

# Wildlife Crossings

Project Proposal and Workplan

*March 19, 2003*



## **The Portland State University Master of Urban and Regional Planning Program and the Planning Workshop:**

The Master of Urban and Regional Planning program at Portland State University provides practicing and aspiring planners with knowledge of history, practice, methodology and a consideration of ethical responsibility surrounding the planning profession. The Planning Workshop is the culmination of the Masters Program and it allows students the opportunity to put their knowledge and skills into practice.

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#### **Metro**

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# Table of Contents

- 1 Executive Summary ..... 1
- 2 Project Overview ..... 2
  - 2.1 Problem Statement ..... 2
  - 2.2 Context ..... 4
  - 2.3 Scope ..... 6
- 3 Methodology ..... 8
  - 3.1 Gather Data ..... 8
  - 3.2 Compile Research on Design Options ..... 8
  - 3.3 Organize Policy Information by Road Classification ..... 8
  - 3.4 Select and Analyze Suggested Opportunity Sites ..... 8
  - 3.5 Synthesize Recommendations ..... 9
  - 3.6 Tasks ..... 9
- 4 Products ..... 10
  - 4.1 Companion Piece / Guidebook ..... 10
  - 4.2 Client Presentation ..... 11
  - 4.3 In-Class Presentation ..... 11
- 5 Timeline ..... 12
- 6 Roles and Responsibilities ..... 12
- 7 Budget ..... 12
- 8 Organization of team ..... 13
  - 8.1 Communication ..... 13
  - 8.2 Process for Decision Making ..... 14
  - 8.3 Prior Commitments ..... 14
- 9 Team/Client Relationship ..... 16
  - 9.1 Team Responsibilities ..... 16
  - 9.2 Client Responsibilities ..... 16
- Appendices ..... 17-28

## 1 Executive Summary

The intersection of roadways and wildlife is increasingly frequent as human development spreads into habitat. While it is an issue few people think about, these meeting points can cause real problems for humans as well as for animals. Not only do moving cars create the risk of collision, but roadway noise and traffic can also scare away many animals. According to a study conducted by the Federal Highway Administration (FHWA), roadways can have two negative effects: they serve as barriers, limiting the range of space for wildlife to roam; or they force animals to cross them, often resulting in animal and person injuries or fatalities (FHWA, 2002). Roadway conflicts are attributed to the loss of thousands of animal lives and immeasurable damage to habitat connectivity throughout the United States each year.

Wildlife crossings provide animals with safe passage across roads, mitigating the safety and connectivity problems associated with habitat and roadway intersections. Examples of crossings, including overpasses, underpasses and culverts, can be found in Europe, Canada, and parts of the United States. The FHWA recently released a report on wildlife crossings in Europe, and recommended that more U.S. jurisdictions incorporate crossings into their transportation planning. The agency identified the value of wildlife highway crossings and cited empirical research demonstrating their effectiveness. Unfortunately, the FHWA has experienced limited success in raising local government awareness about the need for crossings and about the federal funding available for wildlife crossing projects.

There is a wealth of information on wildlife crossings, but there is a need to organize it in a form that will serve planners and provide them with tools for adding this infrastructure to their projects. It is also important to better understand how wildlife crossings may be incorporated into urban road design, as there are few examples of using the infrastructure in urban areas. The goal of the workshop project described in this proposal is to inform planners about ways to improve human and animal safety and connect habitat by integrating wildlife crossings into transportation infrastructure projects.

The final product will serve as a guidebook providing information and guidance to local planners interested in constructing wildlife crossings in the Portland Metro area. The guidebook will contain sections on crossing design, unique regulatory and funding issues associated with road classifications, and locations in Portland that might provide opportunities for crossing construction. The clients for the project are Metro planners; that agency's *Green Streets* document inspired the planned layout and look of the wildlife crossings guidebook.

## **2 Project Overview**

### **2.1 Problem Statement**

With over 4 million miles of roads in the United States, transportation infrastructure has had far-reaching impacts on natural systems and wildlife populations. As the frequency of wildlife-vehicle collisions continues to increase, human health and safety has become an important issue. While there are many concerns that stem from the interaction between roads and wildlife, three primary categories of problems will be explored in this project: 1) motorist safety; 2) costs; 3) habitat fragmentation. These problems are significant in the Portland Metropolitan region as it strives to balance growth and development with preservation of green space and biodiversity. Currently, there is work underway within the region to better understand the affect of urban development on wildlife populations.

#### Motorist Safety

When roads and highways traverse wildlife movement corridors, many safety issues arise for motorists. Vehicle collisions with larger animals can result in substantial damage and personal injury. The act of avoiding a collision with wildlife can also result in accidents. Since most sources of wildlife-vehicle collision statistics rely primarily on locally reported accidents, most of the available data is on collisions with larger animals, such as deer and elk, which often result in damage or personal injury. Out of early 6.3 million motor vehicle crashes in the United States in 2001, it is estimated that 1.5 million were collisions with deer (Conover et al., 1995). These deer-vehicle collisions result in more than 29,000 human injuries and 200 human fatalities annually (Conover et al., 1995). In Oregon alone, over 3000 crashes involving wildlife and motorists occurred between 1996 and 2000, resulting in eleven fatalities and 769 injuries (Bushman, 2002). On average, less than one percent of all automobile-related injuries and fatalities are attributed to wildlife-vehicle collisions – both nationally and in Oregon. Nevertheless, any loss of human life due to avoidable conflicts between motorists and wildlife deserves the attention of planners.

#### Costs

An assessment of the full costs of wildlife-vehicle incidents adds another practical dimension to the problem. Since the number of wildlife-vehicle collisions can be estimated, the risks of personal injury and economic costs of those collisions can also be estimated. For instance, property damage from deer-vehicle accidents is estimated at over \$1 billion annually (Transportation Research Board, 2002). Some of the direct economic costs associated with wildlife-vehicle accidents include roadkill clean-up (equipment, labor), vehicle damage and personal injury or death (medical costs, unemployment). While the net monetary value of a single animal may be difficult (or undesirable) to determine, the increasing loss of popular game species (such as white-tailed deer) does lead to a loss of revenues from hunting activities. A cost-benefit framework will be proposed in this report. The purpose of this framework will not be to make a definitive

statement about the end cost or benefit of wildlife crossings, but rather to identify the wide range of economic impacts that are associated with wildlife-vehicle conflicts.

### Habitat Fragmentation

Roads and highways also result in habitat fragmentation, which can be characterized as a break up of continuous habitat into smaller, more isolated patches. Smaller overall patch sizes lead to higher edge-to-interior ratios and loss of valuable interior habitat. This “island effect” creates an inhospitable environment for many edge-sensitive wildlife species and often leads to human-wildlife conflicts, such as collisions with vehicles. Habitat fragmentation caused by roads and highways can have far-reaching ecological consequences that are disproportionate to the relatively small amount of land area that the roads occupy.

Some of the specific ecological consequences of habitat fragmentation include:

- **Direct, physical loss of wildlife habitat.** This includes both areas designated for roads as well as the resulting degradation of adjacent habitat quality, which is often attributed to increased stormwater run-off and subsequent changes in stream hydrology.
- **Indirect habitat loss.** This includes displacement of wildlife and road avoidance, a tendency in which certain wildlife species avoid areas adjacent to highways due to noise, traffic and other human activities.
- **Decreased genetic diversity.** Roads disrupt processes that maintain regional wildlife populations. Since roads cause disruptions to the natural gene flow patterns of migrating wildlife populations, they contribute to problems such as isolated gene pools, loss of genetic and biological diversity and threaten the long-term viability of wildlife populations (Jackson, 2000).
- **Road mortality.** This is probably the most visible indicator of the broader ecological problems caused by roads.
- **Concentrated resource depletion.** When wide-ranging animals are confined to small, disconnected “islands” of habitat, resources are rapidly depleted.
- **Over predation.** This occurs when pockets of habitat are too small to provide any protection from predators - both humans (hunters) and predatory wildlife species. Habitat “islands” are also more susceptible to invasion by non-native, exotic species, which further disrupt ecosystem functions.

While there is some debate in the scientific community regarding appropriate methods for measuring wildlife habitat fragmentation, it is widely acknowledged as a problem worth addressing. A good example of this difficulty is in determining how or if roads fragment habitat. Whether habitat fragmentation is directly attributed to roads or not depends on a number of factors, including: the size of the road (highway vs. dirt road), the road use (Interstate vs. desolate county highway), who uses the road (commuter vs. hunter), the sensitivity of a particular species to roads (avoidance vs. use), how far any effects extend from the road, the permeability (mortality vs. cross easily), and the scale of a species (moose vs. mouse). A key point here is that measuring habitat fragmentation using these tools requires an understanding of the functional responses of different species to habitat fragmentation, since these responses are likely to be species specific (Theobald, 1998, p.3).

## **2.2 Context**

### Solutions from other places

For years, people around the world have been looking for ways to mitigate the impact transportation infrastructure can have on human and animal safety. Some of the approaches in Europe and other places include signage, flashing signs, “smart” signs that light up when an animal is present, reflectors, olfactory repellents, ultrasound, road lighting, population control, habitat modification, and fencing. Although some of these technologies offer promising results, most have not yielded a significant reduction in mortality, and none of these strategies address the problem of habitat fragmentation (FHWA, 2002).

Using a structural approach to providing wildlife with a safe route across roads is a technique that has been used for years in places such as France, Germany and Switzerland, and is quickly being adopted in places such as Australia, Canada, and the United States. Studies show that the success of the structures depends upon the target species, the land use surrounding the structure, the existence of habitat around and on the structure, and the structure’s design (FHWA, 2002).

The Europeans have conducted extensive research into the effectiveness of their wildlife crossings, particularly the overpasses. A study of 17 overpasses in Germany, the Netherlands, France, and Switzerland using infrared video cameras showed that with suitable habitat on and around the overpasses, they were effectively used by a wide variety of animals, including large mammals, small mammals, flightless insects, and butterflies. Another study of a Swiss overpass showed extensive and regular use by badger, fox, marten, chamois, roe deer, and red deer (FHWA, 2002).

Some of the highest profile wildlife crossings are the ones spanning the Trans-Canada Highway where it cuts through Banff National Park in Alberta. The 28-mile stretch of highway boasts 24 crossing structures, including two 164 foot-wide overpasses that serve bears, elk, moose and bighorn sheep, as well as many other species. Although at one time over 100 large animals were killed there each year, since the crossings were installed, animal mortality has been reduced by 80 percent (as much as 96 percent for ungulates) (Robbins, 2003).

Along Florida's rapidly suburbanizing State Route 46 in Lake County, more than 100 threatened black bears had been killed each year for several years. The solution was to build a culvert with a flat, dirt floor underneath the highway. The road was elevated so that the bears could see through the underpass to the other side. Follow-up research indicates that up to 55 bears used the underpass in the two years after it was completed (Wildlife Crossings Toolkit, 2003), and bears are not the only ones—12 other species, including bobcats, gray foxes, and whitetail deer, are using it, too (FHWA, 2000).

### Wildlife Crossings in Portland

The four-county Portland metropolitan region is projected to add over 500,000 people in the next 20 years, reaching a population of 2.3 million (Metro, 1994). As the region grows, more and more land will be developed<sup>1</sup>. It is inevitable that, as people pave over habitat to make room for their own uses, there will be more and more collisions, both figurative and literal, between humans and animals. Therefore, given the problems of habitat fragmentation and safety outlined above, now is the time to begin considering ways to mitigate the impact that transportation infrastructure has on wildlife.

Portland's reputation for being "green" may make it a good place to implement wildlife crossings. Portland takes pride in the greenspaces it has set aside in the region and is working to preserve more open space and habitat (See Appendix B, Map 1). One goal of Metro's Parks, Trails and Greenspaces program is to create a network of trails and greenways throughout the region that connect habitat as well as neighborhoods and cities. Wildlife crossings are one way to ensure connectivity of greenspaces.

In addition, as in most urban areas, space is at a premium in the Portland region, and planners realize they can only preserve some of the most critical habitat. Because not all significant habitat areas can be preserved, creating and maintaining connections between greenspaces is important to maximize the utility of each individual area.

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<sup>1</sup> State law (ORS 197.296) requires Metro to periodically expand the Urban Growth Boundary (UGB) to maintain a 20-year land supply within the UGB. In the latest expansion in December 2002, an additional 18,700 acres were brought inside the boundary and made available for development (Metro, 2002).



For example, the Audubon Society has indicated that they have noted a high animal mortality rate along Cornell Road, a winding local road that runs through Forest Park (Salinger) (See Appendix B, Map 2). Forest Park provides 5,000 acres of habitat to many species, including vole, weasel, fox, bobcat, elk, coyote, black bear and cougar (No Ivy League). A wildlife crossing along Cornell Road may increase the quality of habitat in this significant urban greenspace.

Boeckman Road in Wilsonville may provide an opportunity for a wildlife crossing on the urban fringe (See Appendix B, Map 3). The road, which cuts across the Coffee Lake wetland complex, is slated for expansion, according to Metro's Transportation Improvement Plan. At the same time, restoration efforts are planned for the wetland, which historically provided habitat for a diverse and rich set of species (Oregon Wetlands Joint Venture, 2001). A wildlife crossing may help mitigate the effects of a road expansion in this environmentally sensitive area.

### Wildlife Crossings Opportunities

In recent decades, our policy focus has gradually switched from adding capacity through road building to preserving the road capacity that we already have through maintenance. As we retrofit old infrastructure, we have the opportunity to rethink the way roads have traditionally been built, and to try to do it better the second time around.

Another opportunity comes in the form of federal funding. The authorization of the Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) expanded the Transportation Enhancements category of Federal Highway Administration (FHWA) funds that are available to states and communities (Finch, 2000). States are required to set aside 10% of their State Transportation Project funds for Transportation Enhancement projects. Now the funds can be used for the study and prevention of wildlife mortality, and can include wildlife crossing structures and habitat connectivity measures on both new and existing roads.<sup>2</sup> Additionally, TEA-21 includes a National Recreational Trails Fund, which will be allocated to states to provide and maintain recreational trails and trail-related projects. Projects with diversified uses, such as multiple-use trails for humans and wildlife, will be given preference (Transportation Research Board, 2002).

## **2.3 Scope**

The goal of this workshop project is to inform planners about ways to improve human and animal safety and connect habitat by integrating wildlife crossings into transportation infrastructure projects. The focus of the study will be on a variety of critical planning factors associated with wildlife crossings in an urban environment – specifically within the Portland metropolitan region. The project objective is to develop a guidebook that organizes information on wildlife crossings and explains how crossings may be

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<sup>2</sup> The funds can be used on all roads except those classified as local or rural minor collectors, unless such roads are on a federal-aid highway system (Transportation Research Board, 2002).

incorporated into the Portland metropolitan area road network. Metro's *Green Streets* guidebook will be used as a model for this project's final product.

As the workshop team is not comprised of any wildlife biologists, we will focus our study on those elements planners should be aware of when looking at building a wildlife crossing. These elements include construction and maintenance costs, potential funding sources, design options, regulatory constraints and opportunities, and possible public involvement strategies. We will depend upon experts at Metro, Portland State University's Biology Department, and other resources to identify possible locations for possible 'opportunity sites' such as NW Cornell Road in Forest Park, and Boeckman Road in Wilsonville, where some of the team's research efforts can be applied towards a real-life vehicle/wildlife conflict area. One benefit of this project is that the team will gain an understanding of the critical factors necessary to build or retrofit a piece of transportation infrastructure.

The client for this project is Metro – the directly elected regional government for the Portland metropolitan area. Within Metro, there are two co-clients. The first client is Ted Leybold in the Transportation Planning Department's Livable Streets Program, and the second is Dr. Jennifer Budhabhatti in the Parks, Trails, and Green Spaces Department. Mr. Leybold was the Project Manager for the Green Streets guidebook. Dr. Budhabhatti is a biologist responsible for the region's wildlife inventory. Kelley Webb in the Transportation Planning Department will also be a key contact for the team.

### **3 Methodology**

#### **3.1 Gather Data**

In our data collection effort, we plan to use the following techniques:

- Review of relevant literature
- Research policies, regulations, and funding sources
- Conduct interviews
- Visit opportunity sites

We will make use of the following data resources:

- Scholarly literature
- Government documents
- Biology specialists
  - Linda Anderson, Research Assistant, Parks, Trails and Greenspaces Department
  - Jennifer Budhabhatti, Biologist, Parks, Trails and Greenspaces Department
- Transportation Planners
  - Ted Leybold, Principal Transportation Planner, Transportation Planning Department.
  - Kelley Webb, Assistant Transportation Planner, Transportation Planning Department
  - Mary Gray, Environmental Protection Specialist, Federal Highway Administration
- Audubon Society
  - Bob Salinger, Audubon Society of Portland Rehabilitation Center
- Metro GIS Data
  - RLIS
  - Wildlife and Incident Data, J.O. Price, GIS Specialist, Data Resource Center
- Oregon Natural Heritage Dictionary
  - Jon Hak, GIS Program Manager, Oregon Natural Heritage Information Center
- Pertinent and reliable internet websites

#### **3.2 Compile Research on Design Options**

- Identify species-specific needs
- Determine topography and land use considerations
- Sketch (draw) various design options

#### **3.3 Organize Policy Information by Road Classification**

#### **3.4 Select and Analyze Suggested Opportunity Sites**

- Roads in Forest Park, Portland
- Boeckman Road, Wilsonville
- Sunrise Highway, Damascus

### **3.5 Synthesize Recommendations**

The recommendations generated by this project will come in the form of a checklist tentatively entitled, “What Planners Need to Know.” The checklist will address issues facing transportation planners in the Portland region who might look into constructing a wildlife crossing. It will include sections on what information planners need from wildlife biologists, what funding and regulatory issues they should be aware of, appropriate design options for various road classifications and wildlife, and potential costs of a wildlife crossing project.

### **3.6 Tasks**

See Appendix C (Timeline) and Appendix D (Roles and Responsibilities) for list of tasks.

## **4 Products**

### **4.1 Companion Piece / Guidebook**

The purpose of the companion piece/guidebook will be to show local planners how they can use wildlife crossings to improve safety and habitat connectivity. The table of contents for the companion piece/guidebook will include:

#### **Chapter 1. Introduction to the Wildlife Crossing Handbook**

- 1.1 What is the Purpose of this Handbook?
- 1.2 What are Wildlife Crossings?
- 1.3 The Problem Statement
- 1.4 Who Will Use this Handbook?

#### **Chapter 2. Rethinking Roadway Safety and Connecting Habitat**

- 2.1 Safety: Human and Animal
- 2.2 Habitat Fragmentation and Wildlife Corridors
- 2.3 Costs of Collisions and Animal Control

#### **Chapter 3. The Portland Context**

- 3.1 Metro's Wildlife Corridors
- 3.2 Road Incidents in the Portland Region
- 3.3 The Need for Wildlife Crossings in the Portland Region

#### **Chapter 4. Design Options**

- 4.1 Species-Specific Considerations
- 4.2 Evidence of Effectiveness
- 4.3 Design and Topography
- 4.4 Land Use Considerations
- 4.5 Developing Mixed-Use Paths
- 4.6 Sketches

#### **Chapter 5: Making Wildlife Crossings Happen**

- 5.1 Road Classifications for Analysis
- 5.2 Costs of Wildlife Crossings
- 5.3 Funding Issues
- 5.4 Regulatory Opportunities and Constraints
- 5.5 Policies and Recommendations

## **Chapter 6: Planner's Checklist**

## **Chapter 7: Opportunity Sites**

6.1 Boeckman Road

6.2 Cornell Road, Forest Park

6.3 Other Examples

### **4.2 Client Presentation**

A final presentation will be given to the client and other parties as appropriate. It will include:

- Background
- Discussion of companion piece/guidebook
- Findings and recommendations

### **4.3 In-Class Presentation**

This depends on the format of the final presentation. If appropriate it will provide comprehensive information on:

- Background and significance of connecting habitat
- Road infrastructure designs concepts on wildlife safety and connecting habitat
- Examples in Portland and case studies

## 5 Timeline

See Appendix C.

## 6 Roles and Responsibilities

See Appendix D.

## 7 Budget

The project team has estimated an exploratory budget to complete the project in 10 to 12 weeks.

Printing and Binding (\$30 x 20)	\$ 600
Print Presentation Materials	\$ 100
Film processing	\$ 75
Photocopying	\$ 50
Local area travel expenses	\$ 50
Miscellaneous (e.g., research documents)	\$ 50
<b>TOTAL</b>	<b>\$ 925</b>

## **8 Organization of team**

### **8.1 Communication**

The project team has identified regularly scheduled group meeting times for the duration of this project. These include:

- 4-hour work sessions each weekend (alternating between Saturday mornings and Sunday afternoons)
- 3-hour work sessions each Monday (4:00 p.m. – 7:00 p.m.)
- 1-hour check-in after class each Wednesday (6:30 p.m. - 7:30 p.m.)

The intention of the work sessions will be to generate and develop ideas as a group, discuss results of various research and data collection efforts by individual team members, and modify the workplan as necessary. The weekly check-in will consist of a round table discussion on the status of individual assignments. This meeting will provide an opportunity for team members to flag problems or request assistance as needed. Other meetings may be scheduled as necessary.

The project team has agreed upon additional communication-related details. These include:

- E-mail will be the primary form of communication between team members
- Each team member will check e-mail at least once every day and promptly respond to project-related correspondence
- Full contact information for each team member has been made available so phone calls are a viable alternate option for team communication
- E-mail will be the primary form of communication between the project team and the client. One primary and one secondary team contact will be established for client communications
- The project team will meet with the client once a week at Metro for a short (30-60 minute) progress report. Although it is understood that not all project team members will be able to attend all meetings, all members are encouraged to attend. The primary and/or secondary team contacts will attend each weekly meeting, and are responsible for the following:
  - Produce an agenda to be e-mailed to the client the day prior to the meeting. The agenda will include any questions or problems the team and the client wish to discuss
  - Write a summary of action items resulting from the meeting that will be e-mailed to all team members and the client
- Three longer (1-2 hour) meetings will be scheduled with the client at Metro, at the following milestone dates:
  - April 24 – completion of analysis work
  - May 16 – review client comments on product first draft
  - May 30 – review client comments on product final draft



## **8.2 Process for Decision Making**

The team has developed the following system for addressing potential conflicts between team members, including preventative as well as mitigating measures.

### Preventative Measures

- Team members have committed to this workshop project as a priority
- Work and class times were avoided in scheduling project team meetings
- Agendas will be set for all project team meetings to provide a structure and time frame for each session
- All members will try to attend all meetings, and be on time when at all possible
- No team member should take on more work than they can handle
- All team members will provide full disclosure on any problems with assignments, and ask for help when needed
- If a team member misses a deadline, they will bring food or beverages for the next team meeting

### Mitigating Measures

- Team decisions will be made by consensus
- If one or more team members disagree with an approach, discussion will take place for the whole group
- If agreement is not reached following the group discussion, the group will write up a brief outline of the issue, including which aspects are controversial, which are not, and two or three approaches that could be taken. This outline will be brought to an outside party for discussion. Depending on the issue, the outside party could be the workshop instructors or the project client
- If an agreement is still not reached, the team will call upon the services of the campus dispute resolution office

## **8.3 Prior Commitments**

Primary and secondary responsibility has been determined for each project task. If a team member is ill or has a special responsibility that takes them from a workshop assignment, the secondary contact for that assignment will assume primary responsibilities. Depending on the duration of the illness or other conflict, the primary contact could become the secondary contact, or a new secondary contact could be assigned to this task.

The following tables detail prior commitments for all project team members throughout the duration of this project:

**March 2003**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
KD away	3	4	5	RD away		8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	Spring Break – much of project team out of town				
	31					

**April 2003**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	RD away
TKC away	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

**May 2003**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AJS and RD in Los Angeles for work one weekend in May

**June 2003**

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

**NOTE**

KD = Kevin Drake

TKC = Theresa Carr

AJS = Arianne Sperry

RD = Radcliffe Dacanay

KES = Kerri Sullivan

CE = Charl Everson

## **9 Team/Client Relationship**

### **9.1 Team Responsibilities**

The team will act as a consulting group to the client. As such, they will work independently but provide regular updates on project status. Specific responsibilities include:

- Attend regular meetings with client
- Give adequate notice for client review of documents and other materials
- Provide adequate turnaround time for feedback
- Keep client up-to-date on project progress and consult on major changes

### **9.2 Client Responsibilities**

The clients will play an active role in the development of this project. Specific responsibilities include:

- Participate in regular team meetings as scheduled
- Provide project team with necessary data
- Review drafts and return with comments within scheduled turnaround time
- Arrange a room and invite guests for final client presentation
- Provide feedback and direction as needed

## Appendix A: References

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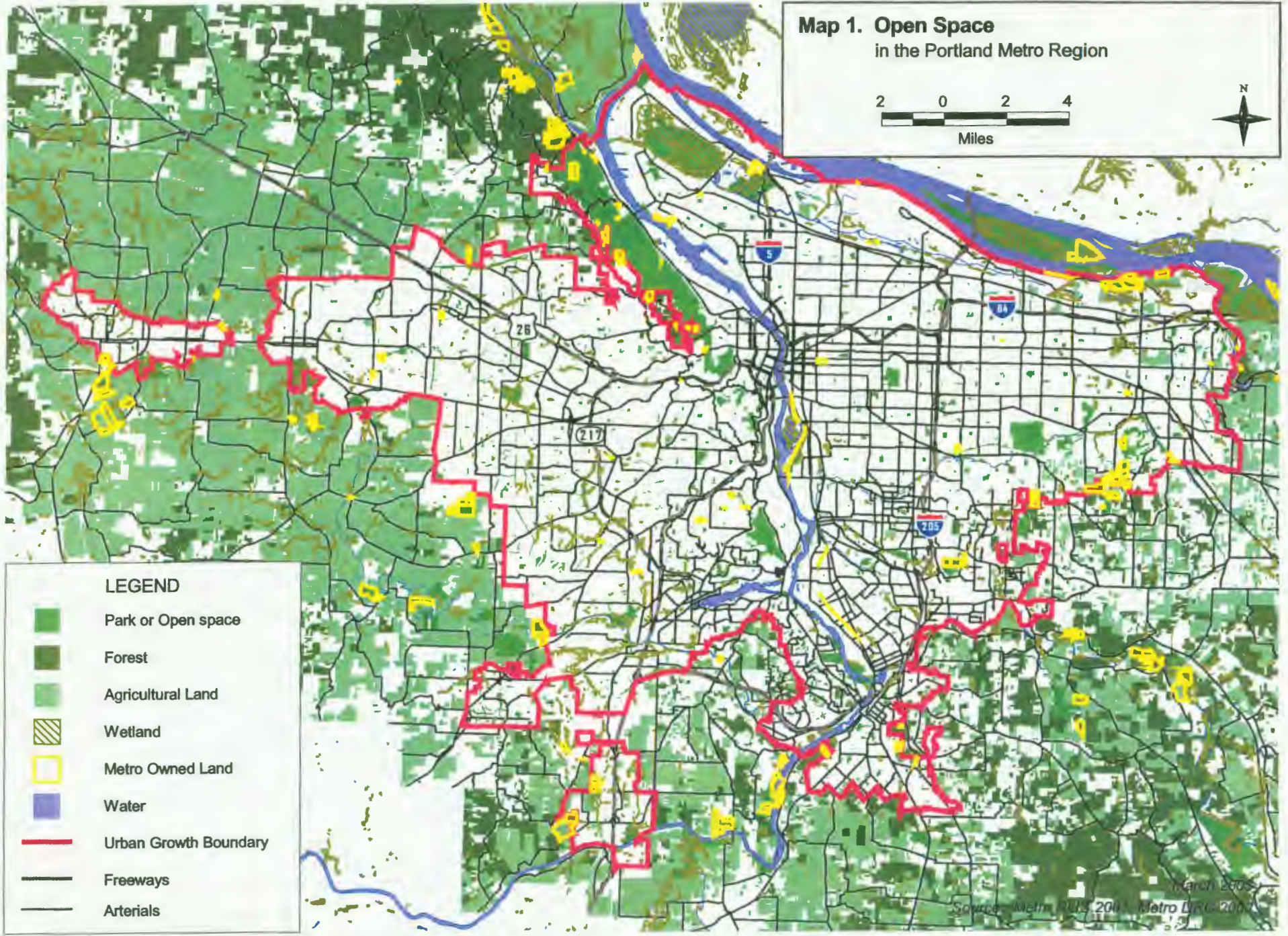
## **Appendix B: Maps**

Map 1. Open Space in the Portland Metro Region

Map 2. Opportunity Site: Forest Park Roads

Map 3. Opportunity Site: Boeckman Road, Wilsonville

**Map 1. Open Space**  
in the Portland Metro Region

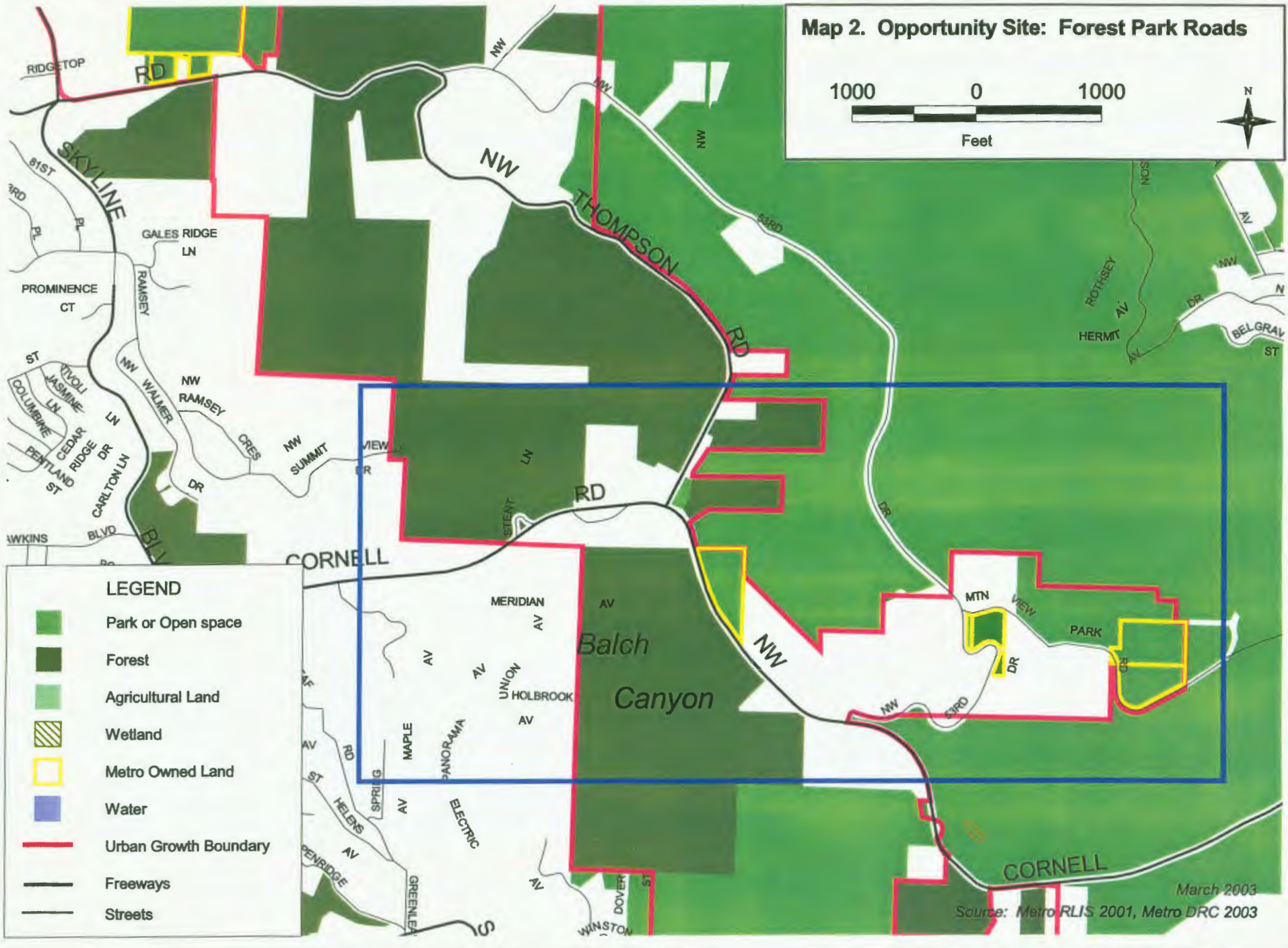


**LEGEND**

-  Park or Open space
-  Forest
-  Agricultural Land
-  Wetland
-  Metro Owned Land
-  Water
-  Urban Growth Boundary
-  Freeways
-  Arterials

March 2005  
Source: Metro GIS 2004, Metro DRC 2004

Map 2. Opportunity Site: Forest Park Roads



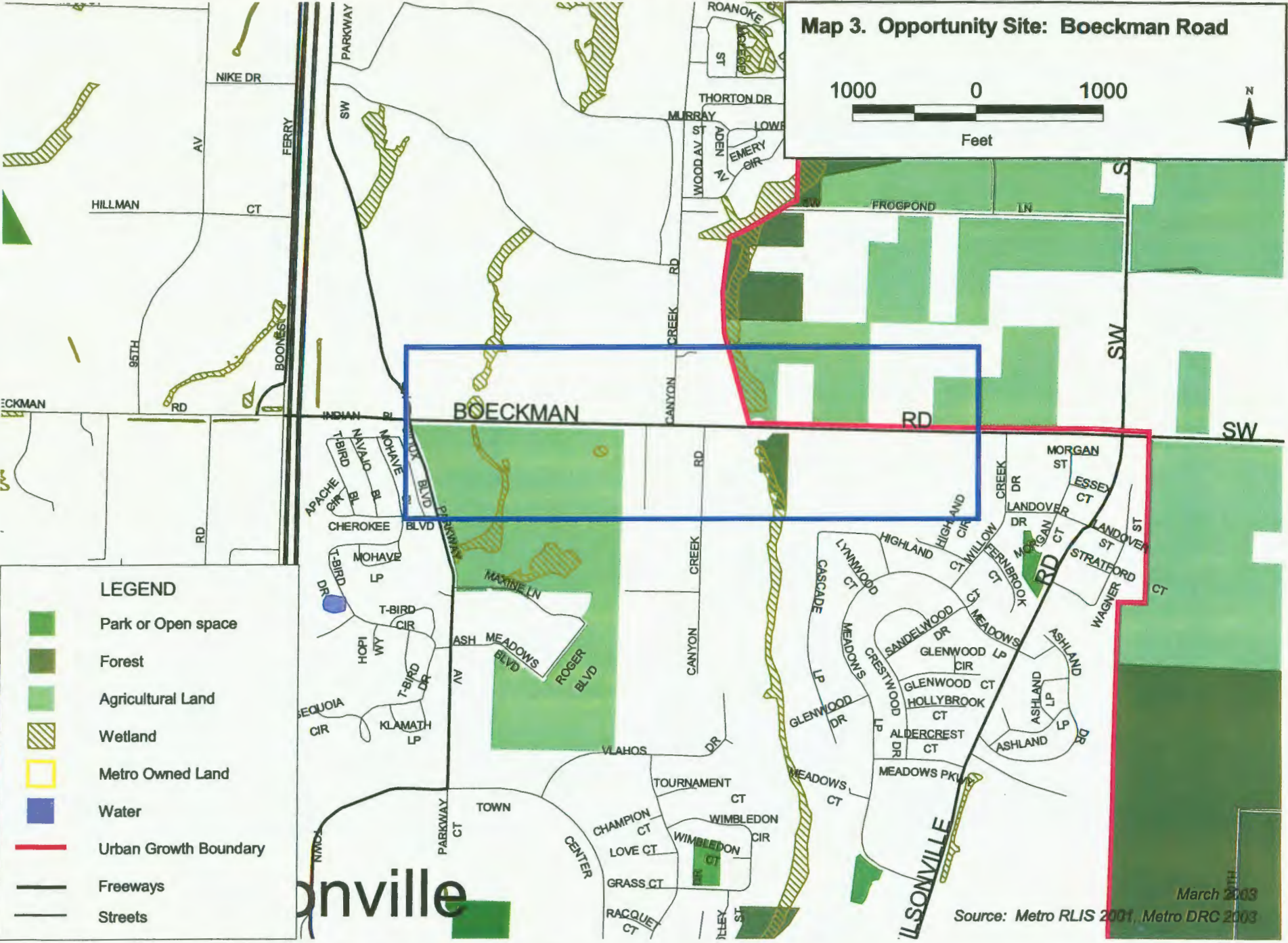
**LEGEND**

	Park or Open space
	Forest
	Agricultural Land
	Wetland
	Metro Owned Land
	Water
	Urban Growth Boundary
	Freeways
	Streets

March 2003  
Source: Metro RLIS 2001, Metro DRC 2003



Map 3. Opportunity Site: Boeckman Road



**LEGEND**

- Park or Open space
- Forest
- Agricultural Land
- Wetland
- Metro Owned Land
- Water
- Urban Growth Boundary
- Freeways
- Streets

Ilsonville

## Appendix C: Timeline







## **Appendix D: Roles and Responsibilities**

# Roles and Responsibilities

## ROLES

- X coordinator
- P primary responsibility
- S secondary responsibility
- advisor

## ROLES

### TASKS

#### 1. Background

- A. Safety: human and animal
  - 1. Conduct literature review
  - 2. Contact resources (short interviews where appropriate)
  - 3. Get national and local statistics on animal/vehicle conflicts
- B. Habitat Fragmentation and Wildlife Corridors
  - 1. Conduct literature review
  - 2. Contact resources (short interviews with Linda Anderson, Jennifer Budhabhatti)
  - 3. Get National and local statistics on habitat loss, etc.
- C. Costs
  - 1. Talk to insurance companies re: collision costs
  - 2. Talk to animal control, etc., to get cost of cleanup
  - 3. Set up a framework for a cost-benefit analysis
  - 4. Costs of maintenance and construction of crossing
- D. Polish/Final Draft - findings
  - 1. Executive Summary
  - 2. Introduction
  - 3. General Background
    - a. What is a wildlife crossing?
    - b. Explain problem statement
    - c. Examples from other places and effectiveness

#### 2. Portland Context

- A. Format GIS data / make maps
  - 1. Display property ownership and plans
  - 2. Display land use and zoning
  - 3. Display vegetation
  - 4. Display Metro's wildlife corridors data
  - 5. Display Metro's incident data
- B. Analysis
  - 1. Perform visual survey of map- wildlife corridor, incident, and road intersections
  - 2. Speak briefly with Linda and Jennifer to explore how "hot spots" are determined
- C. Polish/Final Draft - findings on Portland Context
  - 1. Discuss the need for wildlife crossing in the Portland region
  - 2. Describe Metro's previous work
  - 3. Write paragraph on challenges of identifying "hot spots"

#### 3. Design Considerations

- A. Research + write on crossing effectiveness
  - 1. Physical design: type of crossing (width, noise barriers, under/over, etc.)
    - a. Explore pros and cons of developing mixed-use paths
    - b. Address species-specific considerations
    - c. Look at how to attract animals and importance of habitat

	Arianne	Charl	Kerri	Kevin	Radcliffe	Theresa	Clients
<b>1. Background</b>						X	
A. Safety: human and animal	S			P			
1. Conduct literature review							
2. Contact resources (short interviews where appropriate)							
3. Get national and local statistics on animal/vehicle conflicts							
B. Habitat Fragmentation and Wildlife Corridors				P		S	
1. Conduct literature review							
2. Contact resources (short interviews with Linda Anderson, Jennifer Budhabhatti)							
3. Get National and local statistics on habitat loss, etc.							
C. Costs		P		S			
1. Talk to insurance companies re: collision costs							
2. Talk to animal control, etc., to get cost of cleanup							
3. Set up a framework for a cost-benefit analysis							
4. Costs of maintenance and construction of crossing							
D. Polish/Final Draft - findings							
1. Executive Summary							
2. Introduction							
3. General Background							
a. What is a wildlife crossing?							
b. Explain problem statement							
c. Examples from other places and effectiveness							
<b>2. Portland Context</b>					X		
A. Format GIS data / make maps	S				P		
1. Display property ownership and plans							
2. Display land use and zoning							
3. Display vegetation							
4. Display Metro's wildlife corridors data							
5. Display Metro's incident data							
B. Analysis		P	S				
1. Perform visual survey of map- wildlife corridor, incident, and road intersections							
2. Speak briefly with Linda and Jennifer to explore how "hot spots" are determined							●
C. Polish/Final Draft - findings on Portland Context							
1. Discuss the need for wildlife crossing in the Portland region							
2. Describe Metro's previous work							
3. Write paragraph on challenges of identifying "hot spots"							
<b>3. Design Considerations</b>	X						
A. Research + write on crossing effectiveness	P				S		
1. Physical design: type of crossing (width, noise barriers, under/over, etc.)							
a. Explore pros and cons of developing mixed-use paths							
b. Address species-specific considerations							
c. Look at how to attract animals and importance of habitat							

# Roles and Responsibilities

## ROLES

- X** coordinator
- P** primary responsibility
- S** secondary responsibility
- advisor

## ROLES

### TASKS

	Arianne	Charl	Kerri	Kevin	Radcliffe	Theresa	Clients
d. Cite statistics from case studies (evidence of effectiveness)							
e. Design and Topography							
f. Importance of adjacent land use							
g. Sketches							
<hr/>							
<b>4. Policy Issues</b>		<b>X</b>					
A. Identify road classifications for analysis					<b>S</b>	<b>P</b>	<b>●</b>
B. Research + write on costs of wildlife crossings		<b>P</b>				<b>S</b>	
1. Construction							
2. Maintenance							
3. Auxiliary (fencing, etc.)							
C. Funding Issues		<b>S</b>	<b>P</b>				
1. TEA-21 Transportation Enhancement Funds							
2. TEA-21 National Recreational Trails Fund							
3. Other							
D. Regulatory Opportunities and Constraints			<b>P</b>	<b>S</b>			<b>●</b>
1. Federal, State, Metro goals							
2. Design requirements by road classification							
E. Policies and Recommendations							
F. Polish/Final Draft - findings							
<hr/>							
<b>5. Planner's Checklist</b>			<b>X</b>				
A. Write up assessment checklist	<b>S</b>		<b>P</b>				
<hr/>							
<b>6. Opportunity Sites</b>				<b>X</b>			
A. Boeckman Road		<b>S</b>			<b>P</b>		<b>●</b>
1. Assess project potential (MTIP)							<b>●</b>
2. Consider wildlife in area							
3. Visit site							
4. Consider and suggest appropriate designs							
B. Forest Park	<b>P</b>			<b>S</b>			
1. Assess current problem							
2. Discuss opportunity with Audubon Society							
3. Visit site							
4. Consider and suggest appropriate designs							
C. Discuss other sites in brief			<b>S</b>			<b>P</b>	<b>●</b>
1. Damascus							
2. Cully Neighborhood (Portland, OR)							
D. Polish/Final Draft- findings							
<hr/>							
<b>7. Logistics</b>							
A. Meetings							



## Roles and Responsibilities

### ROLES

- X coordinator
- P primary responsibility
- S secondary responsibility
- advisor

### ROLES

### TASKS

	Arianne	Charl	Kerri	Kevin	Radcliffe	Theresa	Clients
B. Client contact				S		P	
<b>8. Preparing the Document</b>							
A. Ongoing							
B. Write sections							
C. Review Draft							P
D. Submit for final publication							