September 2026

Everett Link Extension

Draft Environmental Impact Statement

ELECTROMAGNETIC FIELDS TECHNICAL REPORT

Appendix G.14

SoundTransit

U.S. Department of Transportation
Federal Transit Administration

Table of Contents

Figures

Tables

Attachments

Acronyms

A/m	Amps per meter
ACGIH	American Conference of Governmental Industrial Hygienists
AIR	SR 99/Airport Road
ASH	Ash Way
BI	Broadway/I-5
DC	direct current
EGN	SR 526/Evergreen
EIS	Environmental Impact Statement
EMF	electromagnetic fields
EVLE	Everett Link Extension
EVT	Everett Station
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEEE	Institute of Electrical and Electronics Engineers
H/m	Henry per meter
MAR	Mariner
NEPA	National Environmental Policy Act
OMF	operations and maintenance facility
PLS-CADD™	Power Line Systems – Computer Aided Design and Drafting
SR	State Route
SR	State Route
SWI	SW Everett Industrial Center
μT	microtesla

1 INTRODUCTION

1.1 Overview

The Central Puget Sound Regional Transit Authority (Sound Transit) is proposing to expand Link light rail transit service northward from the Lynnwood City Center Station to the Everett Station area in Snohomish County, Washington (Figure 1-1). The Everett Link Extension (EVLE) Project would provide fast, reliable light rail service to regional residential and job centers in Snohomish County's growing urban areas. The proposed project is part of the Sound Transit 3 (ST3) Plan of regional transit system investments, funding for which was approved by voters in the region in 2016.

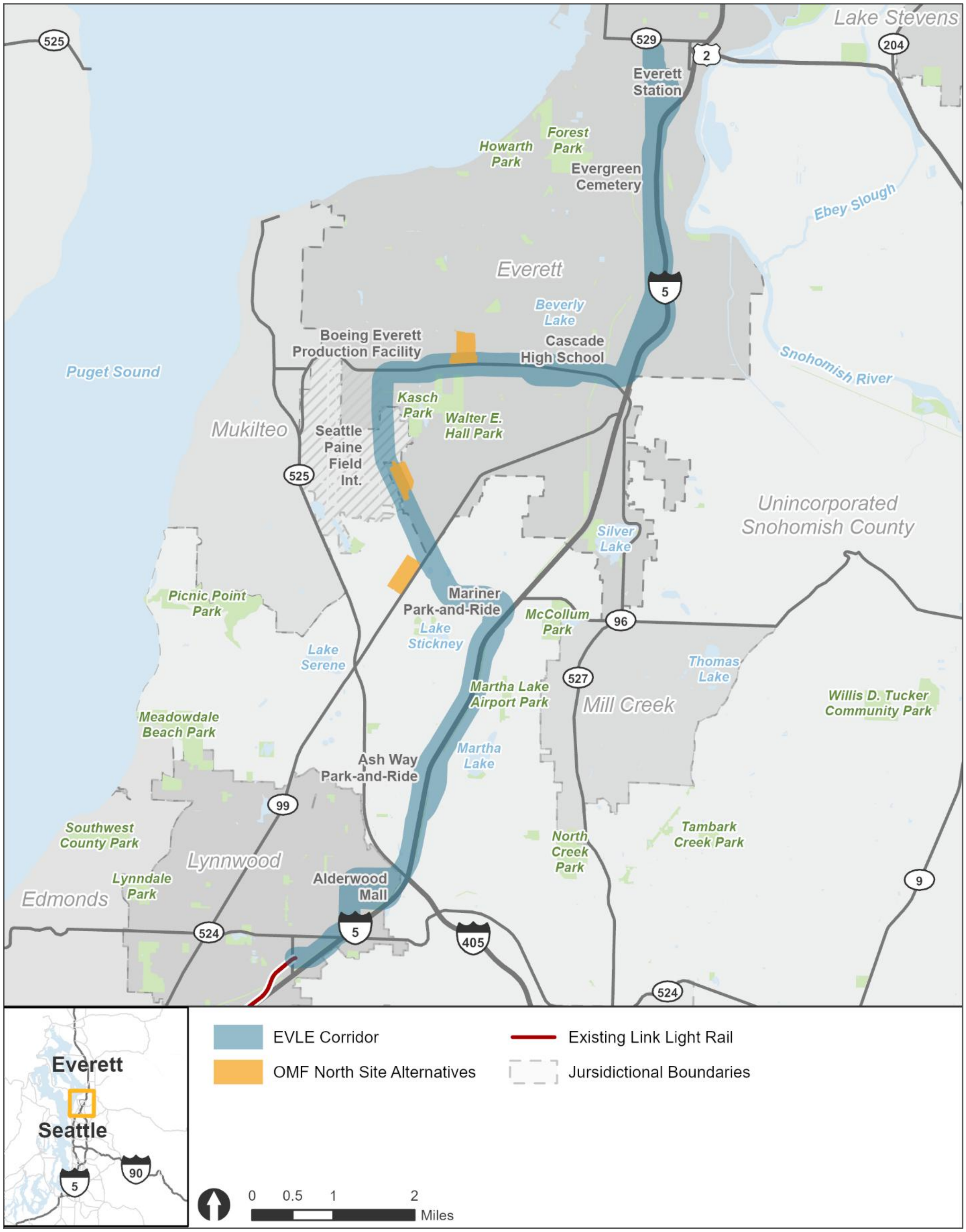
For this analysis, the EVLE Project consists of approximately 16 miles of light rail guideway, seven light rail stations, two parking facilities, and an operations and maintenance facility (OMF North). Sound Transit proposes to begin construction of the project in 2030. The current schedule for opening light rail service from the Lynnwood City Center Station to Everett Station is 2041. A shorter route connecting Lynnwood City Center to the SW Everett Industrial Center Station would open first in 2037 as the initial phase. OMF North would open by 2034, prior to opening of the light rail extension, as the facility is necessary for storing rail cars and supporting service for not only the extension to Everett, but also other parts of the regional system.[1] Parking facilities at the Mariner and Everett Stations would open by 2046.

One station, State Route (SR) 99/Airport Road Station, is currently considered provisional since planning, preliminary engineering, and environmental review are funded, but final design and construction are not. However, for purposes of this evaluation, all seven stations are assumed to be funded and open according to the schedule described above to capture all locations where impacts could occur. The station would be fully constructed and open for service when additional funding is identified.

The initial phase is not discussed in this analysis because it would not have additional potential impacts when compared with the fully built alternatives (i.e., the impacts would be the same in the West Alderwood, Ash Way, Mariner, SR 99/Airport Road, and SW Everett Industrial Center Segments, and for the OMF sites, but the impacts in the SR 526/Evergreen, Broadway/I-5, and Everett Station Segments would not occur until construction on those segments begins). All potential impacts are described in Section 4.

[1] Construction of light rail projects is typically divided into sections, and construction would occur across different parts of the corridor between 2030 and 2046. For more information on the construction approach, see Draft EIS Appendix B.

Figure 1-1 EVLE Project Corridor



For planning and engineering purposes, the project is organized into eight geographic segments, discussed in this document from south to north. Within those segments, a total of 17 alignment alternatives and 18 station location alternatives are under consideration. These alignment and station alternatives are combined into Build Alternatives for analysis as shown in Table 1-1 and Figure 1-2.

Table 1-1 describes the alignment and station alternatives as follows:

- **Segments:** The eight alignment segments and corresponding abbreviations are:
  - West Alderwood (ALD).
  - Ash Way (ASH).
  - Mariner (MAR).
  - SR 99/Airport Road (AIR).
  - SW Everett Industrial Center (SWI).
  - SR 526/Evergreen (EGN).
  - Broadway/I-5 (BI).
  - Everett Station (EVT).
- **Alignment alternatives:** Alignment alternatives in each segment are identified with numbers (e.g., ALD-1).
- **Station alternatives:** Station alternatives in each segment are identified with letters (e.g., ALD-B).[2]
- **Build Alternatives:** Alignments and stations are combined to create the Build Alternative name (e.g., Station ALD-B is located on Alignment ALD-1, so this pairing is referred to as Alternative ALD-1B). If a preferred Build Alternative has been identified by the Sound Transit Board of Directors, it is indicated with an asterisk.
- **Design options:** A design option is an alternate design for a portion of a Build Alternative. It could be a different route or profile along a portion of an alignment, a different station configuration, or a different parking location. For example, in the West Alderwood Segment the Alderwood Mall Boulevard Design Option is being considered for all three Build Alternatives.

[2] Letters identifying station alternatives are non-sequential in some segments; missing letters denote alternatives that did not perform as well as alternatives considered in the Draft EIS. For more information on the Alternatives Development process, see Draft EIS Chapter 2.

Table 1-1 Alignment and Station Build Alternatives by Segment

Segment	Alignment Alternatives	Station Alternatives	Build Alternatives (Combined Alignment and Station)	Build Alternative Design Options Also Considered
West Alderwood	ALD-1	ALD-B	ALD-1B	Alderwood Mall Boulevard
	ALD-2	ALD-D	ALD-2D*	Alderwood Mall Boulevard
		ALD-F	ALD-2F	Alderwood Mall Boulevard
Ash Way	ASH-1	ASH-A	ASH-1A	None
	ASH-2	ASH-D	ASH-2D	None
Mariner	MAR-1	MAR-B	MAR-1B	Surface Parking
	MAR-2	MAR-D	MAR-2D	Surface Parking
SR 99/ Airport Road	AIR-1	AIR-A	AIR-1A	None
	AIR-2	AIR-B	AIR-2B	None
SW Everett Industrial Center	SWI-1	SWI-A	SWI-1A*	Lower
		SWI-B	SWI-1B	None
		SWI-C	SWI-1C	None
SR 526/ Evergreen	EGN-1	EGN-A	EGN-1A	None
	EGN-2	EGN-B	EGN-2B	North Side of SR 526
	EGN-3	EGN-E	EGN-3E	North Side of SR 526
Broadway/I-5	BI-1	None	BI-1*	None
	BI-2	None	BI-2	None
Everett Station	EVT-1	EVT-A	EVT-1A	None
	EVT-2	EVT-C	EVT-2C*	None
	EVT-3	EVT-D	EVT-3D*	None

* Denotes preferred alternative

There are also three OMF North site alternatives under consideration as shown in Table 1-2 and Figure 1-2.

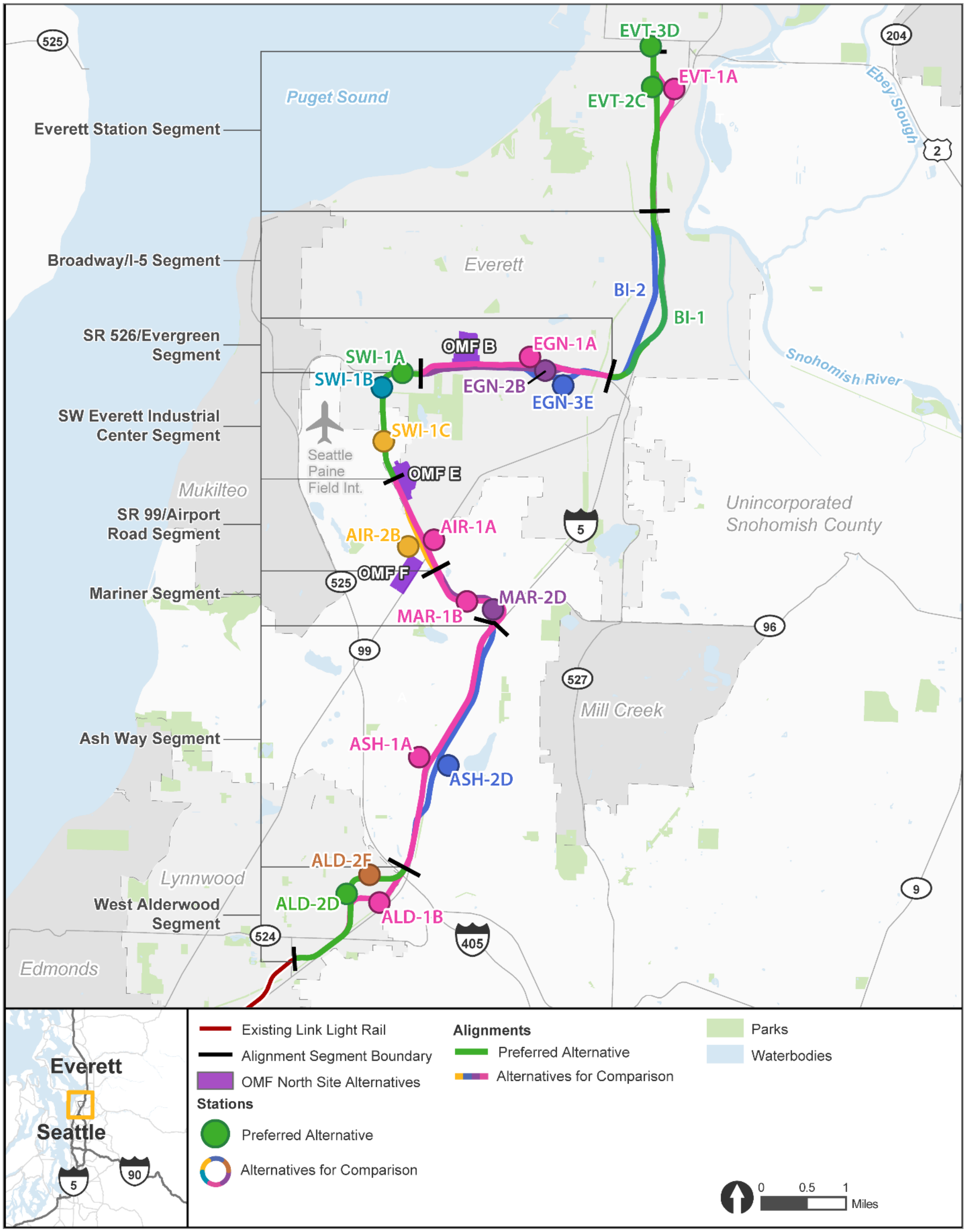
Table 1-2 OMF North Site Alternatives

Build Alternative	Build Alternative Design Options Also Considered
OMF Site F	Lead Tracks to West Side of Airport Road
OMF Site E	None
OMF Site B	Lead Tracks to South Side of SR 526

Analysis of the Build Alternatives was based on the conceptual design drawings included in Draft Environmental Impact Statement (EIS) Appendix F.

The No Build Alternative describes the environment, including the transportation system, as it would exist in 2046 without the proposed project. The No Build Alternative uses 2046 as the year of analysis to align with the target date for completion of all EVLE Project components and the full buildout of the light rail capital projects included in the ST3 Plan.

Figure 1-2 EVLE Project Alternatives



1.2 Potential Design Refinements

In addition to the alternatives described above, the Draft EIS provides a qualitative evaluation of potential design refinements that could reduce overall project cost if applied to the alignment and station alternatives (for more information, see Draft EIS Chapter 2). The potential design refinements identified to date that could be considered in each segment, along with potential changes in impacts, are described in Draft EIS Chapter 4. Sound Transit has not identified any change in electromagnetic field (EMF) impacts as a result of the potential design refinements (see quantitative analysis methodology in Draft EIS Appendix I). If Sound Transit decides to include these refinements as part of the project prior to the Final EIS, they would be reflected in the conceptual design plans and evaluated in the Final EIS.

1.3 Purpose of Report

The purpose of this technical report is to discuss the potential impacts on electric and magnetic fields, also known as EMF, from light rail trains and facilities. EMF from project operation would be generated from direct current electricity flowing from the traction power substation through overhead catenary wires to the light rail trains, from movement of the large metal trains, and from radio frequency fields from wireless systems. These EMFs may result in electromagnetic interference, which can cause disruptions and possibly malfunctions in sensitive equipment, and in some cases, can affect human health. EMF-sensitive receptors typically include hospitals and laboratories that use equipment that is sensitive to electromagnetic interference (e.g., magnetic resonance imaging [MRI] machines). Pipes and cable utilities commonly located under and along roadways can also be susceptible to stray currents.

The following sections provide an introduction to EMF and stray current.

1.3.1 Electromagnetic Fields

Electric and magnetic fields are produced by electricity; electric fields vary with the voltage of electricity in a conductor, and magnetic fields vary with the current. Electromagnetic fields surround all electrical equipment, appliances, and facilities, including light rail trains. Additionally, metal objects, such as trucks and buses, move through the earth’s static magnetic field creating ferromagnetic disturbances. Both electromagnetic fields and ferromagnetic effects can result in interference, which can cause disruption and possibly malfunction in sensitive equipment such as MRI equipment, electron microscopes, mass spectrometers, and magnetic devices, such as heart pacemakers.

The principal type of EMF produced by the light rail system that could be strong enough to affect sensitive receptors is the direct current (DC) magnetic field from the traction power supply system that powers the trains. The traction power supply circuit is formed by an overhead line that provides current to the train via a pantograph, and the running rails which form a path for return current to the traction power substation. Other forms of EMF from trains and the signaling, communication, electrical, and mechanical systems, such as radio frequency emissions, generally only affect the light rail system and not nearby sensitive receptors; they are considered further in this report only where specific concerns have been raised.

In certain situations, with sufficiently high exposure, EMF has the potential to affect human health and hence these effects are also discussed within the report.

1.3.2 Stray Current

Traction power DC can return to its source (i.e., the substation or other vehicles/trains where regenerative braking is active) via conducting paths other than the running rails. This is known as stray current. Alternative conducting paths include metal structures, buried water or gas mains, or buried electrical cables. Stray current can cause corrosion in metallic materials, which, over time, can cause leaks in gas and water mains and can degrade or, in extreme cases, break electrical cables. Stray current can also cause disturbance to DC track circuits in nearby railroad systems.

2 REGULATORY CONTEXT AND METHODOLOGY

2.1 Applicable Laws, Regulations, and Guidelines

There are no federal, state, or local regulations or policies governing EMF. However, the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the American Conference of Governmental Industrial Hygienists (ACGIH), and the Institute of Electrical and Electronics Engineers (IEEE) have developed exposure guidelines for workers and the public (ICNIRP 2009; ICNIRP 2010; ACGIH 2009; IEEE 2019).

The American Public Transportation Association (APTA) has a standard for railroad systems to develop an Electromagnetic Compatibility Control Plan (APTA 2006), but there are no minimum emission and susceptibility levels specified. However, examples are given which reflect the types of interactions which need to be managed.

2.2 Methodology

National Environmental Policy Act (NEPA) regulations require that an EIS disclose impacts (i.e., effects) of a proposed action on the environment. NEPA requires an EIS to evaluate and disclose the “reasonably foreseeable environmental effects of the proposed agency action” (42 USC Section 4332). Reasonably foreseeable environmental effects are those that are sufficiently likely to occur during operation (long-term) or construction (short-term). Reasonably foreseeable environmental effects do not include effects that are speculative in nature or remote in time or place, or that are the result of a lengthy causal chain. For this analysis, reasonably foreseeable effects include all effects that are considered likely to result from the project over its operational lifetime within the study area of each resource.

The study area for the EMF analysis is the area within 300 feet of the alignment, station, and OMF site alternatives. EMF strength reduces rapidly with distance from the source, so any interference or harmful effects would be limited to the area close to the light rail system.

2.2.1 Desktop Survey of Potential Sensitive Receptors

A desktop survey was conducted to identify potentially sensitive receptors within the study area. The desktop survey used information from two sources:

- Geographic information system (GIS) data provided by Snohomish County, including information regarding water lines, sewer lines, and gas lines.

- Google Earth, which provided information regarding facilities within the study area.

Sound Transit reached out to owners of properties that were identified as having the potential to include EMF-sensitive equipment. These properties were identified as likely or known to contain antennas, radio towers, or medical, transportation (including railroad), automobile repair and servicing, industrial and light industrial, retail, or warehousing/storage facilities. If no response was received from a property, it was assumed that EMF-sensitive equipment was not present. Owners of buried metallic water and sewer lines were not contacted for further information due to the negligible risk to these utilities as described in Section 4.1.1.1.

Traffic and telecommunication systems were not considered potentially sensitive equipment based on Sound Transit's design requirements and experience with previous projects.

Identified sensitive receptors requiring further consideration are documented in Section 3.

2.2.2 Traction Power Modeling and Estimation of EMF

Modeling was performed to calculate the magnitude of EMF at various distances from the alignment. The strength of EMF emitted by the traction power system would vary considerably along the alignment, with the peak values only lasting for a few seconds at a time. The levels at any location would depend on several variables, such as:

- Individual train movement at any instant (i.e., whether it is accelerating, at constant velocity, braking, or at rest).
- The number of trains in any one electrical section.
- Proximity to a traction power substation.

The background technical detail for the EMF modeling can be found in Attachment A. The following provides a summary of the methodology used to calculate EMF strength.

2.2.2.1 Model Inputs

Three northbound and three southbound current carrying conductors were identified from which magnetic fields at station locations were calculated, as shown in Table 2-1.

Table 2-1 Current Carrying Conductors

Northbound	Southbound
Overhead line	Overhead line
Rail 1 (inner)	Rail 3 (outer)
Rail 2 (outer)	Rail 4 (inner)

Figure 2-1 illustrates a typical cross section used for the modeling of each rail. A cross section of each station is shown in the conceptual design drawings in Draft EIS Appendix F. The typical height of the overhead conductor (contact wire) from the track is 16 feet, as shown in Figure 2-2.

Modeling was performed for different operating conditions, including normal operation and loss (outage) of individual traction power substations.

Figure 2-1 Typical Guideway Section at Station

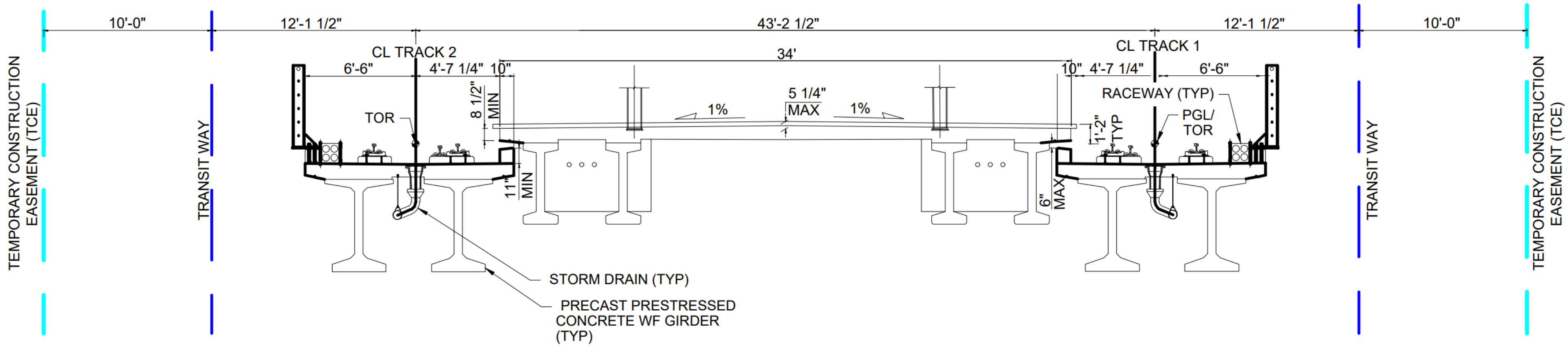
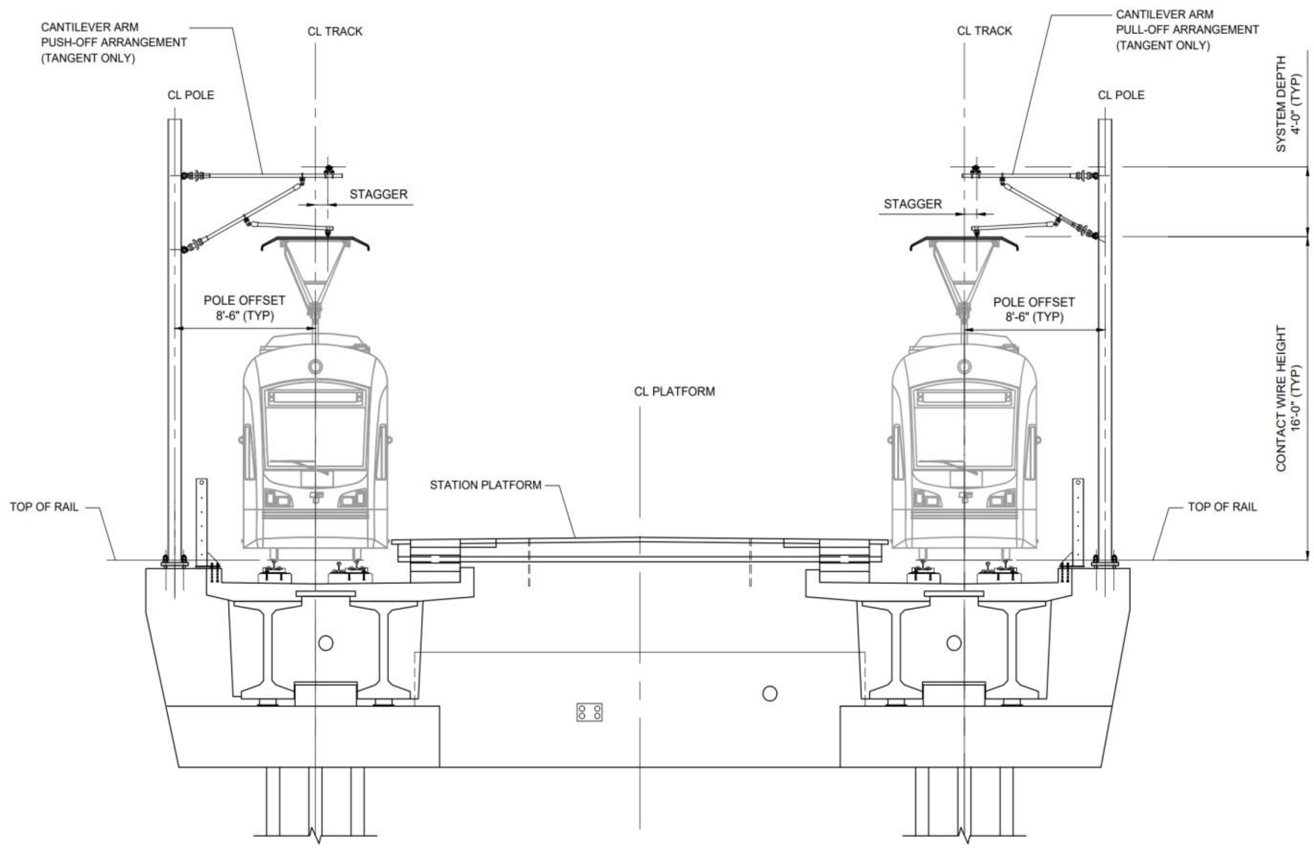


Figure 2-2 Typical Arrangement for Contact Wire Height



SIDE POLES ON AERIAL STRUCTURE WITH CENTER STATION PLATFORM

SCALE: NTS

NOTES:

1. THIS DRAWING REFLECTS TYPICAL ARRANGEMENTS ONLY. FOR ACTUAL POLE OFFSET, CONTACT WIRE HEIGHT, SYSTEM DEPTH, AND STAGGER VALUES AT SPECIFIC POLE LOCATIONS, SEE OCS LAYOUT PLAN DRAWINGS.

2.2.2.2 Estimation of EMF Strength

The traction currents are expected to be higher and to fluctuate more at the stations, compared to between the stations, as this is where trains accelerate from standstill and where the effects of accelerating and braking trains can combine. EMF strength used in the assessment was therefore calculated at the stations.

For sensitive receptors between stations, the highest calculated EMF strength from the two nearest stations was used in the assessment. A significant factor in calculating the EMF strength was the distance above ground level. Hence, where applicable, the results from the station that is closer to the ground were used in the assessment since these generated higher levels of EMF strength.

The EMF was calculated every 0.5 meters (the distance used by the modeling software) up to 300 feet from the light rail guideway (the extent of the study area).

In the absence of specific information on sensitive receptor buildings or equipment locations, it was assumed that all receptors are at ground level.

To correlate modeled EMF strength with relevant equipment limits, the distance at which the most onerous susceptibility threshold (a magnetic field strength of 3 amps per metre (A/m)) was met was calculated (see Attachment B).

3 AFFECTED ENVIRONMENT

3.1 West Alderwood Segment

No EMF sensitive receptors were identified within the study area in the West Alderwood Segment.

A steel natural gas pipeline exists in the West Alderwood Segment, running parallel to the alignment for approximately 1,000 feet. The pipeline has been confirmed by the utility owner to have cathodic protection. From communication with the utility owner (Williams Gas) in August 2024, no concerns were raised regarding proximity of Sound Transit facilities to the pipeline. Several buried metallic water lines and sewer lines have also been identified in the study area.

3.2 Ash Way Segment

No EMF sensitive receptors were identified within the study area in the Ash Way Segment. Several buried metallic water lines and sewer lines are located within the study area.

3.3 Mariner Segment

No EMF sensitive receptors were identified within the study area in the Mariner Segment. Several buried metallic water lines and sewer lines are located within the study area.

3.4 SR 99/Airport Road Segment and OMF Sites F and E

No EMF sensitive receptors were identified within the study area in the SR 99/Airport Road Segment or around OMF Sites F and E. Several buried metallic water lines and sewer lines are located within the study area.

3.5 SW Everett Industrial Center Segment and OMF Site E

No EMF sensitive receptors were identified within the study area in the SW Everett Industrial Center Segment or around OMF Site E. Several buried metallic water lines and sewer lines are located within the study area.

Representatives of Seattle Paine Field International Airport confirmed that there are no fuel or gas lines serving the airport within the study area.

3.6 SR 526/Evergreen Way Segment and OMF Site B

One potentially EMF-sensitive receptor was identified within the study area in the SR 526/Evergreen Way Segment: Access Laser, a manufacturer of scientific equipment, at 2211 W Casino Road in Everett.

Several buried metallic water lines and sewer lines are also located within the study area.

3.7 Broadway/I-5 Segment

No EMF sensitive receptors were identified within the study area in the Broadway/I-5 Segment. Several buried metallic water lines and sewer lines are located within the study area.

3.8 Everett Station Segment

No EMF sensitive receptors were identified within the study area in the Everett Station Segment. Several buried metallic water lines and sewer lines are located within the study area, as well as Amtrak railroad infrastructure.

4 ENVIRONMENTAL IMPACTS

4.1 Build Alternatives

4.1.1 Operational Impacts

Impacts common to all alternatives are discussed in Section 4.1.1.1; Sections 4.1.1.2 and 4.1.1.3 provide additional information on potential for impacts to sensitive equipment in the SR 526/Evergreen Segment and to rail infrastructure in the Everett Station Segment, respectively. Additional information on other segments has not been provided as no sensitive receptors were identified, and therefore no additional impacts beyond those described in Section 4.1.1.1 are expected.

4.1.1.1 Impacts Common to All Alternatives

Human Exposure to EMF

At even the closest of receptors (i.e., where the alignment passes over pedestrian areas), the estimated EMF strength would be three orders of magnitude below the maximum exposure values recommended by ICNIRP and IEEE for the general public, considering magnetic fields at 0 Hz, as shown in Table 4-1.

Table 4-1 Maximum EMF Strength Limits Compared to Estimated EMF Strengths

Maximum EMF Strength Limit Recommended by ICNIRP (2009)	Maximum EMF Strength Limit Recommended by IEEE	Estimated EMF Strength At Closest Receptor
400,000 μT	118,000 μT	127 μT

The level of exposure anticipated would be of a transient and short-term nature as the EMF strength changes in response to changing load current on the light rail system. Therefore, there would be no EMF effects on human health associated with operation of the EVLE Project.

Disturbance to EMF Sensitive Equipment

EMF from the project would be below the ICNIRP (2009) advisory threshold for active implantable medical devices (e.g., pacemakers), so no impacts to human health from interference with this type of critical personal medical equipment would be expected.

It is possible that increased EMF strength from the extension would affect the operation of sensitive equipment used within some residential, commercial, light industrial, or medical properties within the study area. However, the existing Link light rail system has been operating since 2003 with no known EMF-related issues in similar urban and suburban environments. The EVLE Project would operate using the same trains and technology as the existing system. If EMF produced by the light rail system affects the operation of sensitive equipment, appropriate mitigation would be considered (e.g., active or passive screening of the equipment or, in extreme cases, relocating the equipment or applying specific modifications to the project’s traction system to reduce its emissions).

Stray Current

As described in Section 1.3.2, DC electricity flowing through the traction power system may produce stray currents. If not sufficiently controlled, stray currents could cause corrosion over time to adjacent metal structures that are not sufficiently grounded and protected. With implementation of Sound Transit’s typical design measures described in Section 5, impacts from stray currents are not anticipated. Furthermore, a large portion of the guideway is elevated, reducing the risk to buried utilities from stray current even further.

4.1.1.2 SR 526/Evergreen Segment

Access Laser has equipment that may be sensitive to radio frequency emissions and has queried the possible effects of stray current on the operation of their power transformers. Further engagement will be necessary, during preliminary engineering and potentially through to the end of construction, to clarify which equipment, if any, is at risk and whether mitigation measures are required. Monitoring of the effects on Access Laser's equipment may be necessary when the EVLE is in operation.

4.1.1.3 Everett Station Segment

The metallic Amtrak railroad infrastructure may act as a return path for DC traction return current. In addition to the long-term risk of corrosion, the return current may pose a risk to train detection assets (i.e., DC track circuits) leading to performance or safety-related risks. At their closest point, the alignment alternatives and the Amtrak railroad would be 35 feet apart.

4.1.2 Construction Impacts

EMFs would be generated by any construction equipment that contains a high-power drive, electronics, or radio transmission systems, and during construction and testing of the electrical systems. Given the types and levels of EMF that this equipment would credibly generate, it is not considered likely that the receptors identified would be affected.

4.2 No Build Alternative

If the EVLE Project is not built, there would be no light rail-related changes to the existing electromagnetic environment.

5 POTENTIAL MITIGATION MEASURES

Sound Transit is committed to complying with all applicable federal, state, and local environmental regulations, following best management practices (BMPs), and designing the EVLE Project in a way that mitigates impacts. As a result, mitigation measures are reflected in the design of Build Alternatives. The following section presents additional potential mitigation measures that would further reduce or eliminate adverse effects. Final mitigation measures will be based on advanced design and will be included in the Final EIS and in FTA's Record of Decision as environmental commitments for the project.

For EMF, the key mitigation measures are the project design's compliance with relevant EMF standards and guidance related to health hazards and disturbance to third party equipment.

More detailed design may be required to mitigate EMF impacts on nearby sensitive equipment or infrastructure at a later project stage when greater detail regarding equipment, the surrounding environment, and the operation of the project is known. This particularly relates to the possible interaction with the Amtrak railroad route discussed in Section 4.1.1.3 where consultation with the infrastructure manager would be required to determine what types of assets are present and what impact, if any, the EVLE Project might have on these assets. This consultation, which will occur as part of preliminary engineering, will inform any next steps to mitigate EMF impacts.

For stray current, Sound Transit currently uses effective grounding and stray current protection practices on existing light rail lines and would coordinate with utility providers to identify appropriate practices to mitigate corrosion. Sound Transit would mitigate effects on neighboring facilities by incorporating best stray current management practices appropriate for the project. Typical design measures include:

- Installing cathodic protection systems in nearby utility lines to protect them from corrosion
- Installing insulating unions to break the electrical conductivity of the utility line and force the stray current to take another path
- Isolating the electrical rails from the ground
- Installing stray-current-control track-fastening systems, where appropriate

6 REFERENCES

American Conference of Governmental Industrial Hygienists (ACGIH). 2009. *Threshold Limit Values (TLV) / Biological Exposure Indices (BEI) Guidelines*. https://www.acgih.org/science/tlv-bei-guidelines/.

American Public Transport Association (APTA). 2006. PR-E-S-010-98, Edited 2-13-04. *Standard for the Development of an Electromagnetic Compatibility Plan.*

Institute of Electrical and Electronics Engineers (IEEE). 2019. C95.1-2019 *IEEE Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz.*

International Commission on Non-Ionizing Radiation Protection (ICNIRP). 2009. *ICNIRP Guidelines on Limits of Exposure to Static Magnetic Fields*. https://www.icnirp.org/cms/upload/publications/ICNIRPstatgdl.pdf.

International Commission on Non-Ionizing Radiation Protection (ICNIRP). 2010. *ICNIRP Guidelines for limiting exposure to time-varying electric and magnetic fields (1Hz – 100 kHz)*. https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf.

ATTACHMENT A

EMF Simulations

SIMULATION RESULTS

Introduction To Magnetic Field Theory

The combination of the magnetic fields produced by the electric currents in different conductors requires an accurate solution for the complex geometric problem it presents. The relative direction of the electric currents in each of the conductors is required to be correctly represented for an accurate result.

The magnetic field produced by a current-carrying conductor is determined through the Biot-Savart law.

However, most engineering projects comprise complex arrangements of current-carrying conductors, which make the adoption and implementation of this equation geometrically complicated. Solutions that were developed and implemented in MATLAB® R2021b have been used in this report. In this approach, an infinite conductor solution to the above referenced law has been adopted for long and parallel conductors, which was understood to be adequate for the level of detail required at this stage of the project. The MATLAB® R2021b script and results produced by it have been peer reviewed by technical experts and successfully compared against other commercially available tools, such as PLS-CADD™ (Power Line Systems – Computer Aided Design and Drafting).

Results

The section presents the simulation of the magnetic flux density at one of the proposed stations, Station ASH-D, as an example. It provides preliminary results for the worst-case magnetic fields based on traction currents from the project’s load flow analysis. The following figure represents the cross section used for the station.

Figure A-1 Graphic Representation of the Station ASH-D Cross Section (Looking South)

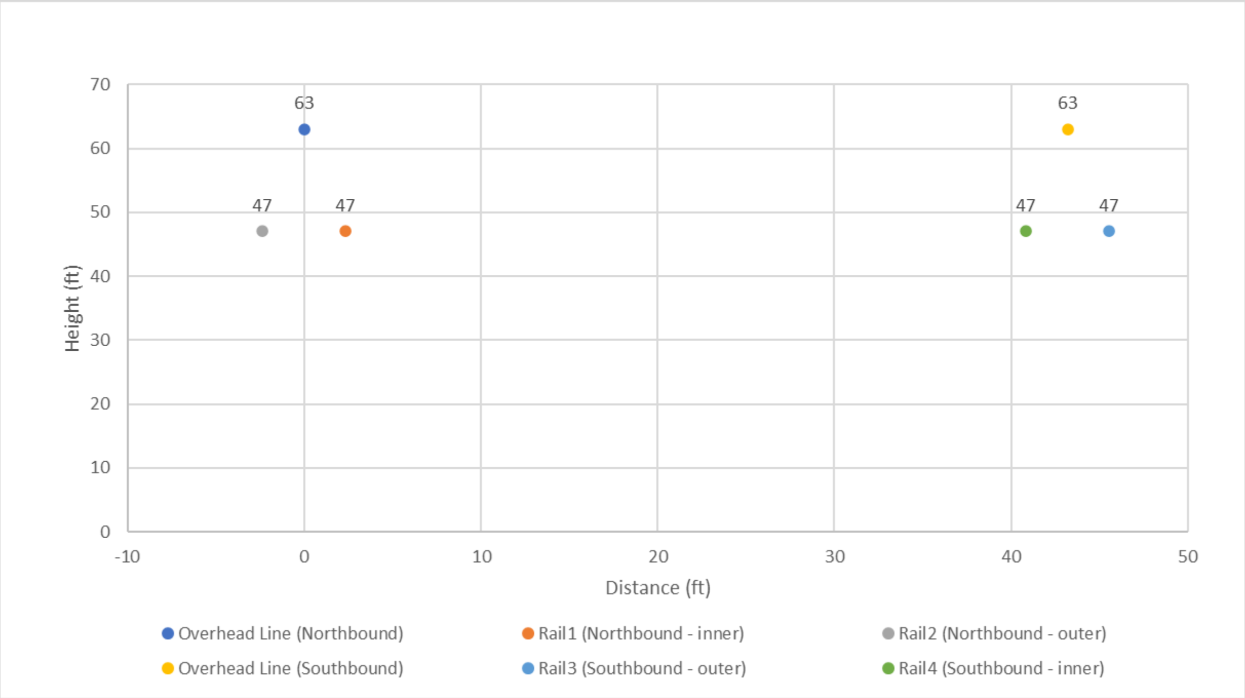
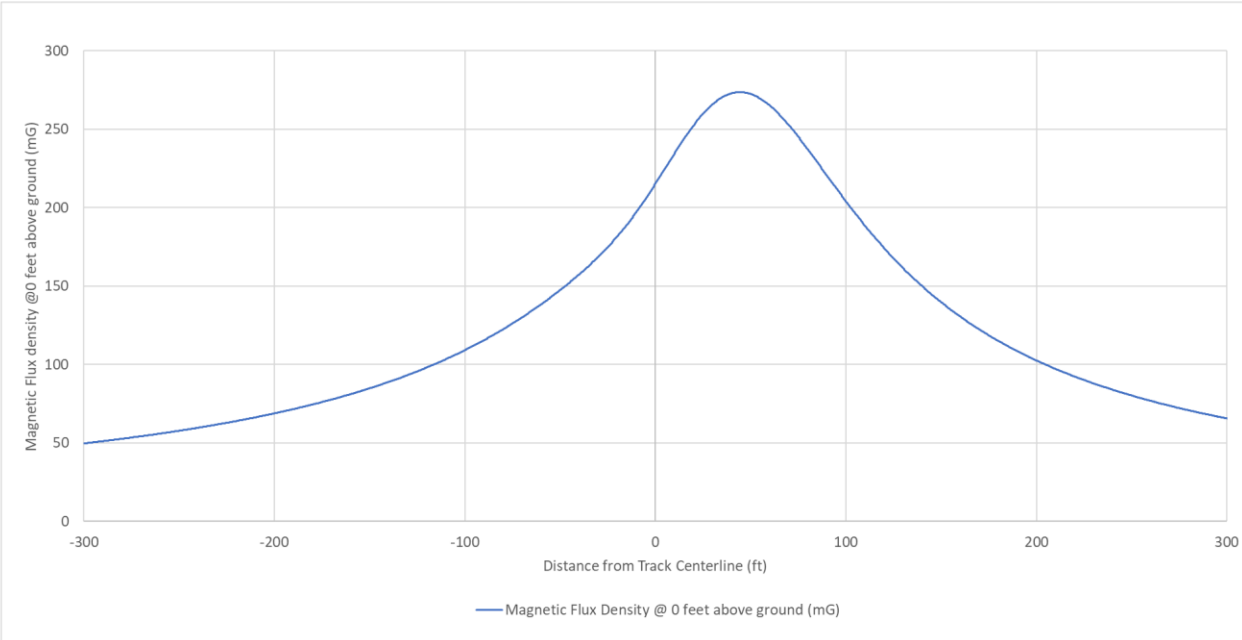


Figure A-2 displays the magnetic flux density obtained at Station ASH-D at ground level considering an observation window of 300 feet from each track.

Figure A-2 Station ASH-D Magnetic Flux Density at 0 Feet Above Ground (Looking South)



ATTACHMENT B

Derivation of Distance to 3 A/m Breakpoint

The least onerous EMF immunity standards specify a 3 amps per meter (A/m) field strength level at 50/60 Hertz (Hz) for equipment intended for residential, commercial, and light industrial environments. Table B-1 contains the details of how the 3A/m breakpoint was derived based on the estimated magnetic field strength calculations detailed in Section 2.2.2. The distance to a 3 A/m EMF strength was recorded for the northbound and southbound light rail tracks for successive pairs of stations, and the worst case (i.e., shortest) distance was identified and used in the assessment.

Table B-1 Distance to 3 A/m EMF Strength

Stations	Distance to 3 A/m from Northbound Alignment (feet)	Distance to 3 A/m for Southbound Alignment (feet)	Worst-Case Scenario (Northbound) (feet)	Worst-Case Scenario (Southbound) (feet)	Segments to Which the Results Are Applicable
Everett Station	182	228	229	275	Everett Station, Broadway/I-5, and SR 526/Evergreen Segments
SR 526/Evergreen Station	229	275			
SR 526/Evergreen Station	229	275	>300	>300	SR 526/ Evergreen and SW Everett Industrial Center Segments
SW Everett Industrial Center Station	>300	>300			
SW Everett Industrial Center Station	>300	>300	>300	>300	SW Everett Industrial Center and SR 99/Airport Road Segments
SR 99/Airport Road Station	216	262			
SR 99/Airport Road Station	216	262	>300	>300	SR 99/Airport Road and Mariner Segments
Mariner Station	>300	>300			
Mariner Station	>300	>300	>300	>300	Mariner and Ash Way Segments
Ash Way Station	>300	>300			
Ash Way Station	>300	>300	>300	>300	Ash Way and West Alderwood Segments
West Alderwood Station	240	287			
West Alderwood Station	240	287	240	287	West Alderwood Segment
Lynnwood City Center Station	206	255			