



**MEMO TO: PLANNING COMMISSION**

**FROM: Pete Sullivan, Senior Planner, 556-2406**

**DATE: July 15, 2011**

**SUBJECT: Conceptual alternative strategies for implementing undergrounding requirement for utility distribution lines**

## **I. BACKGROUND AND REASON FOR PROPOSAL**

In response to a request from City Council, staff reviewed conceptual alternatives for implementing policy UT-15 in the Utilities Element of the Comprehensive Plan. The policy speaks to undergrounding existing utility distribution and individual service lines. For distribution lines, the policy identifies three implementation approaches:

- 1) requiring undergrounding of utility distribution lines as a condition of development,
- 2) undergrounding utility lines or providing for future undergrounding as street projects occur, or
- 3) funding undergrounding through a capital improvement program or local improvement district.

Planning staff have identified three conceptual alternatives starting on page 5, and with feedback from the Technical Committee, has formulated a preliminary preferred alternative shown on page 7 which staff believes merits further evaluation. Staff asks the Planning Commission to review the background, alternatives, and recommendation contained in this memo, and hold a targeted discussion as part of its July 20, 2011 public hearing and study session and subsequent study session as needed. The Commission's recommendation regarding which conceptual alternative(s) should be further evaluated will be forwarded to City Council within the Planning Commission's Report on the Capital Facilities and Utilities Comprehensive Plan Element, currently under review.

Lastly, staff is continuing to consult with the City Attorney regarding the conceptual alternatives and at the July 20 meeting may be able to offer more information on how implementation concepts could be translated into code requirements. Whether or not that information is

available, staff still requests the Planning Commission consider alternatives at the conceptual level, knowing that further research and feasibility study will be required prior to amending the Zoning Code.

## **II. CURRENT COMPREHENSIVE PLAN / ZONING CODE REQUIREMENTS:**

The Utilities Element of the Comprehensive Plan includes general policies (Exhibit A) about above-ground and below-ground utility placement. Narrative within the element cites three main advantages for locating utilities underground.

- **Environmental quality**  
Prevents the need to prune trees and shrubs, which can be detrimental to the plant, both functionally and aesthetically
- **Aesthetic impact**  
Reduces negative visual impacts, such as unsightly overhead power lines
- **Safety and Security**  
Better withstands temporary loss of electrical and telecommunications service due to events such as wind storms and car accidents, and protects the public from fallen lines

The Redmond Zoning Code (Exhibit B) implements Comprehensive Plan policy for utility undergrounding in chapter 21.54.020 - *Electrical Equipment and Wiring*. The regulation's purpose and current requirements are summarized below, followed by potential alternatives.

### Purpose

RZC 21.54.020 ensures the placement of utilities underground in order to:

- Eliminate safety issues caused by damaged overhead lines;
- Reduce the number of service interruptions caused by storms;
- Remove utility poles which are a hazard along streets; and
- Increase the appearance and aesthetics of the public ways.

When required

**1. Existing aerial wiring relocated underground and new facilities installed underground within a property and within the public right-of-way abutting the property when:**

- Subdivisions and short subdivisions are developed;
- Local improvement districts are developed;
- Street or utility improvements are undertaken;
- Binding site plans are developed;
- New commercial, industrial or multifamily residential buildings are constructed;
- Remodeling, additions, or conversions to commercial or industrial uses that increase gross floor area by 50 percent or more, or any alterations or repairs which exceed 100 percent of the value of the previously existing structure
- Single-family and multifamily residential buildings whenever any alterations or repairs exceed 100 percent of the value of the previously existing structure; or
- Building complexes or other projects are developed and are of a size to warrant undergrounding.

**2. Wiring serving a building or property shall be relocated or placed underground from the point of primary distribution to within a property when:**

- Overhead electrical, communication, and primary utility distribution facilities are relocated underground;
- Remodeling, additions, or conversions to commercial or industrial buildings takes place;
- Electrical service panel within a structure or the service lines to the structure are upgraded or modified; or
- Remodeling or additions to the existing residential buildings that increase gross floor area by 20 percent or more, or any alterations or repairs which exceed 100 percent of the value of the previously existing structure.

**3. *All new equipment related to the provision of electrical service, communications, or other utilities, except transformers, switch cabinets, traffic signal cabinets and street lighting cabinets, shall be installed in one of the following locations:***

- Underground;
- Inside a building;
- In a service alley;
- Immediately adjacent to a building and screened from view; or
- In a landscaped area and screened from view;
- The Technical Committee may approve an alternate location if the above are not feasible.

**4. *Existing above-ground equipment, except transformers, switch cabinets, traffic signal cabinets, and street lighting cabinets, shall be relocated within one of the locations described in item 3 when any conditions in items 1 and 2 are present.***

**5. *As overhead facilities are relocated underground, persons and businesses served by such facilities shall relocate and connect to new underground facilities within 90 days of undergrounding completion.***

#### Exemptions

- Electrical distribution substations
- Electrical lines of greater than 50 kV capacity unless it can be shown that the undergrounding of these lines has become economically feasible.
- Where the utility demonstrates that its facilities will not function properly if located underground or cannot be maintained properly if so located
- A private property owner may petition the Technical Committee for relief from any of the above requirements if unusual circumstances render compliance with the regulation an unnecessary hardship.

**Note:** As part of the code updates City Council adopted in April 2011, the City revised the requirements in section 1 above for relocation of existing aerial wiring along the public right of way and within a property. The revision changed the threshold for undergrounding for remodeling or additions to commercial floor area from an increase of 20 percent or more in gross floor area to an increase of 50 percent or more. The revision also changed the threshold for residential buildings from alterations or repairs that exceed 50 percent of the value of the previous existing structure to 100 percent or more of the value of the previous structure.

Typical costs for single family residence

Conversion costs consist of two components: undergrounding overhead utilities along the frontage and undergrounding service lines from the street to the home. Typically 80 to 90 percent of the cost is for undergrounding overhead utilities along the frontage, which usually includes power, telephone and cable TV. This cost is highly variable and depends on factors such as the configuration of the utilities on the poles (type, size, and location) and whether power lines are single phase, which is typical in residential areas, or three phase or three phase feeders.

A site specific, engineered design for frontage conversion work is usually required.

Undergrounding is typically done between utility poles. Depending on location of the poles, an owner might have to also underground all or a portion of their neighbor's frontage. Setting new or intermediate poles to reduce the length of the underground installation (and the cost) is not allowed.

Scenario #1 Estimated cost for a relatively simple, single span conversion (no poles within frontage) is approximately \$30,000 to \$40,000 (Exhibit C). Eighty to ninety percent of this cost is for undergrounding the frontage.

Scenario #2 For a relatively simple, two span conversion (one pole within frontage) the estimated cost is approximately \$45,000 to \$65,000. Over ninety percent of this cost is for undergrounding the frontage.

### **III. ALTERNATIVES**

The City's current approach in implementing undergrounding utility distribution lines is to share costs with private utilities for public projects, and require individual property owners to cover the full costs of undergrounding utilities associated with private development. Two downsides with this approach are that it results in an incremental undergrounding of existing aerial utilities and can create potentially disproportionate cost burdens for minor improvements.

The conceptual alternatives below are proposed to apply to single family properties. Staff recommends maintaining the current implementation approach for Short Plats, Plats and for Multi-family, Commercial and Industrial properties.

**1. Adopt a corridor approach where single family property owners contribute a pre-determined amount toward funding a future City project that undergrounds frontage utilities along an entire corridor, as opposed to the current incremental effort that undergrounds spans one parcel at a time.**

- Single family property owner pays into a fund for future capital improvements performed by the City
- The City of Redmond currently has a utility undergrounding program in support of various types of capital improvement projects, which would be further supported by fees collected from single family property owners. The program currently operates in an opportunity-based manner, in which undergrounding projects are performed in tandem with private, and/or energy utility projects, such that an entire block or corridor becomes underground all at once.

Pros: Economies of scale; protects single family property owners from very high costs;

Cons: Isolated segments may not be good candidates for area-wide approach

**2. Maintain the incremental approach but increase the City's contribution for undergrounding**

- Increase funding for utility undergrounding in City CIP
- Cap the total amount (valuation; fixed cost) single family property owners are responsible for, with City covering the remainder

Pros: Protects affected single family property owners from high costs

Cons: Could maintain or lengthen the time period for eventual conversion; could increase costs burden for all property owners; diverts money from other projects

**3. Maintain the incremental approach but revise code provisions regarding when undergrounding is required, such as:**

- Increase valuation thresholds for when undergrounding of distribution lines for single family property owners is required
- Increase exemptions – such as exempting remodels of existing single family structures
- Allow the Public Works director to authorize a delay in undergrounding when there is a planned future public or private project in the area.
- In the City of Woodinville a homeowner is exempt if undergrounding exceeds 2.5% of project cost

Pros: Protects affected single family property owners from high costs

Cons: More distribution lines would remain aerial, resulting in associated environmental, aesthetic and service reliability impacts for the community

**IV. STAFF RECOMMENDATION**

The Technical Committee’s preliminary preferred conceptual alternative for further evaluation is Alternative 1, as it protects single family property owners from paying high costs for relatively minor projects, and may enable the City to more efficiently implement associated Comprehensive Plan policies.

**V. EXHIBITS**

**A. Current Comprehensive Plan policies related to utility undergrounding**

**B. Current zoning code provisions for utility undergrounding**

**C. Utility undergrounding cost estimates for single family home**

## **Exhibit A: Current Comprehensive Plan policies related to utility undergrounding**

### ***Environmental Considerations***

Redmond has many natural features, such as fish spawning creeks, open space, and forested areas. Minimizing utility intrusion into these areas is a means of protecting these important assets by preventing initial destruction of habitat for installation. When utilities are allowed to build in wetlands, periodic maintenance will require intrusion into sensitive areas and may disrupt wildlife during critical reproductive periods. Utility corridors often need to be free of vegetation for maintenance purposes. Similarly, sewage or stormwater lines that are not carefully located, designed, and constructed can create undesirable environmental impacts.

Placing utilities underground prevents the need to prune trees and shrubs, which can be detrimental to the plant and often result in oddly shaped plants. Undergrounding also can be more aesthetically pleasing, and can reduce the incidence of power and telecommunications loss during events such as storms and auto/utility pole accidents as well as protect the public from fallen lines. Above-ground facilities can be designed to be compatible with or to enhance an area. Examples include Well No. 4, the METRO York pump station at Willows and NE 124th Street, and the SE Redmond Water tank.

**UT – 14      Require undergrounding of all new utility distribution lines, except where undergrounding would cause greater environmental harm than alternatives or where the Washington Utilities and Transportation Commission tariff structure is not consistent with this policy. Consider new technologies such as wireless transmission as they become available.**

**UT – 15      Promote the undergrounding of existing utility lines by means such as:**

- ◆ Requiring undergrounding of utility distribution lines or the provision for undergrounding as a condition for development projects.
- ◆ Undergrounding utility distribution lines or provide for future undergrounding as street projects occur.
- ◆ Funding undergrounding through a capital improvement program or through formation of a local improvement district.
- ◆ Requiring individual service lines to be undergrounded when significant site improvements are made.

## **Exhibit B: Current Zoning Code regulations related to utility undergrounding**

### **RZC 21.54.020 Electrical Equipment and Wiring**

(A) Purpose. The purpose of this chapter is to ensure the placement of utilities underground in order to:

- (1) Eliminate safety issues caused by damaged overhead lines;
- (2) Reduce the number of service interruptions caused by storms;
- (3) Remove utility poles which are a hazard along streets; and
- (4) Increase the appearance and aesthetics of the public ways.

(B) Requirements for Wiring and Electrical Equipment.

(1) Existing aerial wiring shall be relocated underground and new facilities installed underground within a property and within the public right-of-way abutting the property when one or more of the following occurs:

- (a) Subdivisions are developed;
- (b) Short subdivisions are developed;
- (c) Local improvement districts and utility local improvement districts are developed;
- (d) Street or utility improvements are undertaken;
- (e) Binding site plans are developed;
- (f) New commercial, industrial or multifamily residential buildings are constructed;
- (g) Remodeling or additions to existing commercial or industrial buildings or conversions to these uses that increase gross floor area by 50 percent or more, or any alterations or repairs which exceed 100 percent of the value of the previously existing structure, and to single-family and multifamily residential buildings whenever any alterations or repairs exceed 100 percent of the value of the previously existing structure; or
- (h) Building complexes or other projects are developed and are of a size to warrant undergrounding.

(2) Wiring for electrical, communication, and other purposes serving a building or property shall be relocated or placed underground from the point of primary distribution to within a property when one of the following occurs:

- (a) The overhead electrical, communication, and primary utility distribution facilities are relocated underground;
- (b) Remodeling or additions to existing commercial or industrial buildings or conversions to these uses takes place;
- (c) The electrical service panel within a structure, or the service lines to the structure, are upgraded or modified; or
- (d) Remodeling or additions to the existing residential buildings that increase gross floor area by 20 percent or more, or any alterations or repairs which exceed 100 percent of the value of the previously existing structure.

(3) All new equipment related to the provision of electrical service, communications, or other utilities, except transformers, switch cabinets, traffic signal cabinets and street lighting cabinets, shall be installed in one of the following locations:

## Exhibit B: Current Zoning Code regulations related to utility undergrounding

- (a) Underground;
- (b) Inside a building;
- (c) In a service alley;
- (d) Immediately adjacent to a building and screened from view; or
- (e) In a landscaped area and screened from view. The Technical Committee may approve an alternate location if an applicant demonstrates that the equipment cannot be placed in any of the above locations.

(4) All existing above-ground equipment related to the provision of electrical service, communications, or other utilities, except transformers, switch cabinets, traffic signal cabinets, and street lighting cabinets, shall be relocated and placed within one of the locations described in subsection (3) whenever any of the conditions set forth in subsections (1) or (2) are present.

(5) Traffic signal cabinets and street lighting cabinets shall be placed within the street furnishings zone where this zone exists or in a less conspicuous or other alternate location when all operational and maintenance needs of the City of Redmond and other utilities related to safety, access and visibility are met. The street furnishings zone is described in the Transportation Master Plan and consists of a hard surface area between the sidewalk and curb in which trees, benches, trash receptacles, and other street furniture serving pedestrian needs are placed.

(6) Where the Technical Committee has determined that interim street improvements are adequate as provided in RZC 21.52.030, Street and Access Standards, the requirement to underground distribution facilities may be temporarily waived.

(C) Overhead Facilities Prohibited. As overhead communication, electrical and utility facilities are relocated underground, persons and businesses served by such facilities shall relocate all overhead connections underground and connect to the new underground facilities within 90 days of the date of undergrounding completion.

(D) Property Owner's Responsibility for Rewiring. The property owner is responsible for providing all labor and materials for any required rewiring and relocation of existing facilities between primary relocation and the point at which secondary service is received on the customer's premises. The property owner shall also provide necessary occupancy rights and easements for transmission facilities and maintenance.

(E) Construction Specifications. The design and construction specifications for underground facilities covered by this section shall be subject to approval by the Director of Public Works.

(F) Exemptions. The requirements of this section shall not apply to electrical distribution substations nor to electrical lines of greater than 50 kV capacity unless it can be shown that the undergrounding of these lines has become economically feasible. This section shall also not apply where the utility demonstrates that its facilities will not function properly if located underground or cannot be maintained properly if so located.

## Exhibit C: Utility undergrounding cost estimates for single family home

### Case 1 - Underground single span of 150', no poles within frontage

Location	Item	Estimated Cost	Comments
Frontage	PSE Construction	\$10,000	Excludes trenching
Frontage	PSE Engineering	4,000	
Frontage	Trench and backfill	3,000	by owner, 150' x \$20/LF
Frontage	Restoration	1,000	by owner, soft area restoration
Frontage	Other utilities	7,000	\$5,000 for Frontier, \$2,000 for Comcast, excludes fiber
Frontage	Local agency permit	1,000	ROW use permit, electrical permit
Service	Trench, backfill, restoration	2,000	by owner, from street to meter, soft area restoration
Service	PSE Conductors	1,000	conduit and cable from street to meter
Service	Electrical work at panel	1,000	by owner, conversion of weatherhead, etc. Excludes upgrading panel
	<b>Total</b>	<b>\$30,000</b>	based on Brian Doty/PSE estimate
	<b>Total</b>	<b>39,000</b>	based on Andy Swayne/PSE estimate

### Case 2 - Underground two spans (300'), pole within frontage

Location	Item	Estimated Cost	Comments
Frontage	PSE Construction	\$20,000	Excludes trenching
Frontage	PSE Engineering	4,000	
Frontage	Trench and backfill	6,000	by owner, 300' x \$20/LF
Frontage	Restoration	2,000	by owner
Frontage	Other utilities	7,000	\$5,000 for Frontier, \$2,000 for Comcast, excludes fiber
Frontage	Local agency permit	1,000	ROW use permit, electrical permit
Service	Trench, backfill, restoration	2,000	on private property, by owner, from street to meter
Service	PSE Conductors	1,000	conduit and wire from street to meter
Service	Electrical work at panel	1,000	by owner, conversion of weatherhead, etc. Excludes panel upgrades
	<b>Total</b>	<b>\$44,000</b>	based on Brian Doty/PSE estimate
	<b>Total</b>	<b>\$65,000</b>	based on Andy Swayne/PSE estimate

#### Notes:

1. Restoration costs assume soft areas only. Increase estimate for hardscape and challenging locations
2. Costs do not include upgrading the electrical panel at the home if required by code.
3. PSE Construction costs are an average for single phase and include costs for transformers if needed
4. Increase PSE construction costs ( by 2 to 3 times) if distribution lines are three phase or three phase feeders
5. Increase PSE costs for more complex installations such as corner lots, or unusual power line geometry.