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Roadside Vegetation Barriers

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Workshop

Presentation:

- 1. EPA Guidelines**
- 2. Local application of guidelines**
- 3. Design considerations**

Discussion:

Potential areas of conflict and opportunities to avoid them

EPA Guidelines Released July, 2016

- *Recommendations for Constructing Roadside Vegetation Barriers to Improve Near-Road Air Quality*

Project Goal

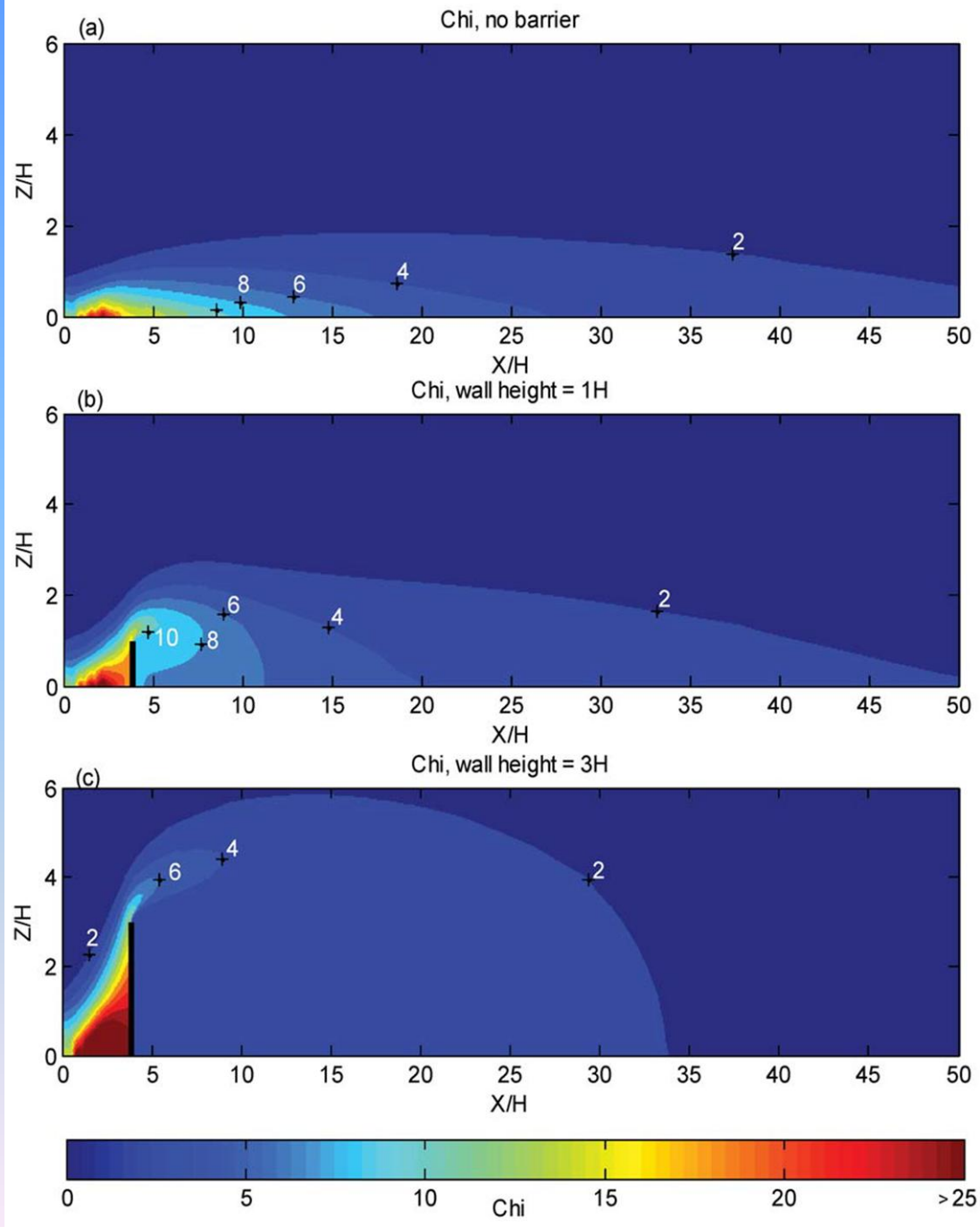
- *Develop local guidelines to support implementation of recommendations in the Sacramento region*



EPA Guidelines

- Barrier Physical characteristics
 - Height (taller is better)
 - Thickness (30m/98.5ft or *more*)
 - Allow some through flow (porosity of 0.5-0.9)
 - Consistent (no gaps)
 - Vegetated from ground to top of canopy
 - Extending past target location 50m/164ft

Figure 1. CFD modeling analysis of varying solid noise barrier heights. For the figure above, the top panel shows no barrier, the middle panel a barrier of height, H , and the bottom panel a barrier of height $3H$. The distances downwind are also relative to the barrier height. As an example, for $H=6$ meters, the middle panel would represent a 6 meter tall barrier and the bottom panel an 18 meter tall barrier, and the x-axis distance values would also be multiplied by 6 meters. For this figure, Z represents the vertical height above ground and X the distance from the nearest travel lane on the road (Hagler et al, 2012).



EPA Guidelines

- Vegetation Characteristics
 - Minimal seasonal effects (no deciduous plants)
 - Low allergen, low BVOC producing, non-poisonous*
 - Urban hardy species
 - Low maintenance
 - Drought tolerant
 - Native preferred
 - Non- invasive species



EPA Guidelines



Vegetation Barriers
+ Solid Noise Barrier
= best reduction and avoidance of
vegetation related issues. Vegetation
should be 1m + above wall.

Local Guidelines will include:

- **Appropriate plant materials**
 - Species matrix for easy use
- **Sample planting plans**
 - To achieve desired thickness and porosity given anticipated planting space constraints
- **Local planting and maintenance best practices**
 - Planting, irrigation and long term management



Plant Materials

GENUS AND SPECIES + CULTIVAR (IF ANY)	COMMON NAME	WATER NEEDS	SIZE	GROWTH RATE	EVERGREEN OR DECIDUOUS	BVOC (AIR QUALITY)	FALL COLOR	FLOWERS	SHAPE	SMUD	GREEN ACRES	NOTES	HEIGHT	CROWN DIAMETER
<i>Acer buergerianum</i>	Trident maple	2	M	↑	Deciduous	★★	Red/Yellow		●	SMUD	GREEN ACRES	Attractive peeling bark at maturity	25-35	20-25
<i>Acer campestre</i>	Hedge maple	2	M	↑/↑	Deciduous	★★	Yellow		●	SMUD		Dense canopy with dark green leaves	25-35	30-35
<i>Acer macrophyllum</i>	Bigleaf maple	3	L	↑	Deciduous	★★	Yellow		◐			Native; best in foothills	30-75	30-50
<i>Acer palmatum</i>	Japanese maple	2	S	↑/↑	Deciduous	★★	Red/Yellow		●	SMUD	GREEN ACRES	Leaves can scorch in hot sun	15-25	15-25
<i>Acer rubrum</i>	Red maple	3	L	↑/↑	Deciduous	★★	Red/Yellow		●	SMUD	GREEN ACRES	Named for red-colored leaf stem	40-50	30-40
<i>Acer rubrum x freemanii</i> 'Armstrong'	Columnar red maple	3	L	↑	Deciduous	★★	Red/Yellow		▬	SMUD	GREEN ACRES	Very narrow maple; fall color not as showy	40-50	15-20
<i>Acer truncatum</i>	Shantung maple	2/3	M	↑/↑	Deciduous	★★	Red/Yellow		●	SMUD		Lower water user than other maples	25-30	20-30
<i>Acer truncatum</i> 'Pacific Sunset'	Pacific Sunset Shantung maple	2	M	↑	Deciduous	★★	Red/Yellow		●		GREEN ACRES	Heat tolerant; glossy leaves; spreading canopy	25-30	25-30
<i>Aesculus californica</i>	California buckeye	1	M	↑	Deciduous	★★		Red flower	◐			Native; dormant in summer to conserve water.	30-50	30-45
<i>Arbutus unedo</i>	Strawberry tree	1	M	↑/↑	Evergreen	★		Red flower	●		GREEN ACRES	Messy flowers and fruit; attractive red bark; best in valley	20-30	20-30
<i>Brachybotan populneus</i>	Bottle tree	2	L	↑	Evergreen	★★★★		Red flower	▲			Unusual wide trunk; best in valley	30-50	30
<i>Calocedrus decurrens</i>	California incense cedar	2/3	L	↑/↑	Evergreen	★★			▲		GREEN ACRES	Native; fragrant needles; best in foothills	70-90	15-25

Design Possibilities

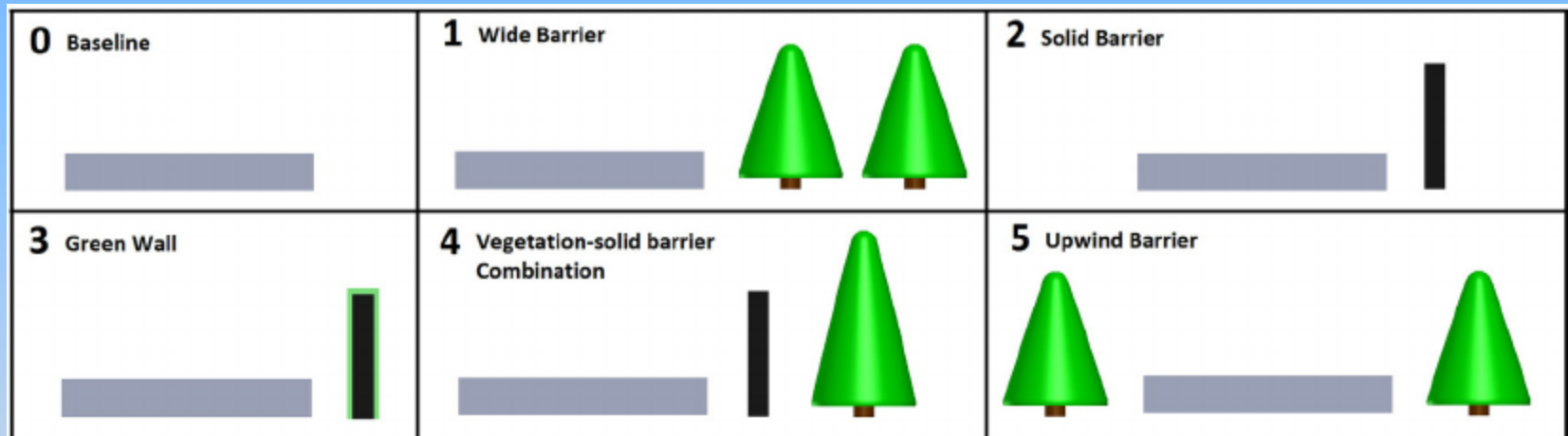


Fig. 2. The schematic of six roadside barrier configurations is shown in side view. In the simulation, the complex geometry of the vegetation canopy is modeled as rectangular blocks. Leaf Area Density (LAD) profile of coniferous trees is applied on each block to represent the real geometry of coniferous evergreen.

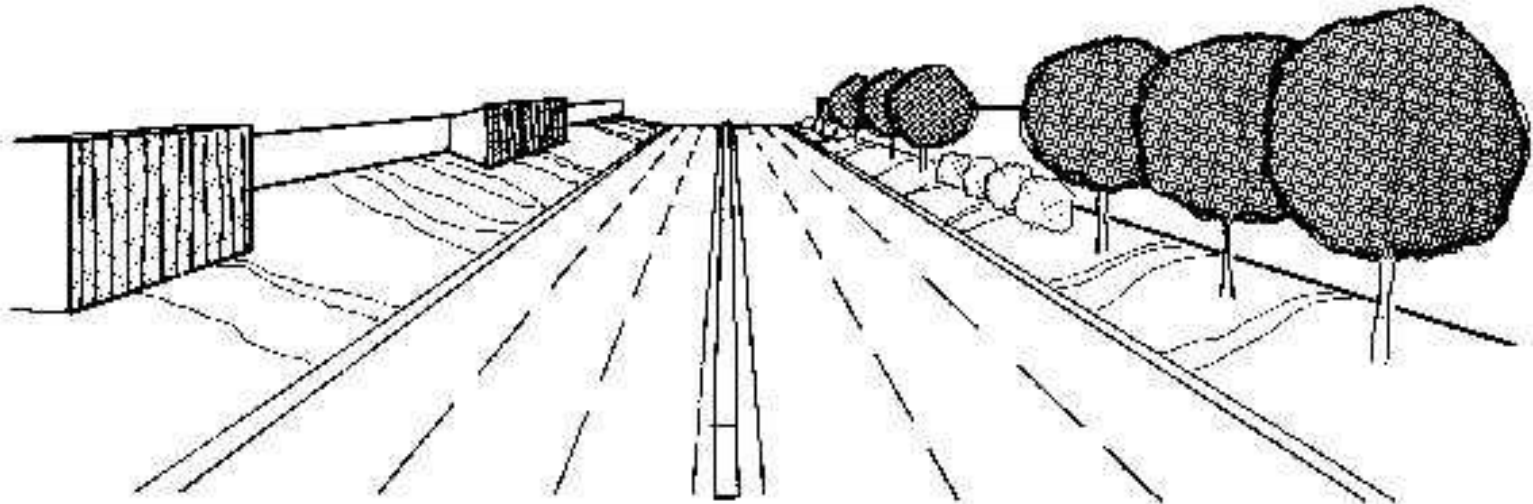
Potential Areas of Conflict

Planting Design

Design Guide:

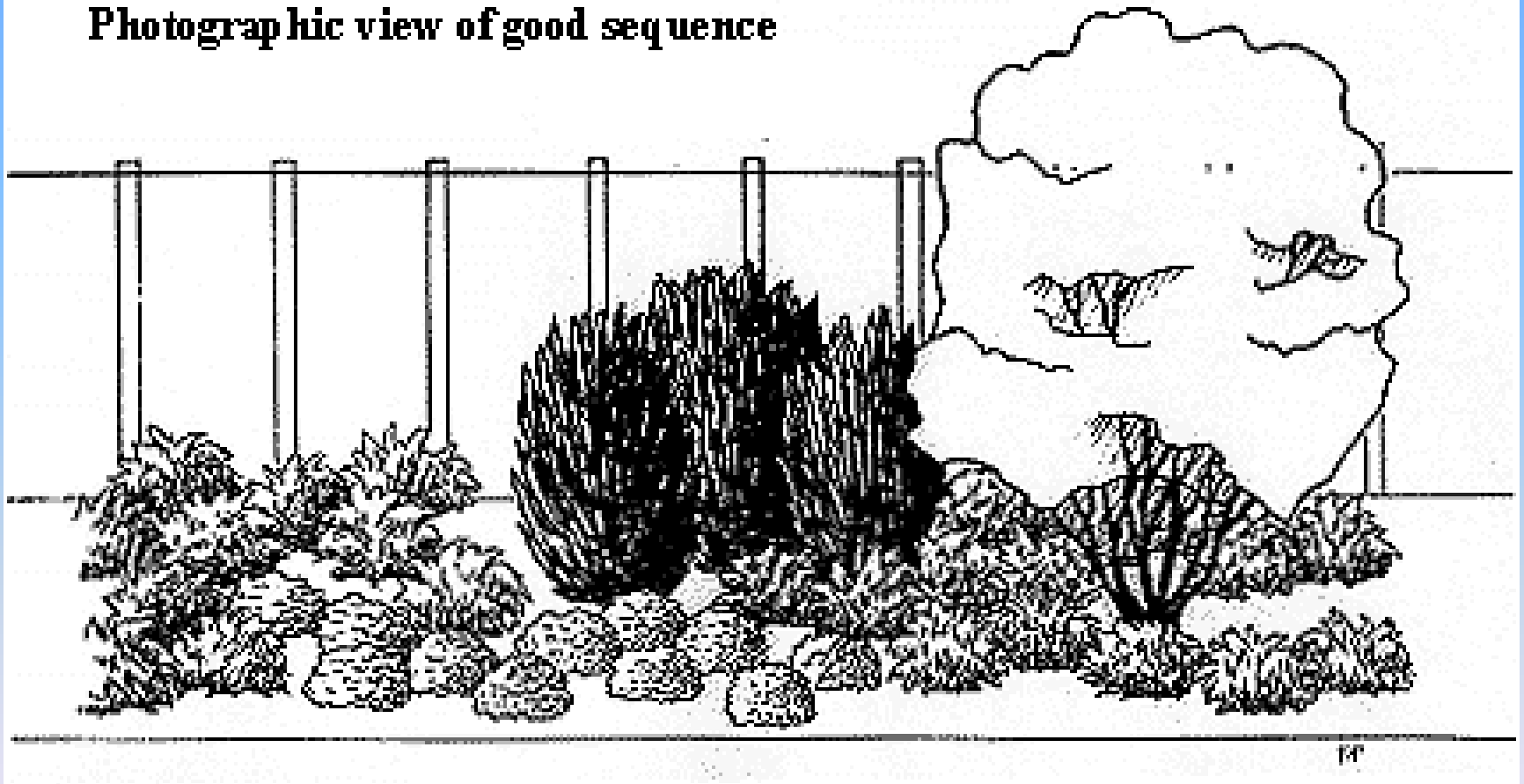
Rhythm and sequence establish consistent, recognizable patterns (Figures 4 and 5). Repeated patterns create a sense of familiarity and comfort. They also provide a sense of progression, unless continued indefinitely. Rhythm and sequence can be created using both the barrier wall and/or landscaping.

Figure 4: Rhythm



Planting Design

Photographic view of good sequence



Planting Design



Space Constraints



Space Constraints

McKinley Village

- Landscaping Zone Fence
- Sound Wall

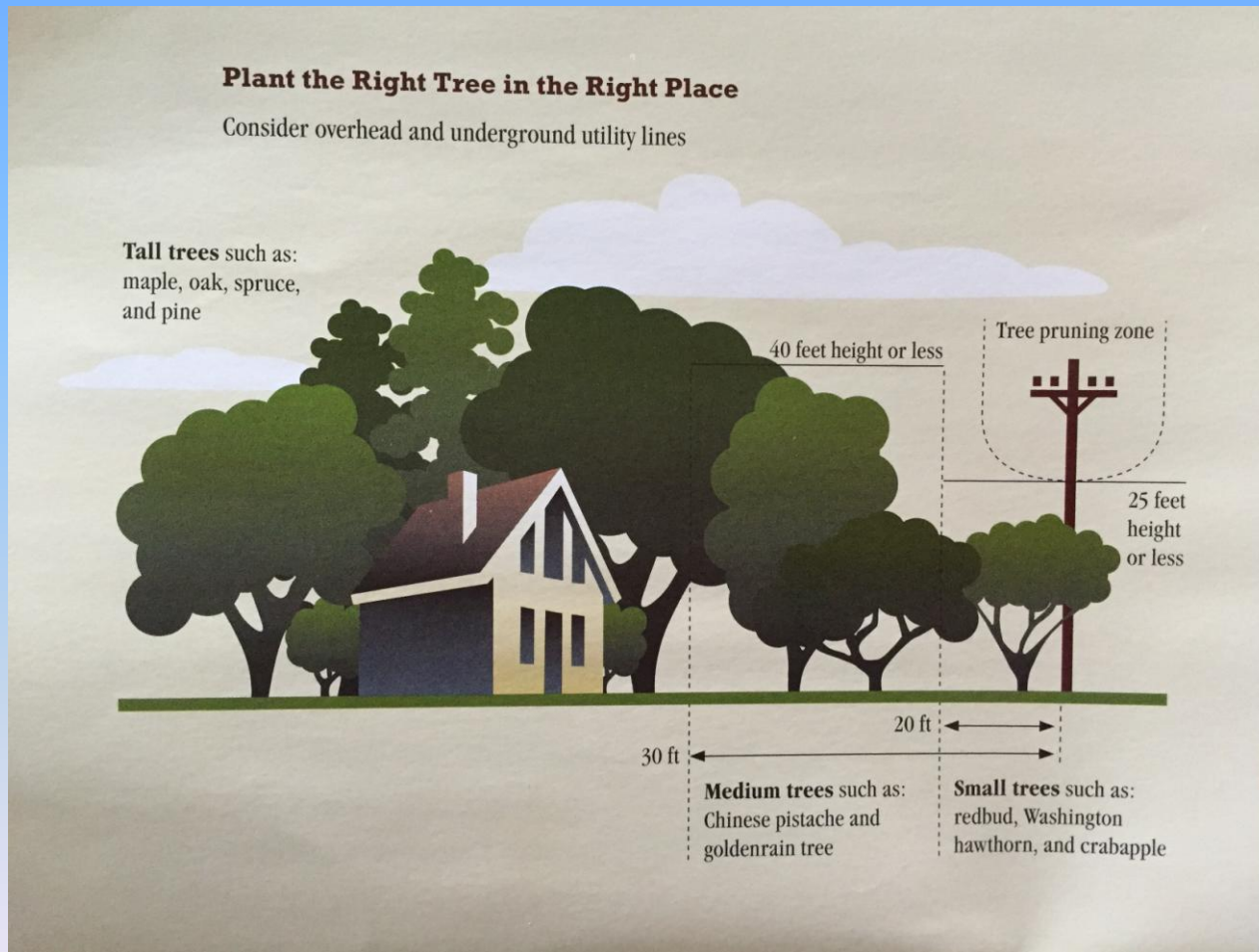


Google earth
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300 ft



Space Constraints



Sightlines



Integrated With Hardscape



Maintenance/Management

Planting and Establishment

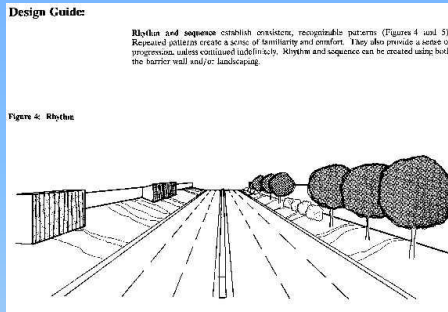
- Irrigation
- Replacement of failed plants
- Weed suppression
- Structural pruning

Stewardship

- Deep, infrequent irrigation
- Response to plant mortality
- Structural assessment and management pruning (porosity)

Potential Conflict Areas

Design



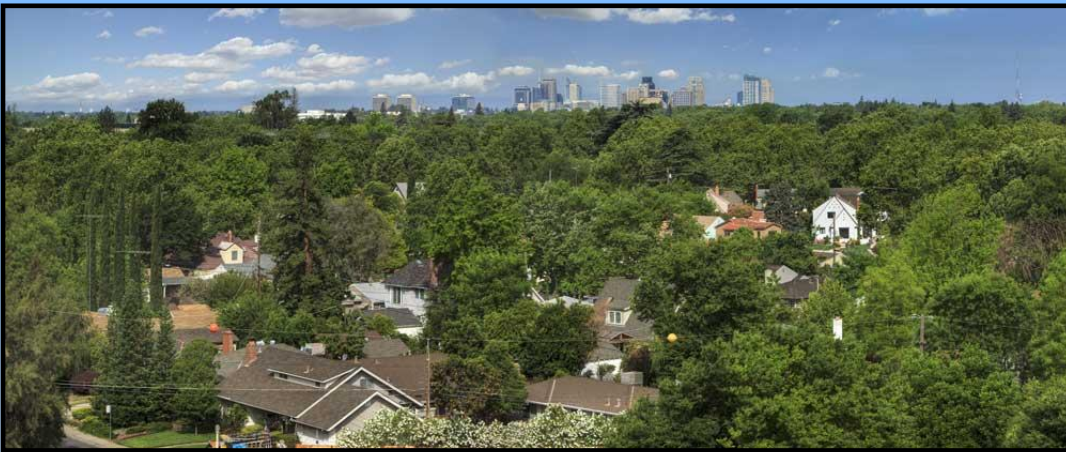
Planting and Establishment

Stewardship



Sacramento Tree Foundation

Thank you



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