Transportation Ecology: Calling Conservation Engineers to Action

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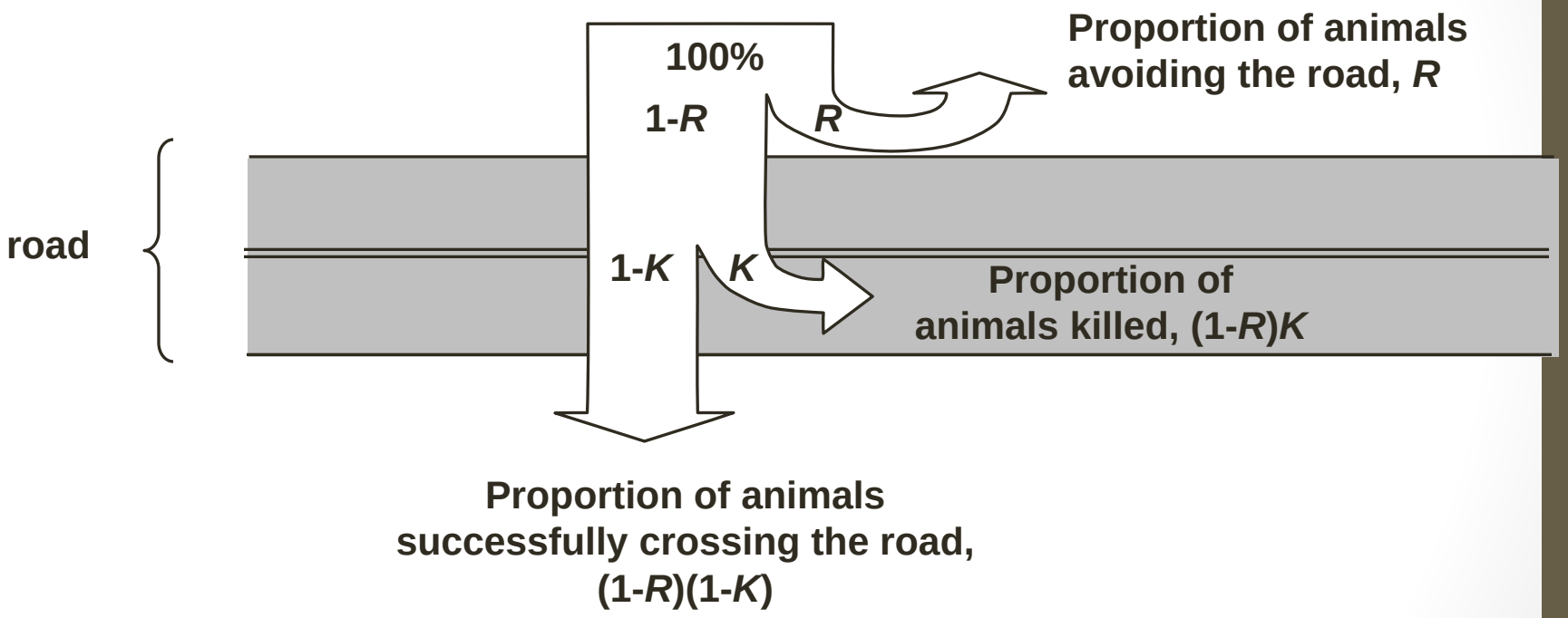
Objectives

- Highlight some impacts to wildlife from highways
- Describe how and why US 97 Lava Butte is novel
- Describe ways for Conservation Engineers to use their talents to bring solutions

This agent is unique

- **It kills outright**
- **It removes habitat and replaces it with expanses of barren surfaces**
- **It slices habitat by creating a barrier to movement**
- **It's noisy and carries frequently noisy people into remote habitat**
- **It creates noxious fumes and salts**

Two Major Impacts: Mortality and Avoidance



Jaeger, J. A. G., and L. Fahrig. 2004. Effects of Road Fencing On Population Persistence. Cons. Bio. 18(6): 1651-1657. Used by permission.

Two Major Impacts

- Mortality from vehicle collisions
- Loss of habitat connectivity
- Most impacts from highways are related to *traffic volume*

Major Issue 1.
So what's the problem with a few road pizzas?

- Vehicle-caused wildlife mortality estimated at *ONE MILLION* vertebrates each day in US (Lalo 1987)
- Virtually all wildlife species affected

Major Issue 2: Loss of habitat connectivity

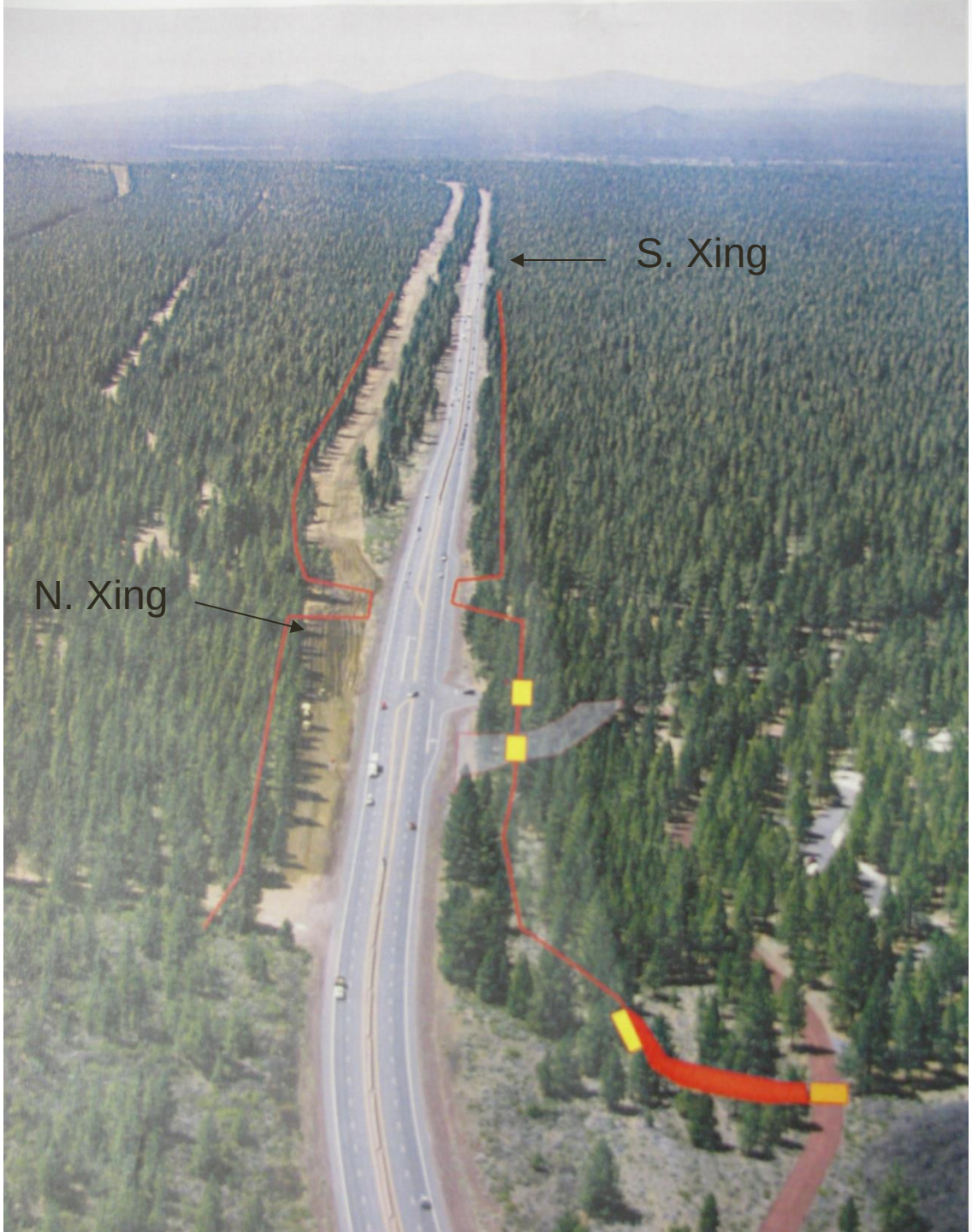
- Permeability: The landscape's ability to allow an animal's free movement to all parts of its range
- Different species have different tolerances to highways, so highways act as 'filters' that change an area's species mix

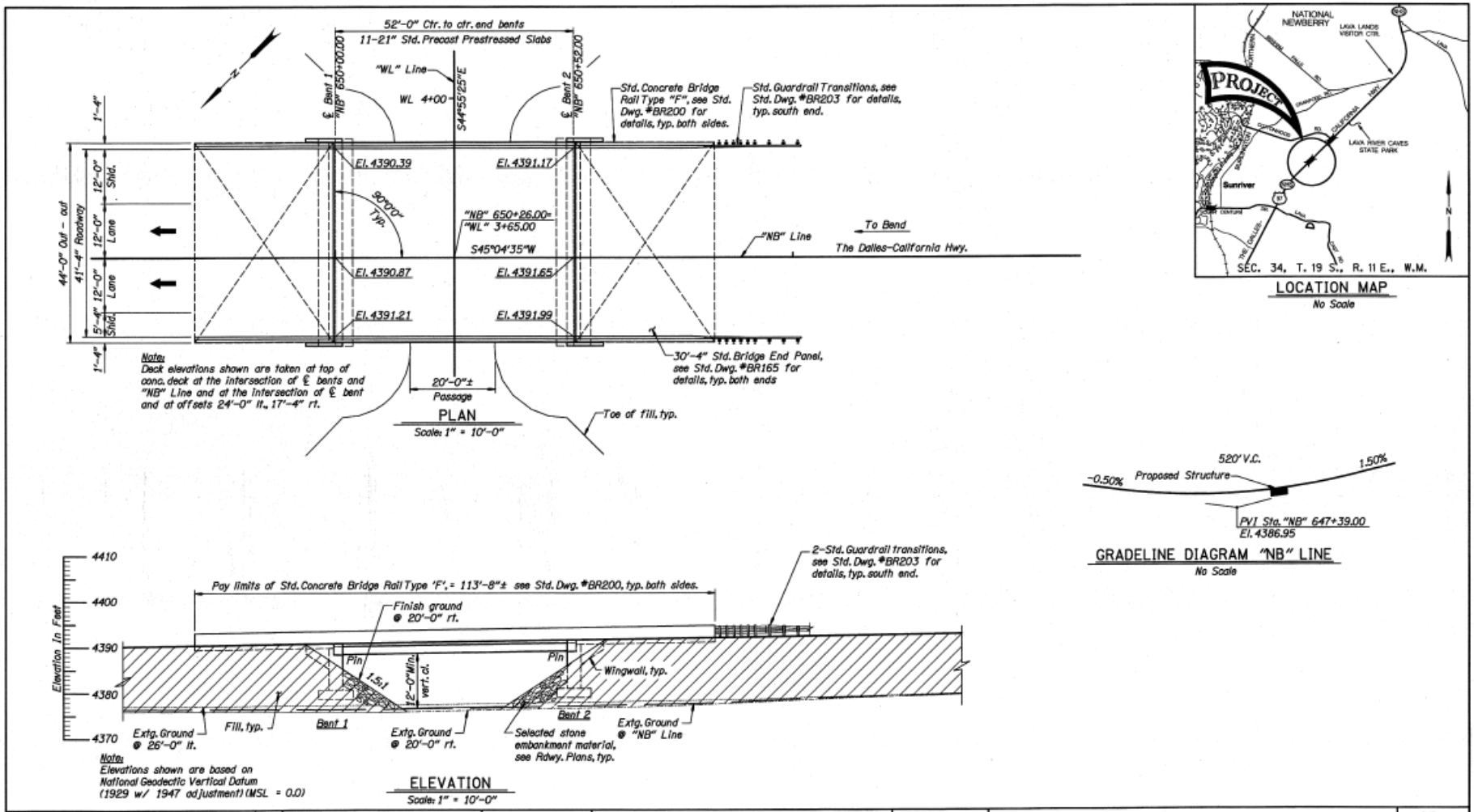

US 97
Lava Butte to S. Century Drive


TRUCKS

Deer Population Statistics

- N. Paulina unit = 8100 (1950's) 4400 (2000's)
- 1, 732 RK documented on 150 miles of Hwy between fall of 2005 to fall 2009
- 400/year
- 19 documented per year in project area
- 5x19=95 (number used for the cost benefit analysis)


S. Xing
N. Xing



△	DATE	REVISION	BY

ACCOMPANIED BY DWGS. 81094-81099, BR165
BR200, BR203, BR415, BR445

DRAFTER: J. Culpepper
DESIGNER: Kelly Burnell
CHECKER: JD Deschamps
REVIEWER: Guido Portier

REGISTERED PROFESSIONAL ENGINEER — OREGON — JULY 14, 2006 — GUIDO A. PORTIER
EXPIRES: 12-31-2010

OREGON DEPARTMENT OF TRANSPORTATION
DAVID EVANS AND ASSOCIATES INC.

STRUCTURE NO.	21017
DATE	Feb. 2009
CALC. BOOK	6076

US 97 NB OVERCROSSING (WILDLIFE PASSAGE)
US 97 : LAVA BUTTE - S. CENTURY DR.
THE DALLES - CALIFORNIA HIGHWAY (MP 152.00)
DESCHUTES COUNTY

PLAN AND ELEVATION

SHEET	1 OF 7
DRAWING NO.	81093

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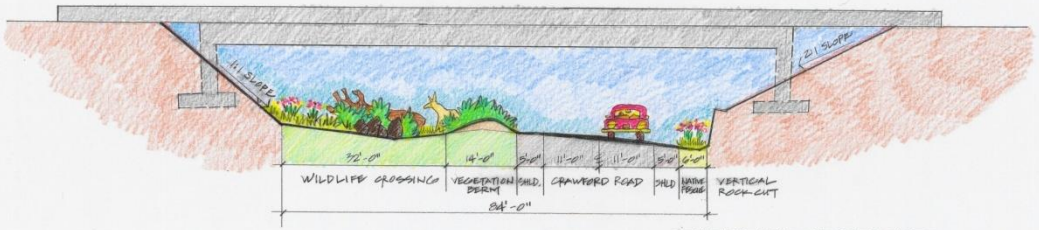
WILDLIFE CROSSING
CONCEPTUAL LANDSCAPE PLAN

SCALE: 1" = 10'-0"



WILDLIFE CROSSING
ELEVATION

WILDLIFE CROSSING LANDSCAPE CONCEPT III

LANDSCAPE CONCEPT III PROPOSES A WIDER WILDLIFE CROSSING OF 32' INSTEAD OF 10' AND ADDING A VEGETATION BERM SYSTEM AS A BUFFER AND VISUAL SCREEN BETWEEN THE ROAD AND WILDLIFE CROSSING. THIS WOULD BE ACHIEVED BY CHANGING THE NORTH SIDE 2:1 SLOPE TO A 1:1 SLOPE AND SHIFTING ALIGNMENT OF CRAWFORD ROAD 8' TO THE WEST.

THE WIDER PASSAGE WOULD CREATE A MORE VIABLE WILDLIFE CROSSING WITH AN EXPANDED BUFFER FROM THE ROAD AND ENCOURAGE MORE OPPORTUNITIES FOR A DIVERSE RANGE OF SPECIES WITH A WIDER SPACE.

THE FALLEN LOGS (20-25' LENGTH) WITH TOPS SEMI-BURIED ARE THE BACKBONE FOR CORRIDOR CONNECTIVITY WITH SUPPORTING COVER AND POCKETS CREATED BY CONTOURED GRADE CHANGES AND BERMS PLANTED WITH NATIVE SHRUBS, GRASSES AND PERENNIALS AND SEMI-BURIED LAVA ROCKS WITH VERTICAL OR ANGLED PLACEMENT AND A FEW STUMPS.

CONNECTION WITH THIS PLANTING SCHEME WOULD CONTINUE TO ADJACENT FOREST AREAS ON EITHER SIDE OF THE BRIDGE.

Deschutes National Forest
U.S.D.A. Forest Service; Pacific Northwest Region

HWY. 97 - CRAWFORD ROAD
WILDLIFE CROSSING
DESIGN CONCEPT III
LANDSCAPE PLAN & ELEVATION

APPROVED:
FOREST SUPERVISOR
FOREST ENGINEER
RECREATION STAFF
DISTRICT RANGER
LANDSCAPE ARCHITECT
DRAWN ROVERGY RAVEY DATE 18 AUG 2009
DESIGNED ROVERGY RAVEY DATE 18 AUG 2009
CHECKED DATE
SUBMITTED DATE
SHT
OF

Ecosystem Passage Features

- Soil retained and replaced under underpasses
- Compost mulched onsite
- Passive water system
- Structure including boulders and logs added
- Onsite native plants reserved, propagated and replanted
- Visuals considered at north underpasses


HITACHI
PAPE


HITACHI
ZAXIS
50U

What can conservation engineers do?

- Engage other disciplines in road and highway projects, especially where culverts and bridges are present

Learn More

- Innovative Approaches to Wildlife and Highway Interactions

Plan for wildlife passage

- Corridor K Tennessee options for overpass

Watch for opportunities

- Retrofitting existing structures
- Replacing structures
- Bat structures

Avoid making new problems

- Especially rip-rap!

Typical Nebraska Bridge Undercrossings

Riprap

Photo Courtesy NDOR


May 2009
April 2013
Photos Courtesy Brian Johnson, NDOR

Maintenance may provide opportunities

Operations can be improved

- Deicing cinders can cause problems

Watch Aquatic Organism Passage projects

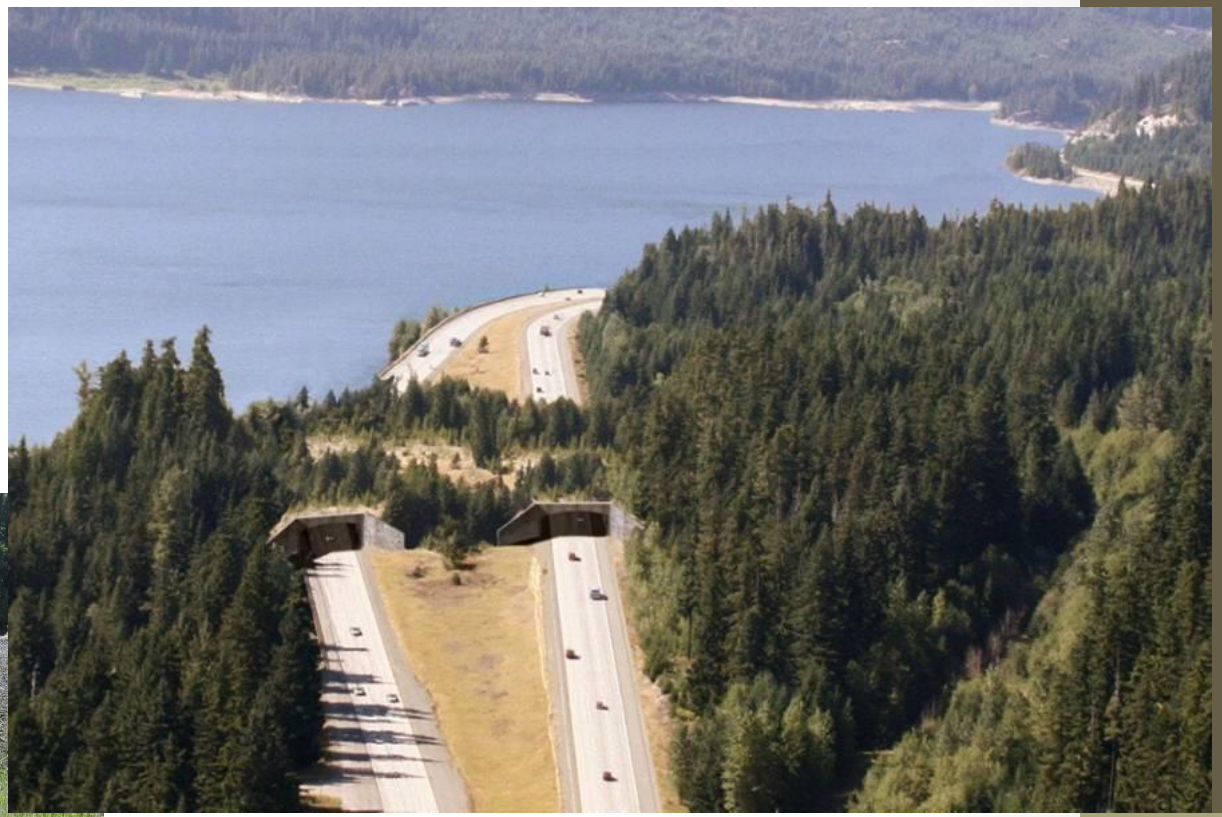
- Avoid reducing terrestrial access

The future?

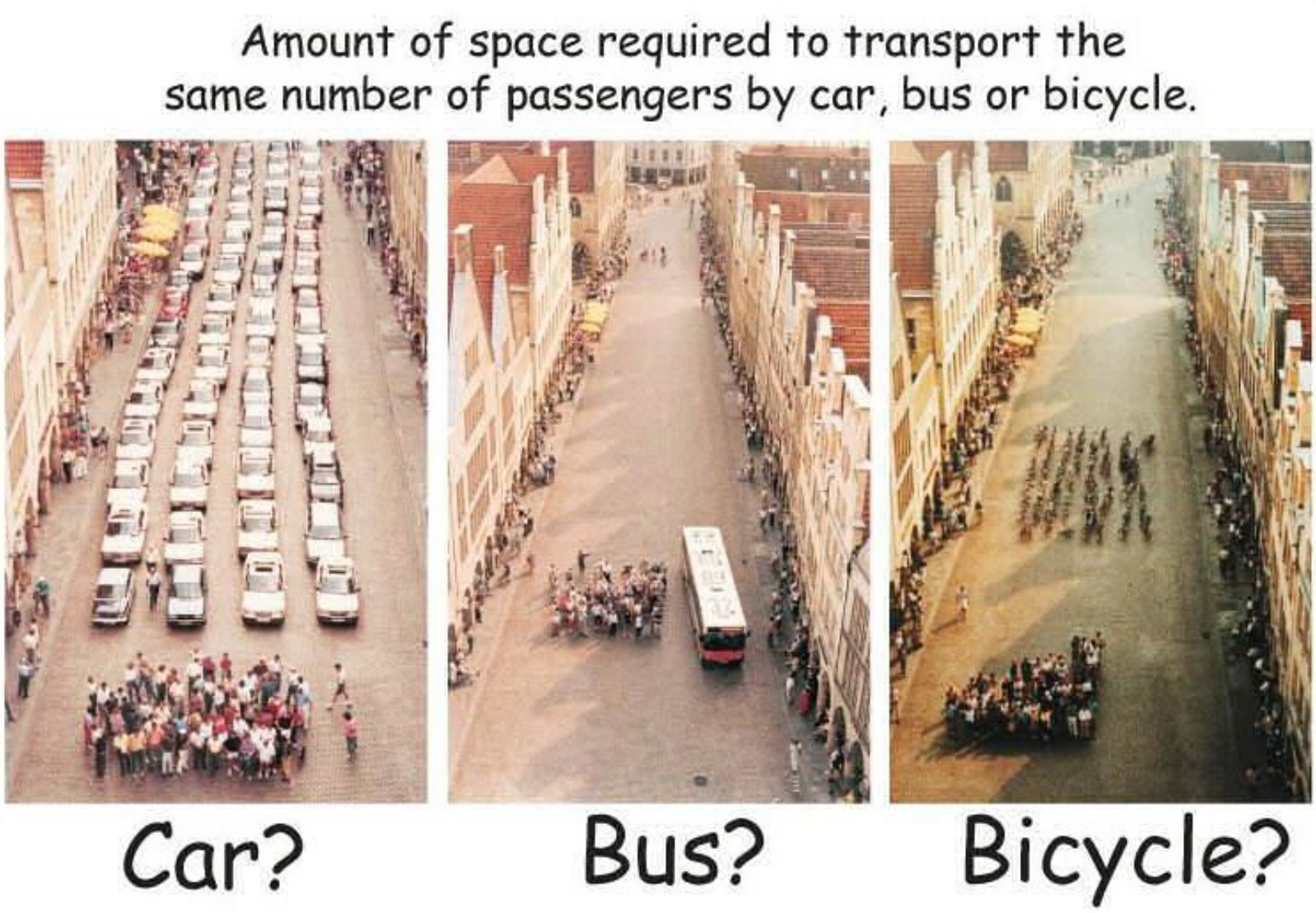
More sophistication in crossing structures

The future: Restoration of existing highways

- New structures
- Retrofitting existing structures



The future: Transit options



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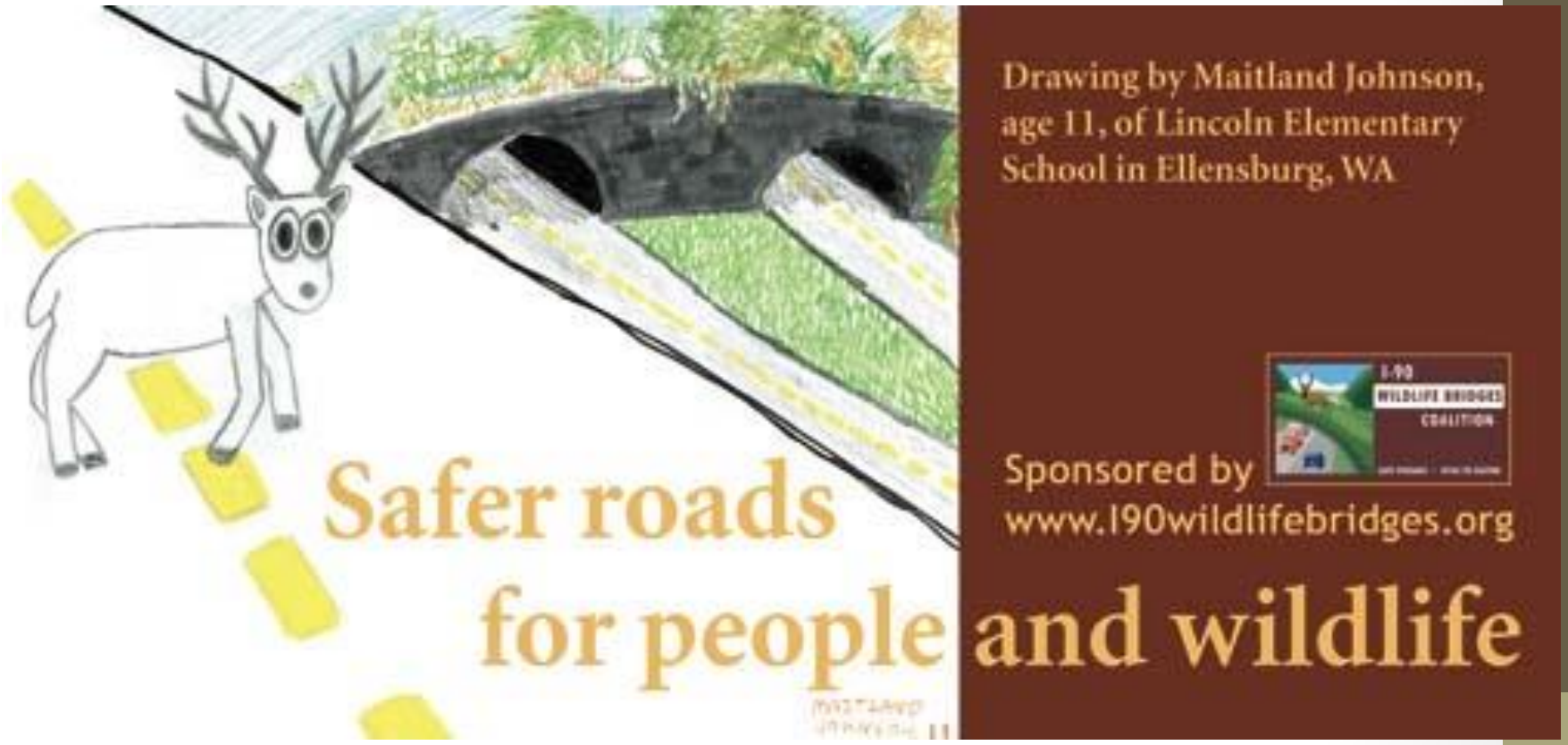
The future: SOP



Thank you!