standards for underground electric supply ▪ Safety-related work practices for the operation and maintenance of electric supply

Siting and Design Consideration	Description
National Institute for Occupational Safety and Health Standards	NIOSH provides guidelines and recommendations for controlling and reducing workplace hazards, as well as best practices for various industries to improve occupational health and safety standards.
Federal Energy Regulatory Commission Guidelines	FERC revises and approves guidelines for the siting and permitting of interstate electric transmission facilities, including environmental impact assessments and public engagement processes.
North American Electric Reliability Corporation Standards	NERC develops reliability standards for the electric grid to ensure reliability and security of the North American bulk power system. NERC works with federal organizations like FERC for the review, approval, and enforcement of standards.
American Society of Civil Engineers Guidelines	ASCE provides guidelines for the structural loading and design of transmission facilities to ensure they can withstand environmental and operational stresses.
American Concrete Institute Standards	ACI develops and publishes standards and guidelines for the design, construction, and maintenance of concrete structures.
International Code Council Codes and Standards	The ICC develops and publishes model codes and standards used in the construction and building industry. ICC codes are designed to ensure the safety and resilience of infrastructure and are often incorporated into jurisdictions like states, counties, or cities.
U.S. Department of Energy Reviews	The DOE coordinates federal authorizations and environmental reviews for interstate transmission projects, aiming to streamline the permitting process while ensuring compliance with environmental and cultural protection laws.
International Commission on Non-Ionizing Radiation Protection Guidelines and Standards	The ICNIRP publishes guidelines and standards related to non-ionizing radiation, including EMF.
Federal Aviation Administration Regulations	The FAA publishes a range of regulations related to aviation safety, operations, and standards.
Stormwater Best Management Practice: Hazardous Material Storage (EPA 2021)	This resource provides BMPs for the storage of hazardous materials and includes regulatory requirements, general considerations, and limitations.

Siting and Design Consideration	Description
Recommended Siting Practices for Electric Transmission Developers (Americans for a Clean Energy Grid 2023)	This document outlines best practices for siting electric transmission facilities. Recommended practices include: ▪ Early and transparent engagement ▪ Respect and fair dealing ▪ Environmental considerations ▪ Interagency coordination ▪ Use of existing infrastructure

ACI = American Concrete Institute; **ASCE** = American Society of Civil Engineers Guidelines; **BMP** = best management practice; **DOE** = U.S. Department of Energy; **EMF** = electromagnetic fields; **FAA** = Federal Aviation Administration; **FERC** = Federal Energy Regulatory Commission; **ICC** = International Code Council; **ICNIRP** = International Commission on Non-Ionizing Radiation Protection; **IEEE** = Institute of Electrical and Electronics Engineers; **NEC** = National Electrical Code; **NERC** = North American Electric Reliability Corporation; **NESC** = National Electrical Safety Code; **NIOSH** = National Institutes of Science and Health

3.8.2 Affected Environment

This section describes public health and safety within the Study Area (see Chapter 1, Introduction). The analysis of the affected environment incorporates the following:

- Occupational Safety
- Hazardous Materials
- Wildfire
- Electromagnetic Fields
- Heat Generation

Other public health and safety concerns related to air quality are analyzed in Section 3.3, Air Quality; traffic hazards are analyzed in Section 3.10, Transportation; service disruptions are analyzed in Section 3.11, Public Services and Utilities; and noise and vibration are analyzed in Section 3.13, Noise and Vibration.

3.8.2.1 Occupational Safety

According to the U.S. Bureau of Labor Statistics (2023), the leading causes of worker injury-related fatalities in 2022 were transportation incidents (37 percent of total fatalities), followed by construction and natural resource extraction incidents (19 percent). From 2011 to 2022, electrical fatalities accounted for 6 percent of all workplace fatalities, of which the leading causes were working on or near live wires (48 percent) or contact with overhead transmission lines (41 percent) (Electrical Safety Foundation International 2023). According to the latest available data, in Washington, the industry sector with the highest number of work fatalities in 2019 was construction, followed by transportation and warehousing, then agriculture, forestry, fishing, and hunting (Washington State Department of Labor & Industries 2019). Motor vehicle incidents were the most common cause of death across all industries, accounting for 37 percent of all workplace fatalities; followed by homicide (19 percent); being struck by objects (13 percent); and falls (11 percent) (Washington State Department of Labor & Industries 2019).

Worker safety in construction and industrial settings is federally regulated by the Occupational Safety and Health Administration (OSHA), and compliance with OSHA standards (e.g., 29 Code of Federal Regulations [CFR] 1910 and 29 CFR 1926) is required in the United States. The State of Washington enforces its own workplace safety programs, which incorporate OSHA regulations and include other requirements as outlined in Washington Administrative Code (WAC) 296-800, WAC 296-45, and WAC 296-24. The new construction, operation and maintenance, upgrade, and modification stages of electrical transmission operations in Washington are required to comply with OSHA and state standards to protect workers from potential construction and industrial accidents, as well as to minimize exposure to workplace hazards (e.g., noise and chemicals).

3.8.2.2 Hazardous Materials

Hazardous materials include a variety of substances that represent a threat to human and environmental health when not managed properly. Hazardous materials include those listed under OSHA Hazard Communication Standards (29 CFR 1910.1200), as well as substances defined under U.S. Department of Transportation regulations at 49 CFR, Parts 170–177. The Resource Conservation and Recovery Act—specifically, 40 CFR 262—details the identification and management of hazardous waste. Several hazardous substances are utilized throughout the new construction, operation and maintenance, upgrade, and modification of overhead and underground electrical transmission facilities. High-voltage power switches, inverters, converters, controller devices, and other power electronics contain lead, brominated fire retardants, and cadmium in their printed circuit boards (EPA 2019). Further, diesel fuel delivery and storage are required for backup or emergency power generation. Substations also require periodic cleaning, yielding hazardous waste. The San Diego Gas and Electric Company (2008) identified the following materials containing hazardous substances that are common to electrical transmission construction and operation:

- 1,1,1 trichloroethene
- ABC fire extinguisher
- Acetylene gas
- Air tool oil

- Ammonium hydroxide
- Antifreeze (ethylene glycol)
- Automatic transmission fluid
- Battery acid (in vehicles and in the meter house of the substations)
- Bottled oxygen
- Brake fluid
- Canned spray paint
- Chain lubricant (contains methylene chloride)
- Connector grease (penotox)
- Contact Cleaner 2000
- Diesel deicer
- Diesel fuel
- Diesel fuel additive
- Eyeglass cleaner (contains methylene chloride)
- Gasoline
- Gasoline treatment
- Hot stick cleaner (cloth treated with polydimethylsiloxane)
- Hydraulic fluid
- Insulating oil (inhibited, non-PCB)
- Insect killer
- Lubricating grease
- Mastic coating
- Methyl alcohol
- Motor oils
- Paint thinner
- Pesticide
- Propane
- Puncture seal tire inflator
- Safety fuses
- Starter fluid
- Sulfur hexafluoride (within circuit breakers in the substations)
- Two-cycle oil (contains distillates and hydrotreated heavy paraffinic)
- WD-40 (penetrating oil)
- Zep safety solvent

Washington has contaminated sites that have required hazardous materials cleanup by the Washington State Department of Ecology's Toxic Cleanup Program. More than 6,000 currently contaminated sites are listed in Washington's contaminated site register as either undergoing or awaiting cleanup (Ecology 2024). Contaminated sites can result from active and inactive industrial land uses such as mineral extraction, processing or manufacturing, and landfill operations, or from commercial activities like fuel storage and vehicle maintenance. Cleanup sites may harbor hazardous materials that are no longer permitted, such as polychlorinated biphenyls (PCBs). PCBs are manufactured chemicals that were commonly used as coolants and lubricants in transformers, capacitors, and other electrical equipment before their manufacture was banned in 1979 (EPA 2016). PCBs are carcinogenic to humans and animals and have been shown to cause toxic effects on their immune system, nervous system, reproductive system, and endocrine system. Further, they do not readily break down in the environment, and if PCB-contaminated sites are encountered, they can still pose health and safety risks to exposed workers. PCBs can travel long distances in the air or water and can accumulate in soil and marine animals.

3.8.2.3 Wildfire

In 2023, more than 55,000 wildfires burned over 2,600,000 acres across the United States (NOAA National Centers for Environmental Information 2024). In the same year, Washington experienced the second highest number of ignitions in its recorded history, with more than 1,800 wildfires burning approximately 165,000 acres (DNR 2023). More than 2.2 million homes are exposed to wildfire risk in Washington, and the threat is increasing as fire seasons are prolonged due to hotter, drier summers and a decline in forest health (DNR 2019). The Washington State Department of Natural Resources has recognized the wildfire crisis as a top priority, prompting the creation of the Washington State Wildland Fire Protection 10-Year Strategic Plan (DNR 2019). The plan outlines goals for community resilience, fire prevention, and public safety to address the escalating risks of wildfires.

Wildfire behavior is dependent on several biophysical and anthropogenic factors, including the following:

- **Fuels:** This factor refers to combustible materials such as vegetation, debris, and organic matter that can ignite and sustain a fire. Certain variables like vegetation composition, cover, and moisture content can increase flammability and fuel availability.
- **Climate:** This factor refers to different climatic variables that can cumulatively increase risks of wildfires, such as high temperatures, low humidity, and high wind velocity.
- **Topography:** This factor refers to the slope and aspect of the landscape that can influence what areas are more prone to fire ignition based on orientation, and how quickly a fire might spread.

- **Ignition sources:** This factor refers to environmental wildfire ignition sources, such as lightning, as well as anthropogenic sources, including human activities like smoking, and construction activities like heat and sparks from vehicles, equipment, and welding.

New construction activities for both overhead and underground transmission facilities can be ignition sources for wildfires. Overhead transmission facilities can also be a source of ignition during operation and can be an obstacle to fighting wildfires. Electrical faults, like overloaded or short-circuited lines, can generate excess heat and ignite nearby combustible materials like encroaching vegetation. Equipment failure, like transformer failure, can increase fire risks. Due to their height, overhead lines are vulnerable to lightning strikes and collisions with air traffic, both of which can cause damage to structures and result in fire. Overhead transmission facilities are also susceptible to damage from extreme weather events. High winds can cause breakage, swaying, and line sag, which may cause phase-to-phase or phase-to-ground electrical arcing[1] if wires encounter adjacent lines or vegetation. Arcing can generate intense heat and sparks and ignite fires when in contact with flammable materials. Similar effects can result from extreme heat and ice or snow accumulation. Falling branches and contact with wildlife can cause short circuits and downed lines, acting as sources of ignition. As underground transmission facilities are protected from external environmental stressors, they are generally not regarded as a common ignition source for wildfires during operation.

3.8.2.4 Electromagnetic Fields

Electromagnetic fields (EMF) are present wherever electricity is used, such as in household appliances, cell phones, wristwatches, lamps, computers, and transmission facilities. Electric fields are produced by voltage and are present even when a transmission facility is not carrying currents. Electric fields occur naturally, radiating from the earth's core to the atmosphere, and can be easily shielded by walls and objects. Magnetic fields are produced by current and naturally occur through current production in the Earth's core. The strength of EMFs is proportional to current and voltage, and both electric and magnetic fields diminish with distance.

EMFs are typically grouped into two categories based on their frequency: ionizing and non-ionizing. Mid- to high-frequency EMFs (10^{16} hertz [Hz] and above), including those

[1] A visible discharge of electricity created by an electric current that jumps across a gap between two conductive points. The arc generates heat, which can cause burns or ignite flammable materials. Sparks may fly from the point of discharge.

from x-rays and gamma rays, are associated with ionizing radiation, which has been shown to cause cellular damage in humans with prolonged exposure (NIEHS 2024). Low- to mid-frequency EMFs (10^{15} Hz and below) like microwaves and radio frequencies, and extremely low frequency (ELF) EMFs, like those associated with electrical transmission facilities, are considered non-ionizing radiation (NIEHS 2024). Non-ionizing radiation is generally regarded as posing little to no risk to human health (Healthline n.d.). High-voltage direct current transmission facilities produce static EMFs that are unidirectional and comparable to the Earth's magnetic field. These static fields do not induce currents or voltages and have not raised as many health concerns as their high-voltage alternating current counterparts (NIEHS 2024).

Most studies of health impacts from transmission facilities focus on high-voltage alternating current systems, which produce alternating currents at ELFs of 60 Hz. While many regulatory agencies regard low-frequency EMFs as generally harmless to human health (NIEHS 2024), conflicting research over the years has contributed to ongoing debate. A study by Wertheimer and Leeper (1979) that linked EMFs to cancer in children sparked a 40-year-long research initiative to investigate the effects of EMF on public health. Numerous scientific review panels have been conducted by various agencies, including the National Institute for Environmental Health Sciences (NIEHS 1999) and the International Commission on Non-Ionizing Radiation Protection (ICNIRP) (ICNIRP 2010). The overarching consensus of the scientific panel reviews is that neither electric nor magnetic fields is conclusively likely to cause adverse health effects at the long-term, low-exposure levels associated with electrical transmission. The only established link between electric or magnetic fields and negative biological or health effects occurs when the body experiences a shock-like effect due to electric currents at extremely high exposure levels. International organizations like ICNIRP, as well as U.S. nongovernmental groups like the Institute of Electrical and Electronics Engineers Standards, provide recommendations and guidelines for exposure limits to protect against acute adverse effects from short-term exposure (ICNIRP 2010; IEEE 2019). Different frequencies of EMFs have been recorded as impairing the functioning of implanted cardiac pacemakers. Reported sources include cell phones, power tools, refrigerator magnets, and escalators, among others. Studies have shown that electric fields from transmission facilities could affect some models of pacemakers with monopolar implants that are sensitive to the electric power frequency of 60 Hz. Although buildings, vegetation, and other objects can effectively shield electric fields, pacemaker manufacturers have implemented many design features that are highly effective at minimizing the risks of exogenous[2] electrical sources, including electric fields.

While there are no federal regulations for public exposure to low-frequency EMFs in the United States, ICNIRP's internationally recognized guidelines provide a science-based framework for evaluating exposure risks. To protect against acute adverse effects from short-term exposure, ICNIRP and other organizations have developed exposure guidelines. For the general public, ICNIRP recommends the following basic restrictions (ICNIRP 2020):

- **Whole-body average specific absorption rate (SAR)**: 0.08 watts per kilogram (W/kg) (averaged over 30 minutes)
- **Localized SAR (head/torso)**: 2 W/kg (averaged over 6 minutes)
- **Localized SAR (limbs)**: 4 W/kg (averaged over 6 minutes)
- **Absorbed power density (frequencies >6 GHz)**: 20 watts per square meter (averaged over 6 minutes and 4 cm^2 surface area)

These limits are designed to prevent adverse thermal effects and are based on conservative assumptions to protect all population groups, including children and pregnant individuals.

3.8.2.5 Heat Generation

Underground transmission facilities generate heat due to the electrical resistance of the conductors. Unlike overhead transmission facilities, which dissipate heat into the air, underground cables are surrounded by soil and insulation materials that retain heat. This makes heat management of underground transmission facilities more challenging. Various cooling methods are employed to manage the heat generated by underground cables, including water cooling or forced air ventilation (Electrical Engineering Portal 2017). Advanced modeling techniques are used to assess the thermal behavior of underground cables. These models consider geological and meteorological conditions to optimize cable performance and prevent overheating (Electrical Engineering Portal 2017).

[2] Originating from outside an organism, system, or process.

3.8.3 Impacts

For this Programmatic EIS, adverse environmental impacts were assessed for the new construction, operation and maintenance, upgrade, and modification of transmission facilities within the Study Area.

3.8.3.1 Method of Analysis

The study area for a project-specific application would typically encompass several key regions and features, such as the following:

- **Project Site and Immediate Vicinity:** This includes the specific location of the project and the surrounding area that might be directly affected by new construction, operation and maintenance, upgrade, and modification activities.
- **Sensitive Receptors:** This includes residential neighborhoods, schools, daycare centers, hospitals and healthcare facilities, and senior living communities.
- **Emergency Services and Infrastructure:** This includes fire stations, police departments, and EMS facilities, evacuation routes or emergency access roads, and utility corridors (e.g., water, gas, etc.)
- **Hazardous Materials and Contaminated Sites:** This includes known Superfund or brownfield sites, areas with historical industrial activity, and locations with underground storage tanks or waste disposal areas.
- **Recreational and Public Use Areas:** This includes parks, trails, campgrounds, public gathering spaces, and cultural or historic sites with public access.
- **Natural Hazard Zones:** This includes floodplains, wildfire risk areas, landslide-prone zones, and seismic hazard zones.

This Programmatic EIS analyzes the affected environment and adverse environmental impacts on public health and safety within the Study Area as defined in Chapter 1, Introduction. Four project stages for each transmission facility type (overhead or underground) were considered: new construction, operation and maintenance, upgrade, and modification.

This evaluation considers both overhead and underground transmission facilities for each stage. Overhead transmission facilities consist of transmission lines, substations, and ancillary infrastructure. Overhead and underground transmission facilities may involve similar aboveground infrastructure. Underground transmission facilities consist of underground transmission lines, underground access vaults, and other infrastructure located below the ground surface. The new construction of underground transmission facilities could include both open trench and trenchless construction methods.

Impact Determination

The discussion of adverse environmental impacts is qualitative given the high-level nature of a Programmatic EIS; quantification would require project-specific details to analyze. **Table 3.8-3** describes the criteria used to evaluate adverse environmental impacts from the Action Alternative and No Action Alternative. Information reviewed to identify adverse environmental impacts on public health and safety in the Study Area was obtained from federal agencies, state agencies, local planning documents, and public scoping.

Table 3.8-3: Criteria for Assessing the Impact Determination on Public Health and Safety

Impact Determination	Description
Nil	No foreseeable adverse environmental impacts are expected. A project would not adversely affect public health or safety.
Negligible	A project would have minimal adverse environmental impacts on public health and safety. Changes would either be non-detectable or, if detected, would have only slight effects. A project would have short-term increases in the risk of worker accidents or injuries, exposure to hazardous materials and EMF, wildfire, and heat generation. This slight increase in risk would not have a noticeable effect on public health and safety. Negligible impacts would be short-term in duration. BMPs and design considerations are expected to be effective.
Low	A project would result in noticeable adverse environmental impacts on public health and safety, even with the implementation of BMPs and design considerations. These adverse environmental impacts may include worker accidents and injuries, but these incidents would be minor and easily treatable. There may be limited exposure to hazardous materials, but spills would be limited and controlled. EMF levels would be elevated slightly above the recommended limit, but these increases would be limited and controlled. The risk of fire would be low and would be easily extinguishable with minimal damage to project property and occupational safety. Adverse impacts on public health and safety would be localized. Adverse environmental impacts may be short or long-term in duration.
Medium	A project would result in adverse environmental impacts on public health and safety, even with the implementation of BMPs and design considerations. A project would result in workplace accidents and injuries that would be more severe or occur more frequently. A project would result in increased exposure to hazardous materials or elevated EMF levels in some areas, compromising occupational and public health. Small, confined fires may spread from the

Impact Determination	Description
	project area, increasing the risk of damage to adjacent land. Medium impacts may be short or long-term in duration.
High	A project would result in adverse and potentially severe environmental impacts on public health and safety, even after the implementation of BMPs and design considerations. A project would cause extreme occupational safety hazards, including severe or fatal accidents, elevated EMF levels that exceed recommended safety thresholds, and substantial exposure to hazardous materials through major spill events. The risk of wildfire would be high, potentially leading to excessive damage and decreased air quality, with widespread impacts on the surrounding community. High impacts may be short or long-term.

BMP = best management practice; **EMF** = electromagnetic field

To clearly understand the potential severity of adverse environmental impacts without any interventions, the following impact determinations exclude the use of Avoidance Criteria and Mitigation Measures. The ratings assume compliance with all federal, state, and local laws and regulations, as well as standardized BMPs and design considerations. Assessing adverse environmental impacts without Avoidance Criteria or Mitigation Measures offers a baseline understanding of potential environmental effects, helping to identify the true extent of these impacts. Environmental laws often require that initial impact assessments be conducted without considering mitigation to maintain the integrity of the environmental review process.

When impact determinations are identified as medium or high, then either the applicant would adopt applicable Mitigation Measures from this Programmatic EIS, or the State Environmental Policy Act (SEPA) Lead Agency may require applicable mitigation measures to be implemented to reduce project-specific adverse environmental impacts. When impact determinations are low, applicable Mitigation Measures should still be considered by the applicant and the SEPA Lead Agency, as these measures would help to further reduce adverse environmental impacts, including the project's contribution to cumulative impacts. These Mitigation Measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

3.8.3.2 Action Alternative

New Construction

Overhead Transmission Facilities

Activities for new construction of overhead transmission facilities would vary and depend on the scale of the facility and site characteristics. New construction could include a relatively short site preparation period (e.g., a few months), followed by a longer construction and start-up period. It is assumed that the new construction of overhead transmission, per mile, would have a shorter duration than underground construction. Overhead transmission facilities could have the following adverse environmental impacts on public health and safety during new construction:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

Increase in Accidents and Injuries

During new construction, risks to workers include injury from motor vehicles and equipment handling; extreme weather exposure; risks associated with working at extreme heights, including falls; electricity-related risks such as electric shock; and chemical hazards such as exposure to hazardous substances. Hot-work activities,[3] such as cutting and welding, can cause fire-related injuries, including burns; expose workers to toxic fumes; and lead to ocular exposure to ultraviolet and infrared radiation. General construction activities, such as working on uneven surfaces, lifting heavy materials, and exposure to occupational noise, can also lead to worker injury. Soil disturbance associated with construction activities can expose workers to fugitive dust. Airborne dust particles can cause respiratory issues and eye and skin irritation, and potentially expose workers to harmful chemicals and biological hazards. If construction activities take place in south-central Washington, workers may be exposed to Valley Fever (Coccidioidomycosis), a disease caused by a fungus found in dust and soil.

[3] Work that generates heat, sparks, or open flames, which can pose safety risks.

When constructing overhead transmission facilities, strict safety regulations, protocols, and personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Adverse environmental impacts on public health and safety resulting from an increase in accidents and injuries during the new construction of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to high.

Exposure to Hazardous Materials

The risks associated with hazardous materials during construction typically result from the accidental release of hazardous materials due to improper handling or storage. The health and safety adverse environmental impacts of a release depend on the material, amount, and location of release. Oil and diesel fuel are common materials used in the new construction of transmission facilities, and there is a potential for their release, which can vary significantly. This range includes small spills occurring during the transfer or refueling process to larger releases that may result from vehicle accidents involving refueling trucks. Greater impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land. In these locations, contamination could compromise drinking water supplies and affect food safety, thereby affecting human health and the environment.

Encountering pre-existing contaminated air, soil, or groundwater (e.g., from hydrocarbon contamination) during construction could pose risks to public health and safety, as exposure to chemicals can lead to toxic reactions or carcinogenic effects on human health. Airborne contaminants, as outlined in WAC 296-841, could be encountered during construction and pose a serious risk to occupational and public health and safety, depending on the type of contaminant, level of exposure, and an individual's pre-existing health conditions.

When constructing new overhead transmission facilities, strict regulations mandate the safe handling and disposal of hazardous materials and outline protocols for the identification and management of contaminated sites, as required by federal agencies, such as the U.S. Environmental Protection Agency (EPA).

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to hazardous materials during the new construction of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from nil to low.

Increased Risk of Wildfire

Wildfire can result from many construction activities, including hot work, the operation of combustion engines, driving motor vehicles over vegetated areas, clearing vegetation, smoking by workers, and other practices that could inadvertently ignite vegetation. The risk of wildfire poses public health and safety concerns for various reasons. Near residential areas, fires caused by the new construction of overhead transmission facilities can lead to property damage, loss of homes, and direct harm to individuals. Additionally, smoke from these fires can have adverse effects on respiratory health, especially for those with pre-existing conditions.

Industry standards like the National Electrical Code, established by the National Fire Protection Association, maintain safety practices for the installation of electrical equipment in the United States.

Impact Determination: Adverse environmental impacts on public health and safety resulting from the increased risk of wildfire during the new construction of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from low to medium.

Underground Transmission Facilities

Activities for the new construction of underground transmission facilities would vary and depend on the scale of the facility and site characteristics. New construction could include a site preparation period of relatively short duration (e.g., a few months), followed by a longer construction and start-up period. It is assumed that the new construction of overhead transmission, per mile, would have a shorter duration than underground construction. Underground transmission facilities could have the following adverse environmental impacts on public health and safety during new construction:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire

Increase in Accidents and Injuries

During the construction of new underground transmission facilities, workers face various risks, including injuries from equipment handling and exposure to extreme weather conditions. There are also fire and electrical risks, such as electrical shock, burns, and hot-work-related injuries. Biological hazards include harmful interactions with plants and animals, while chemical hazards could result from exposure to hazardous substances.

The new construction of underground transmission also introduces additional risks to workers from trenching and excavation activities, machinery risks from moving parts associated with drilling, and risks associated with pressurized systems and working in confined spaces. New underground transmission construction commonly requires continuous trenching, which can cause worker injury or fatality from cave-ins, falling debris, and exposure to fumes or vapor that can collect in confined spaces. Further, the soil disturbance associated with trenching can expose workers to fugitive dust, which can cause respiratory, ocular, and skin issues and, in some parts of Washington, can cause Valley Fever.

If construction occurs in areas with pre-existing buried utilities, trenching, and directional drilling activities can cause accidental utility strikes. Such incidents can result in serious injury to workers and bystanders, create hazardous conditions like fires or flooding, and disrupt utility services (see Section 3.11, Public Services and Utilities).

As discussed in Section 3.4, Water Resources, there is the potential for underground transmission facilities to become inundated with water during storm events, particularly if they are within floodplains or coastal flood zones. Underground transmission facilities located in these areas could pose public health and safety hazards. In the event of a flood occurring during construction, vaults can become inundated with water, creating electrical safety hazards for maintenance workers, including electrocution, drowning, and confined space hazards.

When constructing underground transmission facilities, strict safety regulations, protocols, and personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Adverse environmental impacts on public health and safety resulting from increases in accidents and injuries during the new construction of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from low to high.

Exposure to Hazardous Materials

The risks associated with hazardous materials and waste during underground construction typically result from accidental release of hazardous materials due to improper handling or storage. Oil and gas are typically used during construction to fuel equipment and vehicles, and a potential release could range from small fuel spills during transfer or refueling to large releases as a result of a vehicle accident involving a refueling truck. Greater adverse environmental impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land, where contamination could compromise drinking water supplies and affect food safety.

During construction, encountering contaminated soil, air, or groundwater (e.g., from hydrocarbon contamination) could pose risks to public health and safety, as exposure to chemicals can lead to toxic reactions or carcinogenic effects on human health. Excavation activities associated with trenching can result in large soil piles and increase dust exposure for up to six times longer than for overhead construction (Xcel Energy 2021). This soil disturbance can increase health and safety risks associated with contaminated soil. While horizontal directional drilling (HDD) can reduce soil disturbance, if contaminated soil is uplifted during construction near water, water quality can be impacted, making it unsafe for swimmers and other recreational users.

When constructing transmission facilities, strict regulations mandate the safe handling and disposal of hazardous materials and necessitate protocols for the identification and management of contaminated sites, as required by federal agencies like the EPA.

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to hazardous materials during the new construction of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to medium.

Increased Risk of Wildfire

Wildfire can result from nearly all new construction activities due to blasting, operation of combustion engines, workers smoking, hot-work activity, and other practices that could inadvertently ignite vegetation. Environmental conditions like high temperatures and low humidity can also increase the risk of ignition from new construction activities, as surrounding vegetation can become more flammable (NPS n.d.). Wildfire poses a direct threat to construction workers and, if not contained, can impact public health and safety through decreased air quality and damage to communities and infrastructure.

Industry standards like the National Electrical Code, set by the National Fire Protection Association, maintain safety practices for the installation of electrical equipment in the United States.

Impact Determination: Adverse environmental impacts on public health and safety resulting from the increased risk of wildfire during the new construction of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from low to medium.

Operation and Maintenance

Overhead Transmission Facilities

Activities for the operation and maintenance stage of overhead transmission facilities would vary based on the type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and rights-of-way (ROWs). Overhead transmission facilities could have the following adverse environmental impacts during the operation and maintenance stage:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF

Increase in Accidents and Injuries

Adverse environmental impacts on occupational safety may occur during routine maintenance or repairs. Depending on the repairs necessary, occupational hazards could be similar to those involved in new construction and include motor vehicle and equipment handling, extreme weather exposure, risks associated with working at heights, electricity-related risks such as electric shock, biological and chemical hazards, and hot-work and general construction-related injuries. Because maintenance typically requires fewer workers than new construction, the occupational risks of the operation and maintenance stage are considered lower.

During the operational stage of transmission facilities, strict safety regulations, protocols, and personnel training are required by industry and regulatory agencies, including OSHA.

Impact Determination: Adverse environmental impacts on public health and safety resulting from an increase in accidents and injuries during the operation and maintenance of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to high.

Exposure to Hazardous Materials

Risks associated with hazardous materials during operation and maintenance typically involve the use of oils and gases. While these risks are similar to those described for new construction, they are generally lower during operation and maintenance activities because these activities require less handling of hazardous materials and waste.

If a spill or leak occurs during operation and maintenance, the health and safety impacts would depend on the material, amount, and location of release. Common materials involved in maintenance activities include oil and diesel fuel. Potential releases could range from small oil spills during transfer or refueling to large releases resulting from a vehicle accident involving a refueling truck. Greater impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land, where contamination could compromise drinking water supplies and affect food safety.

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to hazardous materials during the operation and maintenance of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to low.

Increased Risk of Wildfire

Wildfire poses a threat to public health and safety by leading to power outages, degrading air quality, and directly impacting infrastructure and community safety. During operation and maintenance, overhead transmission facilities can be sources of ignition for wildfires and obstruct fire suppression efforts. Ignition points related to maintenance and repair activities such as hot work, vehicle ignition, blading, and overland travel would be similar to those described for new construction.

The operation of overhead transmission facilities can ignite wildfires due to several factors, including contact with vegetation or wildlife, damage from extreme weather like wind and lightning, and general system malfunctions. Environmental conditions can also increase the risk of wildfires. High temperatures and low humidity can dry out vegetation, making it more susceptible to ignition, and strong winds can cause the transmission lines to sway, increasing the likelihood of contacting nearby vegetation.

Additionally, overhead transmission infrastructure can hinder emergency response teams and also become another feature that requires fire suppression efforts. An energized line could be a risk to firefighters on the ground and limit the area in which airplanes could assist in fire suppression (see Section 3.11, Public Services and Utilities).

Impact Determination: Adverse environmental impacts on public health and safety resulting from increased risk of wildfire during the operation and maintenance of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from low to medium.

Exposure to EMF

The operation of overhead transmission facilities could generate EMF, which may raise public health and safety concerns. Some studies suggest a potential link between EMF and various forms of cancer. While there are currently no laws regulating EMF levels, it is important to minimize potential effects where possible due to the limited evidence regarding their implications.

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to EMF during the operation and maintenance of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from nil to low.

Underground Transmission Facilities

Similar to overhead transmission facilities, activities for the operation and maintenance of underground transmission facilities would vary based on the type of facility, scale, and site characteristics. Facilities are not expected to have staff on site daily, but maintenance crews are anticipated to be regularly deployed. Transmission facilities require ongoing maintenance for equipment and ROWs, similar to any other linear industrial facility. Underground transmission facilities could have the following adverse environmental impacts during the operation and maintenance stage:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF
- Excess Heat Generation

Increase in Accidents and Injuries

Adverse environmental impacts on occupational safety associated with the maintenance and repair of underground transmission facilities would be similar to those described for new construction. Occupational safety impacts could include exposure to hazardous chemical and biological materials, working in confined spaces, and worker injuries from electric shock, trenching, hot-work activities, and the use of heavy machinery. As cables are underground, it can take longer to identify the damaged or malfunctioning components. Specialized equipment and expertise are required to detect and diagnose issues, often leading to prolonged maintenance times and an increased likelihood of hazards.

In the event of a flood occurring during maintenance activities, vaults can become inundated with water, creating electrical safety hazards for maintenance workers, including electrocution, drowning, and confined space hazards.

Impact Determination: Adverse environmental impacts on public health and safety resulting from the increase in accidents and injuries during the operation and maintenance of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to high.

Exposure to Hazardous Materials

Unlike their overhead counterpart, underground cable conductors require robust insulation in order to withstand high voltage. Insulation methods depend on the type of cable used, but some cable technologies include the use of insulating fluids, such as mineral oil, which pose a threat to public health and safety in the event of a leak or system malfunction. Leakage of insulating fluids can contaminate soil and groundwater, as well as above waterbodies, if lines are installed underground near water.

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to hazardous materials during the operation and maintenance of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to low.

Increased Risk of Wildfire

Maintenance activities associated with underground transmission facilities could increase the risk of wildfire due to the use of mechanical equipment, flammable materials, and gas-powered equipment. Maintenance and repairs could also introduce sources of ignition points from activities such as hot work, vehicle ignition, blading, and overland travel. These adverse environmental impacts would be similar to those described for new construction.

Impact Determination: Adverse environmental impacts on public health and safety resulting from increased risk of wildfire during the operation and maintenance of overhead transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from low to medium.

Exposure to EMF

Magnetic field intensity decreases with distance, which means that a stronger magnetic field is usually found at ground level directly above an underground cable. Although underground transmission facilities produce EMF, the electric field intensity is expected to be much weaker due to the shielding effect provided by the surrounding soil and insulation materials.

Impact Determination: Adverse environmental impacts on public health and safety resulting from exposure to EMF during the operation and maintenance of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from nil to low.

Excess Heat Generation

Underground transmission facilities generate heat during operation, which can affect the surrounding soil and infrastructure. Excessive heat is a public safety concern because it can lead to thermal stress on nearby structures and affect soil stability. Heat generated from underground transmission facilities can cause damage to both the transmission facility and the adjacent environment. Maintenance activities, such as using testing equipment, could generate excess heat due to load simulations or energization procedures.

Impact Determination: Adverse environmental impacts on public health and safety resulting from excess heat generation during the operation and maintenance of underground transmission facilities are expected to vary depending on the scale of the project and site-specific conditions. In the absence of mitigation, these adverse environmental impacts could range from negligible to low.

Upgrade

Overhead Transmission Facilities

Upgrades to overhead transmission facilities would occur within existing ROWs without expanding the existing facility footprint or causing new ground disturbance. However, these upgrades may result in adverse environmental impacts on public health and safety, including:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF

The adverse environmental impacts from upgrading overhead transmission facilities are often comparable to those of maintaining overhead transmission facilities. These adverse environmental impacts are generally anticipated to be lower than those for modifying or constructing a new transmission facility due to several factors. Table 2.3-1 highlights how upgrading existing transmission facilities would generally result in fewer or less impactful adverse environmental impacts.

Underground Transmission Facilities

Upgrades to underground transmission facilities would occur within existing ROWs, without expanding the facility footprint or causing new ground disturbance. However, these upgrades may result in adverse environmental impacts on public health and safety, including:

- Increase in Accidents and Injuries

- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF
- Excess Heat Generation

The adverse environmental impacts from upgrading underground transmission facilities are often comparable to those of maintaining underground transmission facilities. These adverse environmental impacts are generally anticipated to be lower than those for modifying or constructing a new transmission facility due to several factors. Table 2.3-1 highlights how upgrading existing transmission facilities would generally result in fewer or less impactful adverse environmental impacts.

Modification

Overhead Transmission Facilities

Modifying existing overhead transmission facilities typically involves several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2, Overview of Transmission Facilities, Development Considerations, and Regulations. The adverse environmental impacts of modifying existing transmission facilities would vary depending on the scale of the project-specific application. Overhead transmission facilities could have the following adverse environmental impacts on public health and safety during the modification stage:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF

Adverse environmental impacts of modifying overhead transmission facilities could be similar to those of new construction, but are anticipated to be lower. Table 2.3-2 highlights how modifying existing transmission facilities would generally result in fewer or less impactful adverse environmental impacts.

Underground Transmission Facilities

Modifying existing underground transmission facilities typically involves several key steps, each with specific requirements, timelines, and settings, as outlined in Chapter 2, Overview of Transmission Facilities, Development Considerations, and

Regulations. The adverse environmental impacts of modifying existing transmission facilities would vary depending on the scale of the project-specific application. Underground transmission facilities could have the following adverse environmental impacts on public health and safety during the modification stage:

- Increase in Accidents and Injuries
- Exposure to Hazardous Materials
- Increased Risk of Wildfire
- Exposure to EMF
- Excess Heat Generation

Adverse environmental impacts of modifying underground transmission facilities could be similar to those of new construction, but are anticipated to be lower. Table 2.3-2 highlights how modifying existing transmission facilities would generally result in fewer or less impactful adverse environmental impacts.

3.8.3.3 No Action Alternative

Under the No Action Alternative, the Programmatic EIS would not be adopted as a planning or analytical framework. Instead, transmission facility siting and development would continue under existing state and local regulatory processes, with each project evaluated independently for environmental compliance without the benefit of the environmental review provided in this document. This approach would lack the advanced notice of potential serious environmental concerns for those planning transmission facilities, as well as the Mitigation Strategies developed under the Programmatic EIS. As a result, environmental outcomes could be less predictable and consistent, and adverse environmental impacts could be greater.

3.8.4 Mitigation Measures

Under SEPA, there are six recognized forms of mitigation that agencies can apply to reduce or address adverse environmental impacts:

- **Avoiding the adverse environmental impact** altogether by not taking a certain action or parts of an action.
- **Minimizing adverse environmental impacts** by limiting the degree or magnitude of the action and its implementation.

- **Rectifying the adverse environmental impact** by repairing, rehabilitating, or restoring the affected environment.
- **Reducing or eliminating the adverse environmental impact** over time by preservation and maintenance operations during the life of the action.
- **Compensating for the adverse environmental impact** by replacing or providing substitute resources or environments.
- **Monitoring the adverse environmental impact** and taking appropriate corrective measures.

This section describes the Avoidance Criteria and Mitigation Measures that could apply to adverse environmental impacts from new construction, operation and maintenance, upgrade, and modification of transmission facilities.

All General Measures adopted for this Programmatic EIS, identified in Section 3.1, are relevant to this resource section. Applicants would be responsible for providing information within their application materials documenting their implementation of the General Measures.

Avoidance Criteria[4] that are relevant to this resource section are described below:

AVOID-1 – Hazardous Areas: Avoid having equipment or infrastructure within known hazardous areas, including, but not limited to, contaminated soils, geologically hazardous areas, landfills, and cutbanks.

Rationale: Avoiding hazardous areas provides safety for workers, the public, and infrastructure, as well as environmental protection. Disturbing sites of known contamination or other hazards may require the development of remediation plans.

AVOID-4 – Floodplains: Avoid having equipment or infrastructure within floodplains.

Rationale: This Avoidance Criterion would eliminate the potential for damage to infrastructure and electrical safety hazards because of inundation and would avoid some riparian ecosystems.

AVOID-11 – Oil-Containing Conductor Cables: When installing underground transmission lines, avoid the use of oil-containing equipment for cooling.

[4] The complete list of Avoidance Criteria and their rationales can be found in Section 3.1 and Appendix 3.1-1.

Rationale: This Avoidance Criterion aims to eliminate the risk of insulation fluid leaks associated with oil-containing equipment underground.

AVOID-12 – Heat Sources: Avoid collocation with other heat sources like steam mains.

Rationale: This Avoidance Criterion aims to eliminate the risks associated with excess heat generation, such as thermal stress of nearby structures and soil stability.

The Programmatic EIS is intended to support more efficient and effective siting and permitting of transmission facilities, consistent with the legislative direction in RCW 43.21C.408, by streamlining environmental review where projects incorporate the recommended planning and Mitigation Strategies. Applicants would be responsible for providing information within their application materials documenting the project's compliance with the above Avoidance Criteria. While total avoidance of all adverse environmental impacts is not required in order to use the Programmatic EIS, applicants are expected to demonstrate how their project aligns with the intent of the Avoidance Criteria to the extent practicable. If specific Avoidance Criteria are not met, the applicant would provide an explanation and supporting information. Additional environmental analyses would be required as part of the documentation for SEPA for the project. Additional mitigation could be required, depending on the nature of the deviation and its potential to result in probable significant adverse environmental impacts.

Mitigation Measures have been identified to minimize adverse environmental impacts from transmission facility projects. These measures are intended to be broad so that they can be applied to most projects that would be covered under this Programmatic EIS. However, project-specific plans would be needed to adapt the measures for project-specific applications. The inclusion of a Mitigation Measure in this Programmatic EIS does not imply that a given adverse environmental impact is presumed to occur. Rather, the measures are provided to support early planning and the avoidance of adverse environmental impacts, streamlining project-specific environmental reviews when impacts are identified. Mitigation Measures are intended to serve as a set of potential strategies that the SEPA Lead Agency and applicants can draw from, depending on the specific environmental context and project footprint. Applicants and the SEPA Lead Agency retain discretion to:

- Propose alternative mitigation strategies that achieve equivalent or better outcomes.

- Demonstrate that certain Mitigation Measures are not applicable due to the absence of relevant adverse environmental impacts.

When impact determinations are identified as medium or high, then either the applicant would adopt applicable Mitigation Measures from this Programmatic EIS or the SEPA Lead Agency may require applicable mitigation to be implemented to reduce project-specific adverse environmental impacts. When impact determinations are low, applicable Mitigation Measures should still be considered by the applicant and the SEPA Lead Agency, as these Mitigation Measures would help to further reduce adverse environmental impacts, including the project's contribution to cumulative impacts. These Mitigation Measures would be implemented in addition to compliance with laws, regulations, environmental permits, plans, and design considerations required for transmission facilities.

The following Mitigation Measures could be adopted to mitigate adverse environmental impacts:

H&S-1 – Early Fault Detection: Install early fault detection sensors that detect the radio frequency signal generated by partial discharge arcing on alternating current circuits and use precise time measurements of events to locate the source along the conductors.

Rationale: This Mitigation Measure aims to reduce the risk of fire and power outages through early detection of failing equipment and encroaching vegetation.

H&S-2 – Risk Management Strategy: Develop and apply an electromagnetic field (EMF) and electromagnetic interference[5] (EMI) risk management strategy that regularly considers the consequences, likelihood, and significance of EMF and EMI on public health and existing infrastructure, such as transportation systems, based on emerging research studies and guidelines.

Rationale: This Mitigation Measure aims to reduce the adverse environmental impacts of EMF exposure on the public and EMI on existing infrastructure through informed decision making and adaptive risk management. Techniques to decrease the risk of EMF and EMI would be implemented to ensure the safety of the public and reliability of infrastructure systems.

[5] A disturbance generated by an external source that affects an electrical circuit; when this disturbance occurs in the radio frequency spectrum, it is known as radio-frequency interference.

H&S-3 – Anonymous Tip Hotline: Establish an anonymous tip hotline for workers during the new construction, operation and maintenance, upgrades, and modifications of transmission facilities.

Rationale: This Mitigation Measure aims to enhance worker safety by fostering a strong workplace safety culture.

In addition to the above Mitigation Measures, the following Mitigation Measures[6] developed for other resources may be applicable:

Geo-2 –Slope Stabilization: Use retaining walls, terracing, and vegetation to stabilize slopes and prevent landslides when appropriate to do so.

Air-1 – Traffic Speeds: Limit traffic speeds to 15 miles per hour on unpaved areas that do not have designated speed limits.

Hab-1 – Use of Pesticides, Herbicides, and Fungicides: Minimize the use of harmful chemicals, including pesticides, herbicides, and fungicides, during the new construction and operation and maintenance stages of transmission facility projects.

TR-1 – Coordination with Aviation Groups: Work closely with aviation groups and authorities to ensure that transmission facilities are marked on aviation maps and that pilots, both commercial and recreational, are aware of their locations.

TR-2 – Planning Coordination: Consult local authorities regarding planned construction activity near or crossing roads, waterways, railways, and airports.

PSU-1 – Utility Coordination: Contact impacted or potentially impacted utility service providers as early as possible in the planning process to identify conflicts or issues.

Noise-4 – Prevent Hearing Loss: Identify when construction activities may produce on-site and off-site noise levels that exceed 85 A-weighted decibels (dBA) as an equivalent noise level over 8 hours ($L_{eq[8Hr]}$) and the associated engineering or administrative controls in place to reduce the potential for hearing loss.

[6] The rationales for the identified Mitigation Measures are provided in their respective resource sections.

Rec-4 – Informational Signage and Precautionary Safety Measures: Place informational signage, placards, safety fencing, and other precautionary indicators in areas where transmission facilities are within or adjacent to existing recreational facilities.

Rec-5 – Notice to Air Missions: Coordinate with the appropriate aviation authorities, such as the Federal Aviation Administration, to determine the necessity and content of a Notice to Air Missions (NOTAM).

3.8.5 Probable Significant Adverse Environmental Impacts

Determining the significance of an adverse environmental impact involves consideration of context and intensity, which, in turn, depend on the magnitude and duration of the impact. “Significant” in SEPA means a reasonable likelihood of more than a moderate adverse environmental impact on environmental quality. An adverse environmental impact may also be significant if its chance of occurrence is not great, but the resulting impact would be severe if it occurred (WAC 197-11-794).

Identification of adverse environmental impacts and assignment of discipline-specific ratings are based on a structured evaluation consistent with the criteria outlined in WAC 197-11-330. Significance determinations consider the context and intensity of potential adverse environmental impacts, using both quantitative and qualitative information where appropriate. Professional expertise does not substitute for regulatory compliance. Regulatory requirements establish the baseline for environmental analysis and mitigation. Professional experience is used to supplement this baseline, providing additional insight to identify whether mitigation beyond what is required by regulation may be warranted. In cases where data are incomplete or unavailable, a conservative approach has been applied to ensure that potential adverse environmental impacts are not underestimated.

This Programmatic EIS weighs the potential adverse environmental impacts on public health and safety that could result from transmission facilities after considering the application of laws and regulations, siting and design considerations, including agency guidance and BMPs, and Mitigation Strategies, and makes a resulting determination of significance for each impact. **Table 3.8-4** summarizes the adverse environmental impacts anticipated for the new construction, operation and maintenance, upgrade, and modification of transmission facilities.

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Table 3.8-4: Summary of Adverse Environmental Impacts, Mitigation Strategies, and Significance Rating for Public Health and Safety

Adverse Environmental Impact	Project Stage	Description of Impact	Impact Determination Before Applying Mitigation	Mitigation Strategy Applied[(a)]	Significance After Applying Mitigation Strategy	Rationale for Significance Rating
Public Health and Safety – Increase in Accidents and Injuries	New Construction	The new construction of overhead and underground transmission facilities could result in injuries, such as falls, ground collapse, electrical shocks, and equipment-related accidents. Soil disturbance associated with construction activities can expose workers to fugitive dust. Airborne dust particles can cause respiratory issues and eye and skin irritation, and potentially expose workers to harmful chemicals and biological hazards. These impacts could lead to serious physical harm or fatality, result in long-term health complications, and reduce the quality of life for the affected individual.	**Overhead**: negligible to high **Underground:** low to high	▪ **AVOID-1:** Hazardous Areas ▪ **AVOID-4**: Floodplains ▪ **H&S-3:** Anonymous Tip Hotline ▪ **Geo-2:** Slope Stabilization ▪ **Air-1:** Traffic Speeds ▪ **TR-1**: Coordination with Aviation Groups ▪ **TR-2**: Planning Coordination ▪ **PSU-1**: Utility Coordination ▪ **Noise-4**: Prevent Hearing Loss ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures ▪ **Rec-5**: Notice to Air Missions	Less than Significant	Strict regulatory requirements and guidelines ensure worker well-being through the implementation of safety programs and inspections. Compliance with these regulations helps minimize health and safety impacts on workers. Standard BMPs like employee training are typically used. Standard BMPs, along with the identified Mitigation Strategies, are generally effective at managing accidents and injuries to workers. Locating vaults outside of floodplains is an effective measure for controlling potential damage and electrical safety hazards.
	Operation and Maintenance	Adverse environmental impacts on occupational safety may occur during routine maintenance or repairs of both overhead and underground transmission facilities. Depending on the repairs necessary, occupational hazards could be similar to those involved in new construction. These hazards include risks related to motor vehicle and equipment handling, as well as exposure to extreme weather conditions. Because maintenance typically requires fewer workers than new construction, the occupational risks of the operation and maintenance stage are generally considered to be lower. In the event of a flood, underground vaults may become submerged and could damage electrical equipment requiring maintenance and repair work. Maintenance and repair work in flooded or wet vaults can be dangerous for workers due to the risk of electrocution, drowning, and confined space hazards. Furthermore, identifying damaged or malfunctioning components in underground transmission facilities can take longer. Specialized equipment and expertise are required to detect and diagnose issues, often leading to prolonged maintenance times and an increased likelihood of hazards.	**Overhead**: negligible to high **Underground:** negligible to high			
	Upgrade	Upgrades to existing transmission facilities conducted entirely within the existing ROW and without additional ground disturbance would still involve activities that pose safety risks to workers and, to a lesser extent, the public. These risks are generally lower than those associated with new construction or modification involving ground disturbance, but could still include electrical hazards, falls from heights, struck-by or caught-in/between incidents, or musculoskeletal injuries. Upgrading underground transmission facilities may present risks such as confined space entry, exposure to pressurized systems, and handling of heavy vault covers or cables. Since underground transmission facilities generally take longer to construct and	**Overhead:** negligible to high **Underground:** negligible to high			

Adverse Environmental Impact	Project Stage	Description of Impact	Impact Determination Before Applying Mitigation	Mitigation Strategy Applied[(a)]	Significance After Applying Mitigation Strategy	Rationale for Significance Rating
		maintain, it is expected that the impacts would be similar to those described for operation and maintenance.				
	Modification	Modification of existing overhead and underground transmission facilities could result in injuries similar to those described for new construction. These accidents and injuries may include electrical shocks and equipment-related accidents, among others. Such accidents could lead to serious physical harm or fatality, result in long-term health complications, and reduce the quality of life for the affected individual.	**Overhead:** negligible to high **Underground:** negligible to high			
Public Health and Safety – Exposure to Hazardous Materials	New Construction	During the new construction of overhead and underground transmission facilities, several hazardous materials may be encountered or used. Hazardous materials could cause health effects. If these materials leak or are improperly managed, they can contaminate soil and water, posing risks to workers, as well as nearby infrastructure and communities.	**Overhead:** nil to low **Underground:** negligible to medium	▪ **AVOID-1**: Hazardous Areas ▪ **AVOID-11**: Oil Containing Conductor Cables ▪ **H&S-3:** Anonymous Tip Hotline ▪ **Hab-1:** Use of Pesticides, Herbicides, and Fungicides ▪ **Rec-4:** Informational Signage and Precautionary Safety Measures	Less than Significant	Strict regulatory requirements and guidelines ensure that construction projects implement effective hazardous materials and waste management. Compliance with these regulations helps minimize the public health and safety impacts of activities. Standard BMPs such as proper labeling, storage, and inspection of containers, proper storage of containers, employee training, and spill control measures are commonly used. Standard BMPs, along with the identified Mitigation Strategies, are generally effective at managing impacts of hazardous materials and waste on public health and safety.
	Operation and Maintenance	Hazardous materials, such as insulating oils, lead-based components, and cleaning agents, may be used during the operation and maintenance of both overhead and underground transmission facilities. Greater impacts on public health and safety could occur if hazardous materials were released at sensitive locations like aquifers or agricultural land. In these locations, contamination could compromise drinking water supplies and affect food safety, thereby affecting human health and the environment.	**Overhead**: negligible to low **Underground**: negligible to low			
	Upgrade	Upgrades to overhead and underground transmission facilities within the existing ROW and without additional ground disturbance may still involve limited exposure to hazardous materials. These materials can include: ▪ Insulating oils (e.g., mineral oil or SF_6 gas in switchgear and transformers) ▪ Lead-based components in older infrastructure ▪ Cleaning agents, solvents, or coatings used during maintenance or upgrades ▪ Residual contamination from previous operations or spills For overhead transmission facilities, exposure risks may arise during handling of aged equipment, insulators, or conductors that contain hazardous substances.	**Overhead:** negligible to low **Underground:** negligible to low			

Adverse Environmental Impact	Project Stage	Description of Impact	Impact Determination Before Applying Mitigation	Mitigation Strategy Applied[a]	Significance After Applying Mitigation Strategy	Rationale for Significance Rating
		For underground transmission facilities, if present, risks may include contact with contaminated soils or vaults, or exposure to pressurized insulating gases.				
	Modification	Adverse environmental impacts resulting from hazardous materials and waste associated with modifying existing overhead and underground transmission facilities would be similar to those described for new construction.	**Overhead**: nil to low **Underground:** negligible to medium			
Public Health and Safety – Increased Risk of Wildfire	New Construction	Wildfires can result from many construction activities associated with the new construction of overhead and underground transmission facilities, including hot work, the operation of combustion engines, driving motor vehicles over vegetated areas, clearing vegetation, smoking by workers, and other practices that could inadvertently spark surrounding vegetation.	**Overhead:** low to medium **Underground:** low to medium	▪ **AVOID-1**: Hazardous Areas ▪ **H&S-1:** Early Fault Detection	Less than Significant	Strict regulatory requirements and design standards ensure that construction projects implement effective fire control measures. Compliance with these regulations helps minimize the public health and safety impacts of wildfires linked to electrical transmission sources. Standard BMPs, such as vegetation management and lightning protection measures, are typically used. Standard BMPs, along with the identified Mitigation Strategies, are generally effective at managing the impacts of wildfire on public health and safety.
	Operation and Maintenance	The operation and maintenance of overhead and underground transmission facilities could increase the risk of wildfire due to the use of mechanical equipment, flammable materials, and gas-powered equipment. Maintenance and repairs could also introduce sources of ignition points from activities such as hot work, vehicle ignition, blading, and overland travel. These adverse environmental impacts would be similar to those described for new construction.	**Overhead:** low to medium **Underground**: low to medium			
	Upgrade	Although upgrading existing overhead and underground transmission facilities would occur within the existing ROW and without additional ground disturbance, it may still present increased risks of wildfire. Certain activities and conditions can elevate fire potential, including: ▪ Hot work operations, such as welding or cutting near dry vegetation ▪ Use of vehicles and equipment that may generate sparks or heat ▪ Contact with energized components, which could result in electrical faults or arcing Adverse environmental impacts resulting from increased risk of wildfire associated with upgrading existing overhead and underground transmission facilities would be similar to those described for operation and maintenance.	**Overhead:** low to medium **Underground:** low to medium			
	Modification	Adverse environmental impacts resulting from increased risk of wildfire associated with modifying existing overhead and underground transmission facilities would be similar to those described for new construction.	**Overhead:** low to medium **Underground:** low to medium			

Adverse Environmental Impact	Project Stage	Description of Impact	Impact Determination Before Applying Mitigation	Mitigation Strategy Applied[a]	Significance After Applying Mitigation Strategy	Rationale for Significance Rating
Public Health and Safety – Exposure to EMF	New Construction	This adverse environmental impact is not anticipated to occur during the new construction of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **H&S-2:** Risk Management Strategy	Less than Significant	Although there are no federal or state regulations regarding EMF exposure, compliance with recommended exposure limits and implementation of the identified Mitigation Measure can help minimize health and safety impacts of EMF exposure.
	Operation and Maintenance	Overhead and underground transmission facilities could generate EMF. Studies have suggested a link between EMF and various health issues, including cancer, headaches, and sleep disturbances.	**Overhead:** nil to low **Underground:** nil to low			
	Upgrade	Upgrades to transmission facilities within the existing ROW and without additional ground disturbance are not expected to noticeably alter EMF exposure levels for workers or the public. For overhead transmission facilities, EMF exposure may occur during work near energized conductors or equipment, particularly during live-line upgrade. For underground transmission facilities, EMF exposure is generally lower at the surface due to shielding provided by soil and infrastructure, though workers accessing vaults or conduits may experience elevated levels during energized work. While short-term occupational exposure may increase slightly during upgrade activities, these exposures are typically well below regulatory thresholds established by organizations such as the ICNIRP and the IEEE. No long-term increase in EMF exposure is anticipated for the general public, as upgrades do not involve expanding the existing transmission facility ROW. Assuming receptor proximity and sensitivity do not change.	**Overhead:** nil to low **Underground:** nil to low			
	Modification	The modification of existing transmission facilities may involve expanding the existing ROW, which could bring these facilities closer to sensitive receptors, potentially increasing exposure levels. The levels of exposure may vary based on whether the work is performed on energized lines or involves the rerouting of power. Additionally, modifications may require longer or more complex work on energized lines, which could increase the duration of occupational exposure.	**Overhead:** nil to low **Underground:** nil to low			
Public Health and Safety – Excess Heat Generation	New Construction	This adverse environmental impact is not anticipated to occur during the new construction of overhead or underground transmission facilities.	**Overhead:** N/A **Underground:** N/A	▪ **AVOID-11**: Oil-Containing Conductor Cables ▪ **AVOID-12:** Heat Sources ▪ **PSU-1:** Utility Coordination	Less than Significant	Strict regulatory requirements and design standards ensure that construction projects implement effective heat control measures. Compliance with these regulations helps minimize the public health and safety impacts of excess heat generation in underground transmission facilities.
	Operation and Maintenance	Underground transmission facilities generate heat during operation. Maintenance activities, such as using testing equipment, could generate excess heat due to load simulations or energization procedures. Prolonged heat exposure can affect soil and ground stability, potentially leading to subsidence or ground deformation, which can impact the stability of structures and roadways above the transmission facilities. Excessive heat generation can cause degradation of insulation materials, leading	**Overhead:** N/A **Underground:** negligible to low			

Adverse Environmental Impact	Project Stage	Description of Impact	Impact Determination Before Applying Mitigation	Mitigation Strategy Applied[a]	Significance After Applying Mitigation Strategy	Rationale for Significance Rating
		to potential failures or breakdowns in the electrical system and increasing the risk of fire.				Standard BMPs, such as cooling systems, are commonly used. Standard BMPs, along with the identified Mitigation Strategies, are generally effective at managing the impacts of excessive heat generation on public health and safety in underground transmission facilities.
	Upgrade	Activities during the upgrade of underground facilities, such as using testing equipment, could generate excess heat due to load simulations or energization procedures. Additionally, increasing the capacity of underground transmission facilities could increase the amount of heat they generate.	**Overhead:** N/A **Underground:** negligible to low			
	Modification	Activities during the modification of underground facilities, such as using testing equipment, could generate excess heat due to load simulations or energization procedures. Additionally, increasing the capacity of underground transmission facilities could increase the amount of heat they generate.	**Overhead:** N/A **Underground:** negligible to low			

Notes:

[a] Appendix 3.1-1 provides a detailed listing of each Mitigation Strategy. This appendix serves as a reference section that can be consulted independently of the main text. This is particularly useful for detailed guidance and technical specifications that may be referred to multiple times. Additionally, including this information in an appendix allows for easier updates and revisions. If Mitigation Strategies or guidance changes, the appendix can be updated without altering the main content.

BMP = best management practice; **EMF** = electromagnetic fields; **ICNIRP** = International Commission on Non-Ionizing Radiation Protection; **IEEE**= Institute of Electrical and Electronics Engineers; **N/A** = not applicable; **ROW** = right-of-way

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3.8.6 Environmental Sensitivity Map

No criteria specific to public health and safety were identified that would impact project siting decisions at a broad, programmatic level. Consequently, no environmental sensitivity map was developed for this resource. Public health and safety can vary significantly over time and across individual projects. Therefore, a more detailed, site-specific analysis is required to determine the suitability of a project in any area. This variability can make it difficult to create a static environmental sensitivity map that accurately reflects current conditions and accounts for the adverse environmental impacts of transmission facilities on public health and safety.

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