2002 Urban Forest Canopy & Land Use in Portland's Hollywood District

Project Goal

The urban forest is a vital part of a city, providing a variety of benefits that are well-documented in literature.

This project explores urban forest canopy in Portland's Hollywood District and relates it to land use data in order to propose ways to maximize tree canopy.

Study Area

PORTLAND

Land Use

- Single Family Residential
- Duplex
- Multi Family Residential
- Commercial
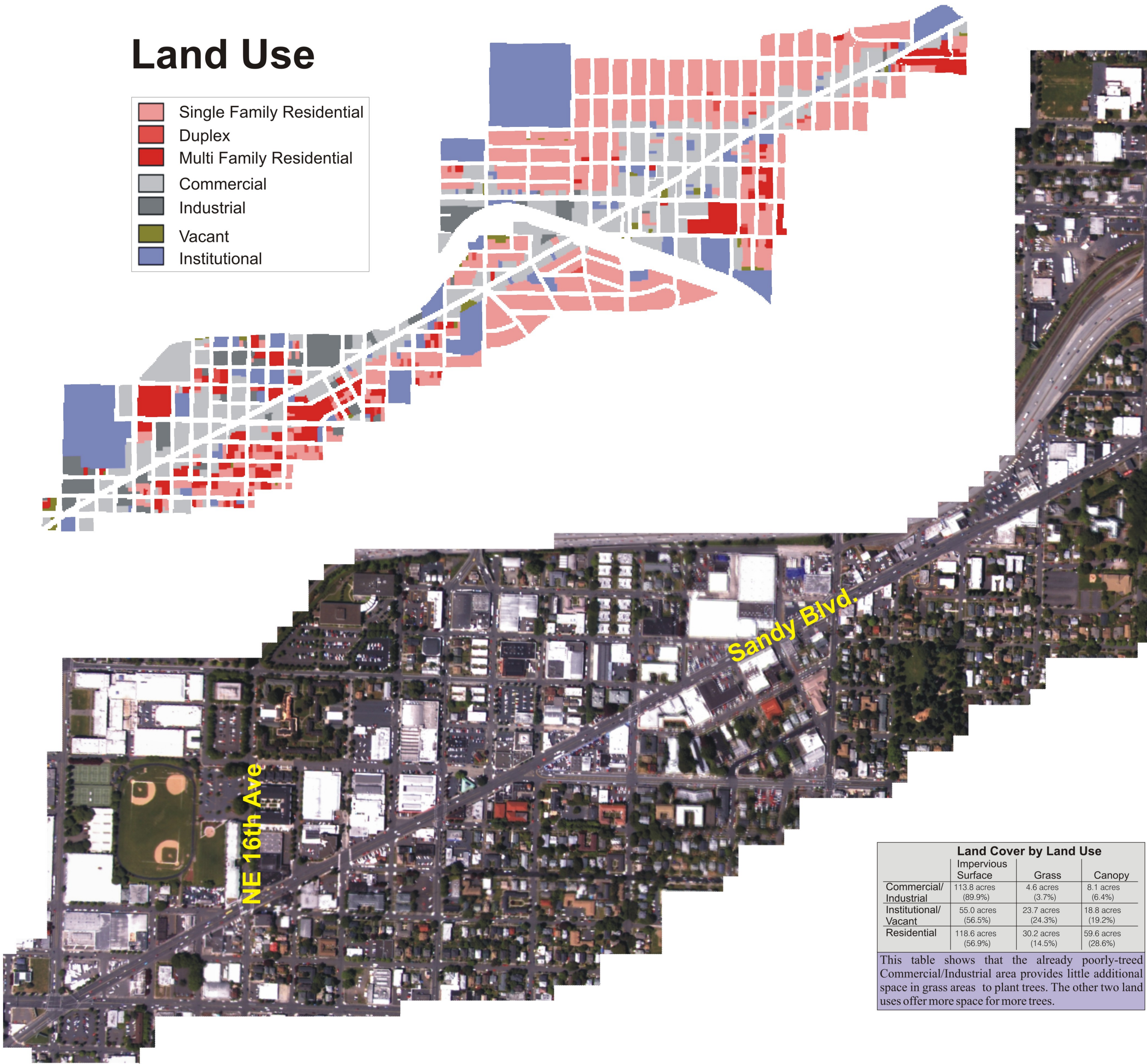- Industrial
- Vacant
- Institutional

Data & Methodology

One-meter digital aerial photography was available in form of a natural-color image, illustrated by the main image, and red, green, and infrared bands. These data were used to produce a land cover classification that resulted in 3 classes (trees, grass, impervious surface). The land cover classification was then related to land use data. This step was the basis for establishing possible tree-planting areas for the different land use categories.

NE 51st

I-84

Sandy Blvd.

NE 16th Ave.

Land Cover by Land Use

	Impervious Surface	Grass	Canopy
Commercial/ Industrial	113.8 acres (89.9%)	4.6 acres (3.7%)	8.1 acres (6.4%)
Institutional/ Vacant	55.0 acres (56.5%)	23.7 acres (24.3%)	18.8 acres (19.2%)
Residential	118.6 acres (56.9%)	30.2 acres (14.5%)	59.6 acres (28.6%)

This table shows that the already poorly-treed Commercial/Industrial area provides little additional space in grass areas to plant trees. The other two land uses offer more space for more trees.

Results: Canopy Maps

The large map on the right shows the land cover classification with the three classes canopy, grass, and impervious surface (asphalt, roof tops, etc.). Grass areas are potential sites where trees could be planted. Trees could also be planted in other areas, but grass provides a cost-efficient solution because no concrete cuts have to be made as is the case with sites on pavement.

The smaller maps underneath illustrate that different land uses contain different amounts of grass areas. Street trees are excluded in this study because they require a different approach to tree inventory than canopy cover.

Surface Categories
(for canopy maps)
- Impervious Surface
- Grass
- Canopy

Residential (208.4 acres)

Commercial / Industrial (156.3 acres)

Institutional / Vacant (97.5 acres)

A   NE 49th & NE Brazee

B   NE 18th & NE Glisan

C   NE 16th (Benson High School)

Results: Spreading vs. Columnar Trees

Tree characteristics, such as shape (columnar vs. spreading) and spacing between trees, are important factors when choosing a tree planting site. Knowing such specific values helps estimating planting costs by determining how much area the tree canopy can potentially cover and how far the tree crowns will be apart when fully grown. The table and graph on the right provide some specific numbers for the study area.

This table shows the available grass areas for each land-use category and the number of trees that it takes to cover that area with trees of various spreads. For example, 4367 trees of 300 square feet are needed to cover the grass areas in the residential land use. It has to be noted that grass areas in the institutional land use have ball fields, which are not meant to have tree plantings, not included in the calculation.
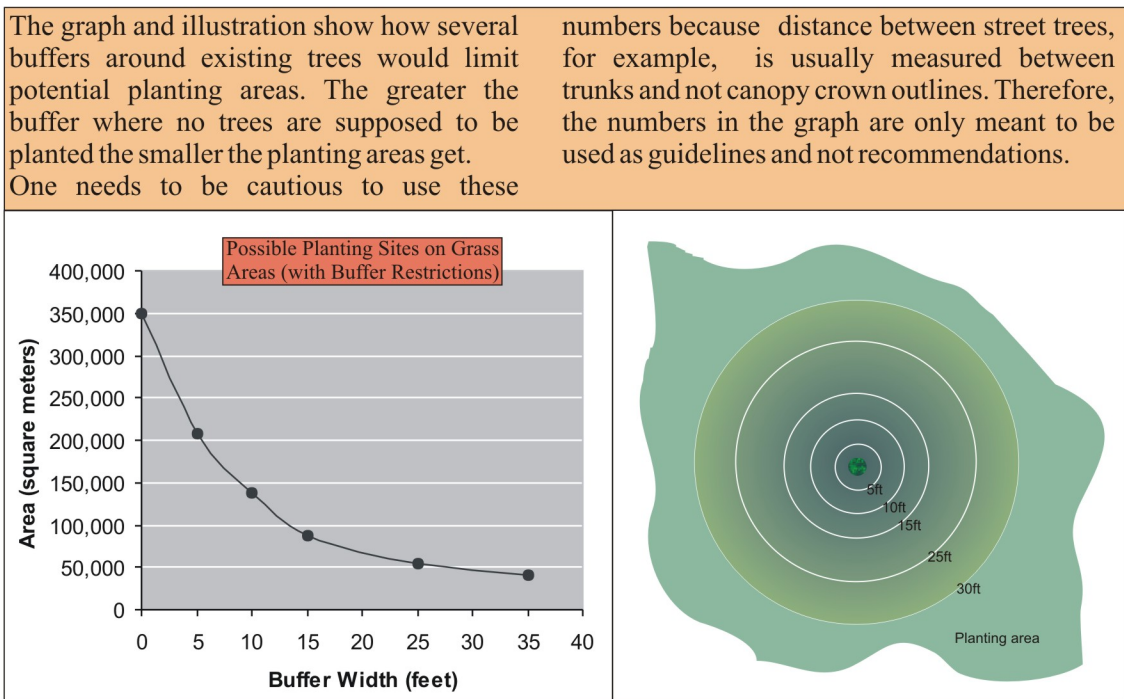
Number of trees needed to cover grass area

Land Use	Grass Area (in Acres)	55sq.ft.Tree	97sq.ft. Tree	194sq.ft. Tree	300sq.ft.Tree
Commercial/Industrial	4.6	3,759	2,088	1,044	671
Institutional/Vacant	23.7	19,159	10,644	5,322	3,421
Residential	30.2	24,456	13,586	6,793	4,367

The graph and illustration show how several buffers around existing trees would limit potential planting areas. The greater the buffer where no trees are supposed to be planted, the smaller the planting areas get.

One needs to be cautious to use these numbers because distance between street trees, for example, is usually measured between trunks and not canopy crown outlines. Therefore, the numbers in the graph are only meant to be used as guidelines and not recommendations.

Example of Columnar Tree:
Calocedrus decurrens (Incense Cedar)

Example of Spreading Tree:
Acer platanoides (Crimson King Norway Maple)

Possible Planting Sites on Grass Areas (with Buffer Restrictions)

Area (square meters) / Buffer Width (feet)

Planting area