

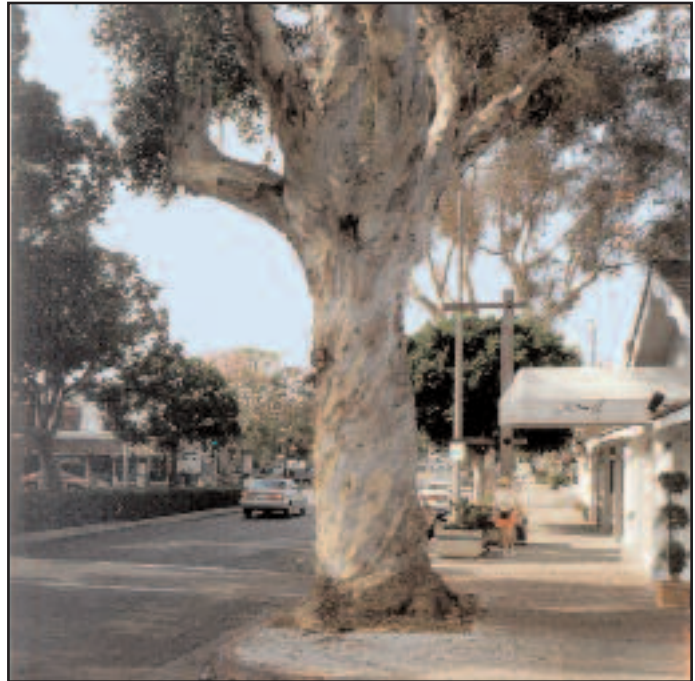
Right of Way Tree Encroachment

A Growing Issue

Do trees and plants negatively impact infrastructure in rights of way?



Quick and easy access to pipelines is critical.



Tree management plans include identification and evaluation of vegetation encroachment hazards.

“Managing encroaching trees within rights of way is an important consideration for many agencies. Conflicts between tree canopies and electrical transmission lines are well-documented, but below-ground conflicts between roots and buried infrastructure result in costly structural damage and potential losses of service.”

BY MICHAEL S. HUFF

Encroaching vegetation can be a significant problem within public easements and rights of way (ROW). Heightened focus on security of linear infrastructure (electrical transmission lines, railways, pipelines, etc.) has prompted public works officials to look closely at the conditions within miles of utility and transportation corridors. Trees and large shrubs within the ROW can affect security and physical access as well as damage facilities. Federal regulations mandate that ROWs be maintained in a manner that allows safe operation. In a precedent-setting example, a pipeline company in Texas was fined by the Department of Transportation for failure to maintain or remove large trees in a residential area thereby creating an unsafe ROW. While structures, fences, pools, driveways, etc., are often unknowingly constructed within established ROWs, by far the most prevalent encroachment is by vegetation — trees causing the most problems. Unmanaged, trees will establish and thrive at amazing rates, threatening access, maintenance, security and even structural integrity, as well as enhancing wildfire damage potential.

Tree and vegetation encroachment in the ROW is a major issue for electrical utilities. One of the largest line items in most electrical distributor's budgets is vegetation management. For example, large utility companies in California spend millions of dollars every year to trim and remove trees within their ROW. Underground utilities also can be negatively impacted by vegetation. A management program will reduce overall system costs, particularly by mitigating the associated risks of large trees and shrubs within ROWs.

The Urban & Community Forestry staff at Dudek works with public agencies and its in-house environmental staff to develop and fund programs to identify, evaluate and manage vegetation encroachment hazards. Dudek is currently working with Southern California Edison to survey and monitor the removal of hundreds of thousands of dead pine trees from electrical transmission ROW to minimize the possibility of trees falling into lines and the possibility of wildfire that also could disrupt transmission.

Experienced arborists and urban foresters use global positioning system (GPS) technology to locate and inventory encroaching trees and shrubs by species, size and distance from the utility, etc., and then identify and prioritize existing or potential threats. Access, security and structural threats are a function of tree numbers, sizes and ages, species, and distribution. Once the database is established, a prioritized maintenance plan is prepared with estimated costs in accordance with environmental regulations. When recommending the removal of high-impact trees, the plan also focuses on the prevention of future problems. And when aesthetics are an issue, recommending the replacement of high-impact trees with low-risk, beneficial trees may be appropriate. A tree management plan will provide a framework for:

- Managing/removing existing trees in the ROW
- Constraining future tree growth or establishment in the ROW
- Defining approved (aesthetic) plantings, if appropriate
- Complying with federal, state and local regulations and policies

Using Technology for Better Presentation

GPS and geographic information system (GIS) technology allow for the preparation of ROW maintenance plans with viewer friendly exhibits detailing types of features, where they are located and color or symbol codes for priority rankings. GIS analysis is also used to determine priority inspection and resulting mitigation for areas that traverse large sections of native vegetation. Concentrations of high-priority removal and maintenance are better identified, presented and appropriately budgeted.

Graphically enhanced maintenance plans facilitate dealings with neighboring landowners. Neighbors are often emotionally attached to encroaching vegetation and must be contacted and informed of pending removals. Before and after visuals often are necessary to show the public in order to obtain cooperation, particularly when replantings are required.

Well-prepared plans facilitate better contractor management. Graphic-based, specific, easy-to-understand plans and specifications help assure that maintenance and removals are completed professionally and efficiently and avoid disturbing property outside the easement. A knowledgeable urban forestry professional must then work with the contractor, providing regular inspections and providing ideas to correct non-approved practices.

The city of Irvine, CA, includes nearly 50,000 city-owned trees. These trees vary in sizes and are planted within city ROWs. Above-ground issues include smaller utilities that may be affected by falling trees, branches or litter. Below-ground issues include sewer, water and other buried utilities that can be damaged by aggressive root systems. Dudek inventories, GPS maps and assesses the ROW trees on a 3-year cycle with a focus on identifying potential issues — either above or below ground — and then prescribing management options to mitigate the potential threat. ROW in urban areas and in more remote locations are prone to invasive (or citizen planted) trees. Often times, these trees are not appropriate for a ROW location due to their mature height, aggressive roots or tendency to limb or total tree failure. Regular inspections catch these issues before they become more costly and politically difficult to mitigate.

Periodic monitoring and database updating are required to avoid future large-scale tree and shrub removal work, resulting in long-term cost savings.



Telephone wires - Tree and vegetation encroachment in the ROW is a major issue for electrical utilities

Types of Tree Encroachment Impacts Potentially Occurring within Your Right of Way

1. Subterranean Root Impacts

- a. Damage to pipeline protective coating – premature corrosion through root contact with pipeline
- b. Growth under pipeline or conduit – lifting or displacement as root expands
- c. Growth around pipeline or conduit – displacement, lever effect with tree failure, pressure
- d. Penetration – old gaskets or fine cracks, degradation of joints
- e. Soil voids – dead and decomposing roots leave soils voids and the potential for trench subsidence
- f. Soil changes – tree transpiration can cause repeated expansion and shrinkage of soils
- g. Lifting or degradation of footers of transmission towers or substations

2. Surface Impacts

- a. Tree failure on above-ground mechanisms or pipeline
- b. Trees obscure visible damage or exposed sections of the pipeline
- c. Trees hinder access to damaged sections of the pipeline

3. Liability Issues

- a. Tree failure damage to private property or persons
- b. Pipeline failure repairs delayed due to tree-related access issues resulting in increased damage to private property
- c. Tree removal during an emergency may invite lawsuits for tree replacement value
- d. Un-maintained vegetation can enhance wildfire potential and intensity

4. Security Issues

- a. Dense vegetation and tree canopy conceal potentially dangerous activities and situations
- b. Tree and brush cover can conceal minor utility failures
- c. Excess vegetation provides cover for vandals, terrorists, etc., targeting above- or below-ground utilities