Vegetation Management Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs

SUMMARY

This utility standard describes the requirements for the Pacific Gas and Electric Company (PG&E) Vegetation Management (VM) Transmission Right-of-Way (ROW) programs, which are ROW expansion (referred to as ROWX) and ROW maintenance (referred to as TIVM). The programs establish and maintain vegetation control in wire and border zone areas underneath and adjacent to overhead electric transmission facilities (managed areas), ensuring that PG&E complies with commitment-based obligations.

ROWX is a one-time effort to manage vegetation within ROWs, widen managed areas to the easement widths or, where possible, beyond easement widths, and mitigate danger trees outside ROWs.

Transmission Integrated Vegetation Management (TIVM) is an ongoing effort to maintain electric transmission-managed areas. TIVM also includes the management of assigned PG&E fee‑owned properties to comply with local city and county weed and hazardous vegetation abatement ordinances.

TARGET AUDIENCE

Vegetation Asset Strategy and Analytics (VASA)

VM Organization, including contractors supporting the ROWX and TIVM programs

Quality Management

TABLE OF CONTENTS

Vegetation Management Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs

REQUIREMENTS

1 Requirements and Commitments

1.1 The ROWX and TIVM programs are not designed to respond to specific regulatory requirements. Regulatory requirements applicable to electric transmission facilities are reflected in TD-7103S and TD-7103P-01.

1.2 The ROWX and TIVM programs are designed to support industry standards and best practices, including goals established in the following documents (commitments):

- California Independent System Operator (CAISO) Transmission Control Agreement (TCA). Refer to Utility Standard RISK-6340S, "Electric CAISO Maintenance Practice Compliance Program."
- PG&E Wildfire Mitigation Plan (WMP) Commitments. See the Community Wildfire Safety Program (pge.com).

1.3 The TIVM program maintains a subset of PG&E electric fee parcels. When maintaining assigned PG&E fee-owned parcels, the TIVM program complies with any state, county, or local city weed abatement ordinances through ongoing collaboration with the Land Department.

2 Goals and Expectations

2.1 The ROWX Program:

1. Widens existing managed areas where land rights or easements allow, or where property owners are willing, to the targeted widths in Appendix A, Table 1.
2. Inspects trees outside managed areas and mitigates trees that, in the professional judgment of the inspector, are danger trees.
3. Implements wire zone–border zone concepts.
4. Removes incompatible vegetation within the resulting managed areas.

2.2 The TIVM Program:

1. Promotes desirable, low-growing plant communities that resist invasion by tall-growing tree species by using appropriate, environmentally sound, and cost-effective control methods.
2. Applies integrated vegetation management (IVM) control methods to manage incompatible vegetation, which may include a combination of chemical, biological, cultural, mechanical, and manual treatments.

a. Applies EPA-approved herbicides by following the applicable regulations to maintain sustainable, low-growing, diverse plant communities compatible with electrical facilities, per Pest Control Adviser (PCA) recommendations.

3. Implements wire zone–border zone concepts.

4. Maintains managed areas to the targeted widths in Appendix A, Table1, as long as supported by PG&E land rights (easements) and customer and agency agreement.

5. Performs timely vegetation control on specific PG&E electric fee parcels managed by Transmission VM.

2.3 To the fullest extent possible, the ROWX and TIVM programs prescribe and complete vegetation work to achieve full enjoyment of PG&E's land rights.

1. The desired outcome is removing incompatible trees and vegetation in the wire and border zones when vegetation work is required.

2. Felling of incompatible vegetation and resprout treatment is preferred. Palm trees that could encroach on clearance thresholds must be listed for removal (see Appendix A, Table 4, "Clearance Thresholds for Incompatible Vegetation"). All century plants must be listed for removal.

2.4 The ROWX and TIVM programs inspect vegetation inside managed areas to identify and mitigate:

1. Vegetation that could encroach on PG&E-defined clearance thresholds for incompatible vegetation for high voltage conductors see Appendix A, Table 4, "Clearance Thresholds for Incompatible Vegetation").

NOTE

The clearance thresholds for incompatible vegetation exceed the PG&E-defined minimum clearance requirements, as shown in Appendix A, Table 3, "PG&E Minimum Clearance Requirements Around Transmission Lines."

2. Vegetation that overhangs or which could break the vertical plane of the outside conductor (overhang) within the next year.

3. Vegetation that prevents access to the area to allow transmission line personnel and/or equipment to get in and do maintenance, construction, or emergency work.

4. Woody vegetation that obscures the inspection of poles, tower footings, and guy wires. The programs should obtain and maintain 10 to 15 foot tower/pole footprint clearances and 5 foot guy wire clearances.

5. High levels of vegetative fuels in the ROW, including debris from prior Electric Transmission VM activities.

2.5 PG&E implements a modification of the wire zone–border zone concept to provide accommodation for the differences in line height and movement throughout a span along with topography. (See topographical exclusions definition below.) Ground to conductor clearance may allow for effective border zones within the ROW to be established. (As an illustration, see Appendix B, Figure 1, "Effective Border Zone.") However, no species should be promoted that have the genetic propensity to encroach on minimum vegetation clearance distances.

2.6 Incompatible vegetation may be pruned where removal is prevented by constraints, such as areas with environmental or agency restrictions, land rights limitations, customer interference, maintained landscapes, AND where pruning can mitigate fall-in or grow-in risks. Slow growing and large diameter trees may remain in managed areas, provided that they won't grow within the clearance thresholds in the next 5 years (see Appendix A, Table 4, "Clearance Thresholds for Incompatible Vegetation").

2.7 A reasonable attempt is made to provide customers or property owners written notification identifying the inspections planned on their property, when feasible. As needed, subsequent discussions are conducted and documented, including agreements with property owners, land managers, or agencies. Other internal and external stakeholders are engaged as necessary.

2.8 An imminent threat must receive an immediate response to remove such threat. An imminent threat is a vegetation condition affecting NERC transmission lines that is likely to cause a fault at any moment or vegetation that is within the NERC Minimum Vegetation Clearance Distances (MVCD). See Utility Procedure TD-7103P-09, "Transmission Vegetation Management Imminent Threat and Hazard Notification Procedure."

3 Roles and Responsibilities

3.1 The Vegetation Asset Strategy and Analytics (VASA) team is responsible for Scope of Work, development, in collaboration with input and review from VM Operations personnel.

3.2 The VM Operations team is responsible for creating procedures and processes to meet the expectations of this standard and support compliance with regulatory requirements. The VM Operations team is also responsible for executing day-to-day operational tasks to meet the expectations in this standard and compliance obligations.

1. The primary responsibility of a Vegetation Program Manager (VPM) is overseeing and guiding program execution.

2. The primary responsibility of a Project Setup Contractor (PSC) or VM inspector (VMI) is to oversee projects, inspect vegetation, and prescribe work in accordance with program requirements and industry best practices. Responsibilities include regular field checks for quality management and documenting work as complete in the system of record.

3. The primary responsibility of a vegetation/tree contractor is to execute the prescribed vegetation work, including vegetation treatment and cleanup work, in compliance with program requirements and industry best practices.

3.3 The Vegetation Management Vice President and the Wildfire and Enterprise Risk Management Vice President, or their delegates, are responsible for approving variances to this standard.

4 Industry Standards and Arboriculture Practices

4.1 The programs must consider industry standards and best management practices such as, but not limited to, the documents listed in the "Reference Documents" section.

5 Vegetation Management Cycles

5.1 The ROWX and TIVM programs have two cycles: inspection and work cycles.

5.2 During the inspection cycle, vegetation is inspected and listed for work to ensure adherence to program requirements. Inspections for the programs may be made in the year before the work cycle.

5.3 During the work cycle, vegetation treatment, pruning, removal, and felling are performed to ensure adherence to program requirements.

5.4 The cycles are planned on an annual timeline but allow for unforeseen schedule changes when a constraint or external factor is documented.

6 Annual Planning

6.1 Work plans are created annually before the inspection cycle begins, prioritizing work in the High Fire-Threat Districts (HFTD) and High Fire Risk Areas (HFRA).

6.2 Prioritization of TIVM is based on aging work cycles and evaluation of vegetation regrowth. After the initial work is performed, the ROWs are reassessed every 2 to 5 years.

6.3 Thresholds for implementing TIVM are considered when incompatible vegetation exceeds 3 feet in height or exceeds 50% ground coverage within the managed area.

6.4 Most urban areas and all agricultural vegetation are excluded from the ROWX and TIVM work plans.

6.5 The planning process identifies the scope of work and opportunities to adjust the schedule based on the data and information available. Data and information are available and can include, but are not limited to, light detection and ranging (LiDAR) data, ETGIS data, modeling, input or requests from local experts, environmental considerations, tree species growth or failure rates, outage and ignition data, past project history, and coordination with wildfire mitigations outside of vegetation management.

7 Records Management and Data Integrity

7.1 The ROWX and TIVM programs are required to document work and to create and complete records per the "Records and Information Management" section below.

END of Requirements

DEFINITIONS

Border Zone: A section of an electric transmission ROW that extends a specific distance from either side of the wire zone to the ROW edge, usually managed to promote non-tree, mixed vegetation below a specified height (contrast with effective border zone and wire zone). See Appendix B, Figure 2, "Wire Zone and Border Zone."

Constraint: A situation that occurs when a customer, property owner, agency, or an environmental restriction obstructs or delays PG&E inspection work or the completion of the intended vegetation work.

Danger Tree: Any tree located on or adjacent to a utility right-of-way or facility that could damage utility facilities should it fall where (1) the tree leans toward the right-of-way, or (2) the tree is defective because of any cause, such as: heart or root rot, shallow roots, excavation, bad crotch, dead or with dead top, deformity, cracks or splits, or any other reason that could result in the tree or main lateral of the tree falling. (Source: Cal. Admin. Code title 14, § 895.1)

Easement: An interest in land owned by another person or entity that gives the owner of the easement limited right to that land for a specific, defined purpose. It is a non-possessory, restricted right for a specific use or activity on the land of another that is less than ownership. Used interchangeably with right-of-way.

Effective Border Zone: A modification of the traditional border zone concept where a high-voltage line has sufficient ground-to-conductor clearance to accommodate mixed vegetation including trees and shrubs throughout the ROW (contrast with border zone). See Appendix B, Figure 1, "Effective Border Zone."

Fee Properties: PG&E parcels that are owned in "fee" which are subject to state and local weed abatement and defensible space fire ordinances. Instead of an easement interest on lands of another, the Company owns the strip of land.

Felling: Dropping or cutting down a tree.

Hazard Trees: A whole or partial tree that is dead, exhibiting signs of disease, decay, or ground/root disturbance and may fall into or otherwise impact electric facilities.

- **All lines:** Trees that are dead or show signs of disease, decay, or ground or root disturbance which might fall into or otherwise impact the conductors, towers, or guy wires before the next inspection cycle.
- **NERC lines only:** In addition, trees within the easement with a likely potential to fail within the next two years which would pass within the PG&E minimum clearance requirements.

- **All lines in HFTD:** In addition to traditional arboricultural evaluation of trees for hazard, transmission VM has both LiDAR and wind modeling that can be used to further inform decision making.

High Fire Risk Area (HFRA): An area designated by PG&E for use in scoping Public Safety Power Shutoff events, where risk factors for the potential of catastrophic fire from utility infrastructure ignition during offshore wind events is higher.

High Fire-Threat District (HFTD): Those areas comprised of the following:

- Zone 1 is Tier 1 of the latest version of the United States Forest Service (USFS) and CAL FIRE's joint map of Tree Mortality High Hazard Zones (HHZs). (Note: The map may be revised regularly by the USFS and CAL FIRE.)
- Tier 2 is Tier 2 of the CPUC Fire-Threat Map.
- Tier 3 is Tier 3 of the CPUC Fire-Threat Map.

Incompatible Vegetation: Vegetation that is undesirable or unsafe or that interferes with the intended use of the site. This includes any vegetation that can grow to a height that encroaches into the PG&E minimum vegetation clearance distances, presents a potential fire hazard, impedes access, or obscures the inspection of facilities.

Integrated Vegetation Management (IVM): A system of managing plant communities in which compatible and incompatible vegetation are identified, action thresholds are considered, control methods are evaluated, and selected controls are implemented to achieve specific objectives.

LiDAR: Light detection and ranging technology used to determine vegetation conditions, predominantly distances and clearances, in relation to electric conductors and easement boundaries.

Managed Area: Areas, including the wire zone and border zone, where vegetation maintenance is occurring. This may include vegetation within the easement or ROW along with areas outside of the easement where widening is agreed upon or may have historically occurred. See Appendix A, Table 1, "Targeted Width of the Managed Area."

Minimum Ground to Conductor Clearance (MGCC): The closest the lines can sag to the ground based on clearances listed in CPUC General Order 95, Rule 37, Table 1, and Case 4. MGCC is provided through engineering analysis of "as-flown" LiDAR data which have been analyzed to determine maximum conductor sag along the line span.

Overhang: A tree and/or limb breaking the vertical plane of the outside conductor. As part of both routine and other transmission VM operations, management of overhang is accomplished by removing limbs substantially beyond the vertical plane.

Right-of-Way (ROW): See easement definition.

Topographical Exclusions: Areas below the conductors, such as canyons or ravines, where sufficient vegetation-to-conductor clearance is always achieved without vegetation

management and where heat damage to conductors from a wildfire passing below would be minimal.

Wire Zone–Border Zone Concepts: The wire zone is managed to develop low-growing plant communities dominated by grasses, herbs, and small shrubs. The border zone is the remainder of the ROW. It is managed to establish shrubs and trees that are compatible with electric facilities.

Wire Zone: The section of an electric transmission ROW under the wires and extending out both sides to a specified distance, usually managed to promote low-growing vegetation (contrast with border zone). For 60/70 kV facilities, the wire zone is the section of the corridor located between the outside conductors plus 10 feet on each side. For 115 kV and 230 kV facilities, the wire zone is the section of the corridor located between the outside conductors plus 15 feet on each side. For 500 kV facilities, the wire zone is the section of the corridor located between the outside conductors plus 20 feet on each side. See Appendix A, Table 2, "Wire Zone Width," and Appendix B, Figure 2, "Wire Zone and Border Zone."

IMPLEMENTATION RESPONSIBILITIES

The Vegetation Asset Strategy and Analytics team is responsible for the development and communication of this standard to VM Operations leadership, as well as the periodic review of this document.

VM Operations is responsible for the communication of this standard to applicable Operations personnel by providing training and conducting regular reviews to ensure adherence.

GOVERNING DOCUMENT

TD-05, "Vegetation Management Policy"

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

PG&E Transmission Maintenance Agreement, approved and enforced by the California Independent System Operator (CAISO)

PG&E Wildfire Mitigation Plan (WMP)

State, county, and city weed abatement ordinances

Records and Information Management:
PG&E records are company assets that must be managed with integrity to ensure authenticity and reliability. Each Functional Area (FA) must manage Records and Information in accordance with the Enterprise Records and Information (ERIM) Policy, Standards and Enterprise Records Retention Schedule (ERRS). Each FA is also responsible for ensuring records are complete, accurate, verifiable and can be retrieved upon request. Refer to GOV-7101S, "Enterprise Records and Information Management Standard" for further records management guidance or contact ERIM at Enterprise_RIM@pge.com."

Vegetation Management Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs

REFERENCE DOCUMENTS

Developmental References:

California Power Line Fire Prevention Field Guide

ANSI A300, “Tree Care Standards,” Tree Care Industry Association (TCIA)

International Society of Arboriculture (ISA) Best Management Practices, “Pruning,” “Utility Pruning of Trees,” “Integrated Vegetation Management,” “Tree Risk Assessment,” and “Utility Tree Risk Assessment”

Supplemental References:

PG&E Wildfire Mitigation Plan

RISK-6340S, “Electric CAISO Maintenance Practice Compliance Program”

TD-1005S-Att01, “Electric Transmission Right-of-Way Management Plan”

TD-7103S, “Transmission Vegetation Management Program”

TD-7103P-01, “Vegetation Management Transmission Inspection Procedure”

TD-7103P-09, “Transmission Vegetation Management Imminent Threat and Hazard Notification Procedure”

TD-7111P-01, “Transmission Integrated Vegetation Management Right-of-Way Maintenance Procedure” (formerly TD-7103P-04)

TD-7111P-02, “Vegetation Management Transmission Right-of-Way Expansion (ROWX) Procedure”

APPENDICES

Appendix A, Managed Area Widths and Clearance Distances

Appendix B, Visual Examples of Managed Areas

ATTACHMENTS

NA

DOCUMENT RECISION

TD-7111S, “Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs,” Rev. 0, 05/26/2022

Vegetation Management Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs

TD-7103S, “Transmission Vegetation Management Standard,” Rev. 2, 10/01/2016 (Section 4, Right-of-Way (ROW) Maintenance Program)

DOCUMENT APPROVER

[redacted] Director, Vegetation Management

Concurrence:

[redacted], Director, Vegetation Asset Strategy and Analytics

DOCUMENT OWNER

[redacted] Director, Vegetation Management

DOCUMENT CONTACT

[redacted] Principal Asset Management Specialist, Vegetation Asset Strategy and Analytics

[redacted] Expert Vegetation Program Manager, Vegetation Management

[redacted], Senior Vegetation Program Manager, Vegetation Management

REVISION NOTES

Where	What Changed
Throughout	Sections moved and renumbered.
Section 1	Wildfire Mitigation Plan commitments added.
Section 2	Full enjoyment of the easement added.
Section 3	Roles and responsibilities summarized. Procedural details removed. Data management specialist (DMS) removed.
Definitions	Definitions added: border zone, constraint, easement, effective border zone, fee properties, felling, HFRA, HFTD, IVM, managed area, topographical exclusions, wire zone–border zone concepts, and wire zone.
Appendix A	Tables revised: Minimum wire zone added. Preferred clearance replaced with minimum clearance around lines. Overhang area removed. Diagram removed.
Appendix B	Diagrams added of wire zone and border zone and of effective border zone.

Vegetation Management Transmission Right-of-Way (ROW) Maintenance and ROW Expansion Programs

Appendix A, Managed Area Widths and Clearance Distances

Table 1. Targeted Width of the Managed Area

	60/70 kV	115 kV	230+ kV
Targeted Width of the Managed Area	80 ft.	100 ft.	120 ft.

Note:

- PG&E manages the existing managed area, which in some areas is wider than the targeted width.
- Divide the width values to calculate widths from the centerline (e.g., 60 kV and 70 kV lines: 80 ft., with 40 ft. on each side of the centerline).

Table 2. Wire Zone Width

	60/70 kV	115 kV	230 kV	500 kV
Wire zone width, beyond the outside conductors on each side	10 ft.	15 ft.	15 ft.	20 ft.

Note: See Appendix B, Figure 2, for a diagram of the wire zone.

Table 3. PG&E Minimum Clearance Requirements Around Transmission Lines

	60/70 kV	115 kV	230 kV	500 kV
PG&E Minimum Clearance Requirement	4 ft.	10 ft.	10 ft.	15 ft.

Note: The PG&E-defined minimum clearance distances are designed to meet or exceed all applicable regulatory requirements, including NERC Reliability Standard FAC-003-4 and CPUC GO 95, Rule 35.

Table 4. Clearance Thresholds for Incompatible Vegetation

	60/70 kV	115 kV	230 kV	500 kV
Clearance Thresholds for Incompatible Vegetation	6 ft.	12 ft.	12 ft.	22 ft.

Note: Trees or vegetation that could grow within these threshold distances are considered incompatible and using professional judgement should be mitigated (pruned or felled) with felling typically being the preference. The primary concern is trees in the wire zone, but trees in the border zone that could also grow into the threshold distances should be mitigated.

Appendix B, Visual Examples of Managed Areas
Page 1 of 2

Image courtesy of International Society of Arboriculture

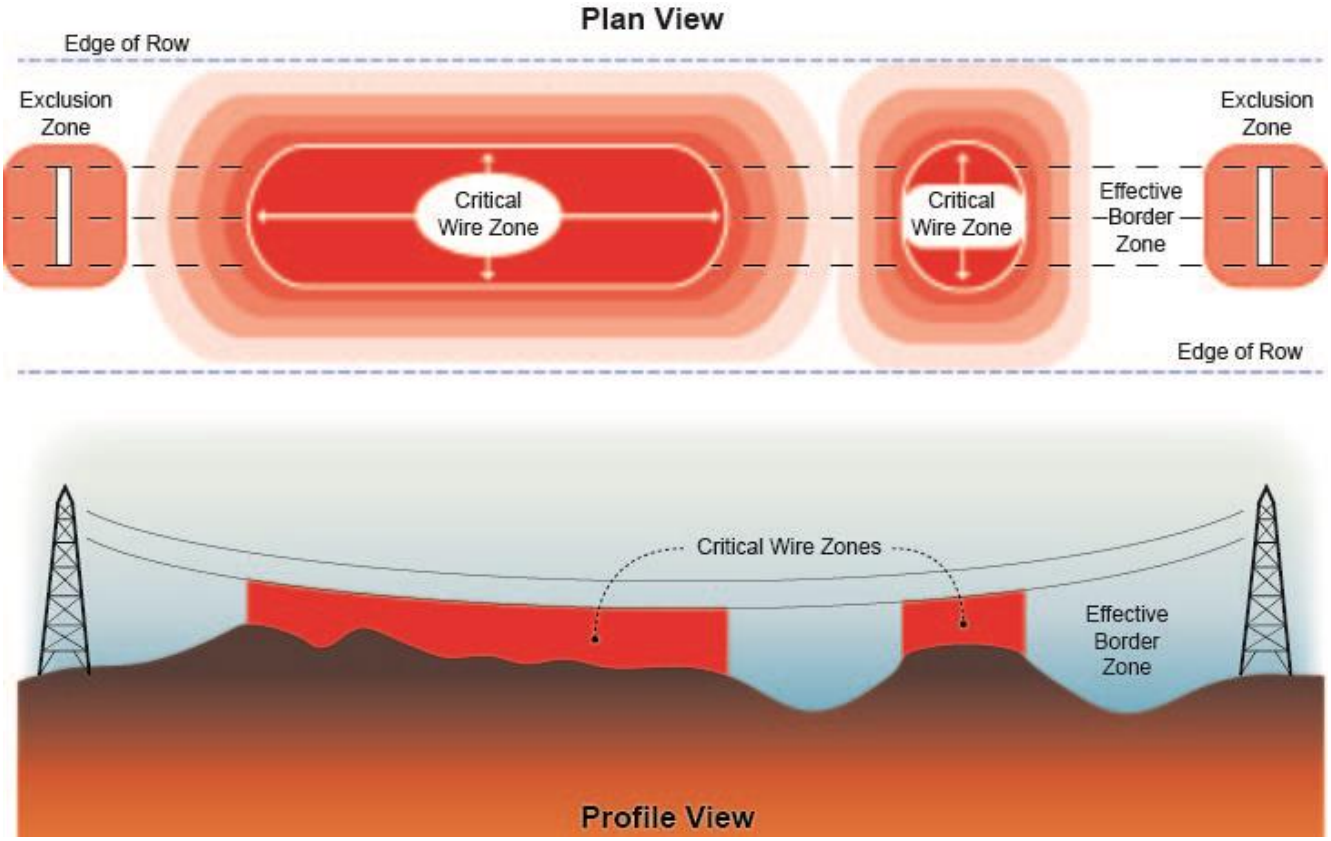

Figure 1. Effective Border Zone

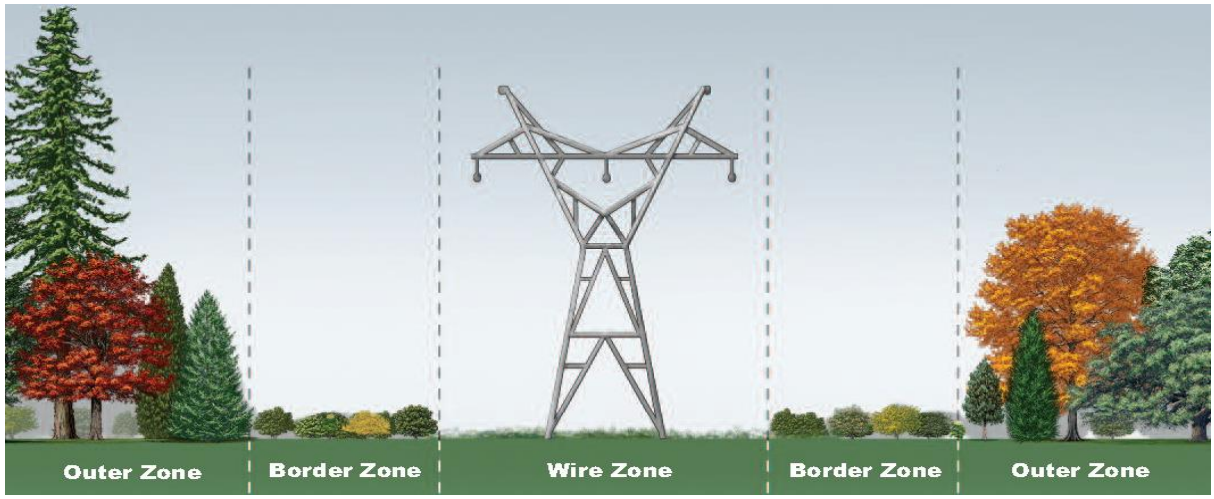

Figure 2. Wire Zone and Border Zone

Appendix B, Visual Examples of Managed Areas
Page 2 of 2

The photographs below show a ROW before and after application of the ROWX requirements.

Figure 3. ROW Before ROWX Work

Figure 4. ROW After ROWX Work