



Innovative Facility and Infrastructure Design™

IMPLEMENTATION OF COMPLETE STREETS CONCEPTS

Engineering Guide

PRESENTED BY SCOTT KNEBEL, P.E. | OCTOBER 19, 2010

OVERVIEW



- › Introduction
- › General design criteria (why)
- › Design elements by user (how)
- › Other examples

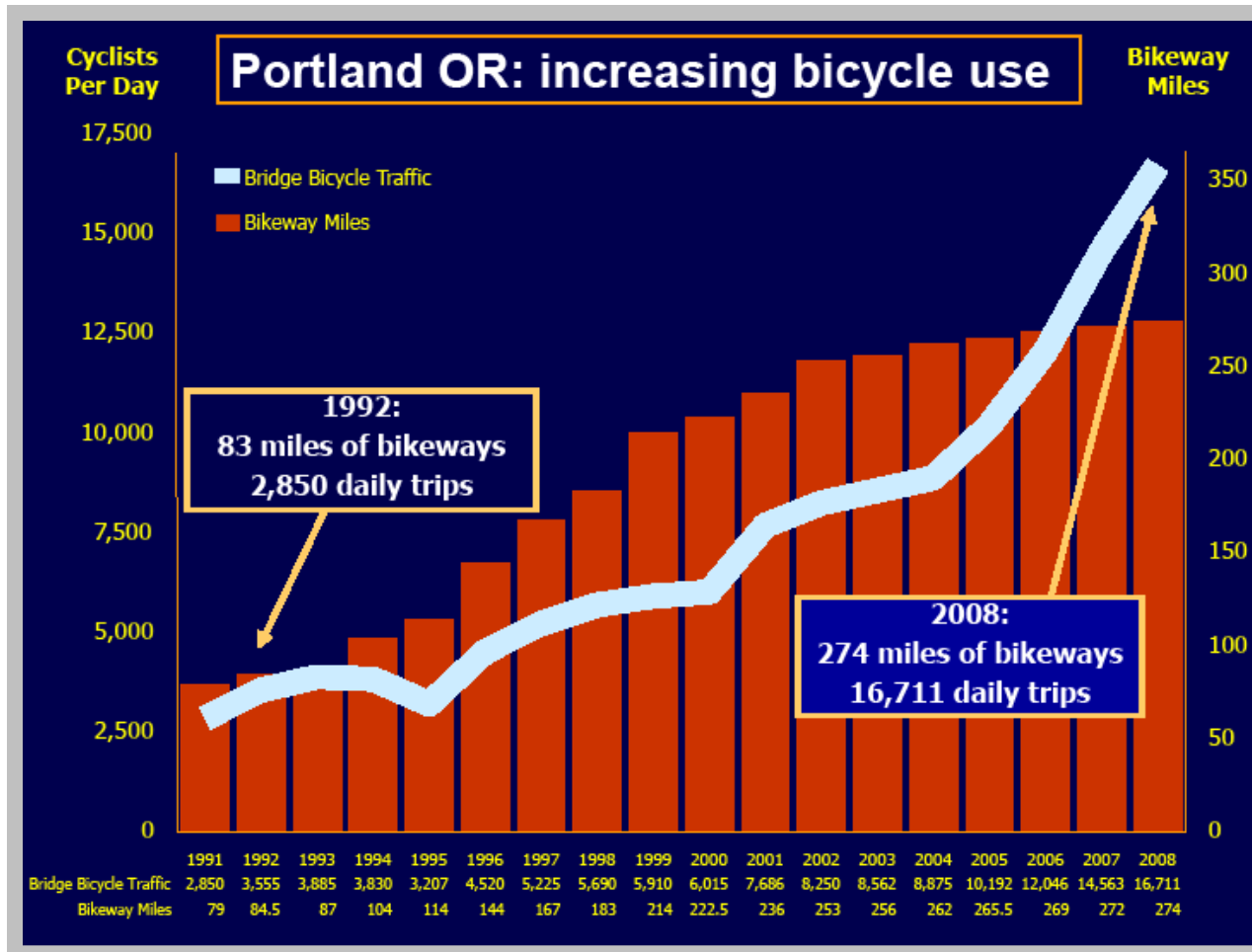
US DOT POLICY STATEMENT



"Today, I want to announce a sea change. People across America who value bicycling should have a voice when it comes to transportation planning. This is the end of favoring motorized transportation ..."



BUILD IT AND THEY WILL COME



CHANGE IS HARD



- Direct (logic)
- Motivate (emotion)
- Shape the Path

> *Switch: How to Change Things when Change is Hard* by Chip and Dan Heath

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Shape The Path

AASHTO GUIDANCE

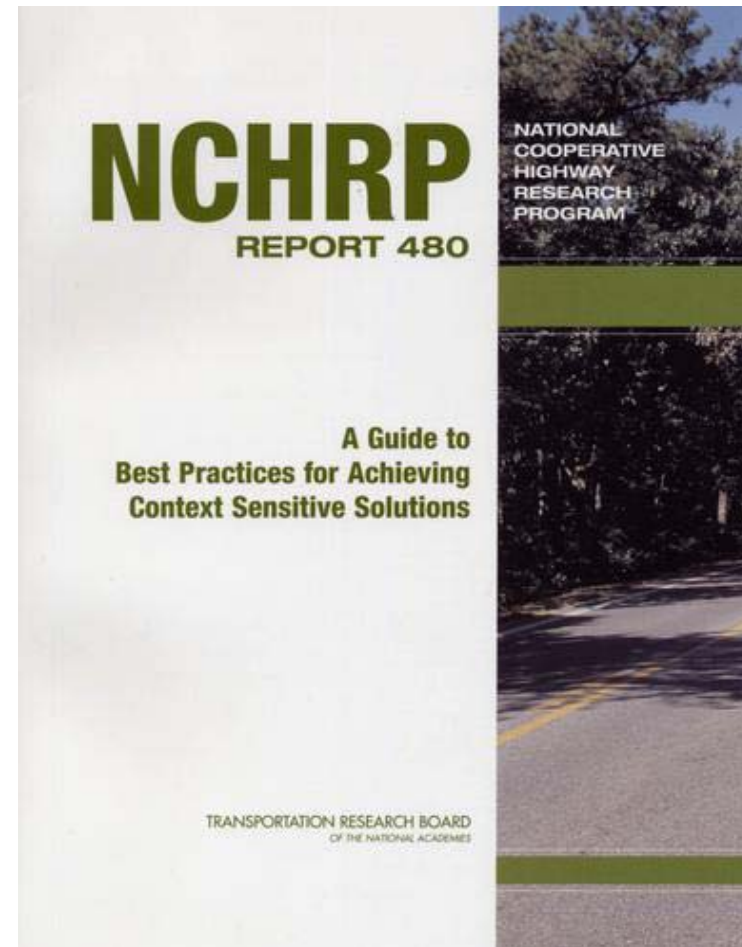


- Consider multiple transportation modes
- Requires compromise most favorable to all users
 - > Design and control measures beneficial to bus operation may have an adverse effect on other traffic, and vice versa
- Preferred criteria are not used where impacts are critical
 - > 10 feet lane width is acceptable (≤ 45 MPH) – PROJECT SPECIFIC
 - > 11 feet lane width is adequate on urban arterials

NCHRP Report 480: CSS



- A Guide to Best Practices for Achieving Context Sensitive Solutions, TRB, 2002



NCHRP 480 GUIDANCE



- Consider multiple transportation modes
- Design criteria should be met or exceeded
 - > 3 feet minimum sidewalk width to meet ADA criteria
 - > 5 feet minimum sidewalk width to meet PROWAC criteria
- Engineers run the risk of being seen as biased by advocates of mobility without BALANCE

BALANCE



OVERVIEW



- Introduction
- General design criteria (why)
- Design elements by user (how)
 - > Bicycle facilities
 - > Lane widths
 - > Drainage
 - > Pedestrian facilities
 - > Transit facilities
 - > Roadside landscape
- Other examples

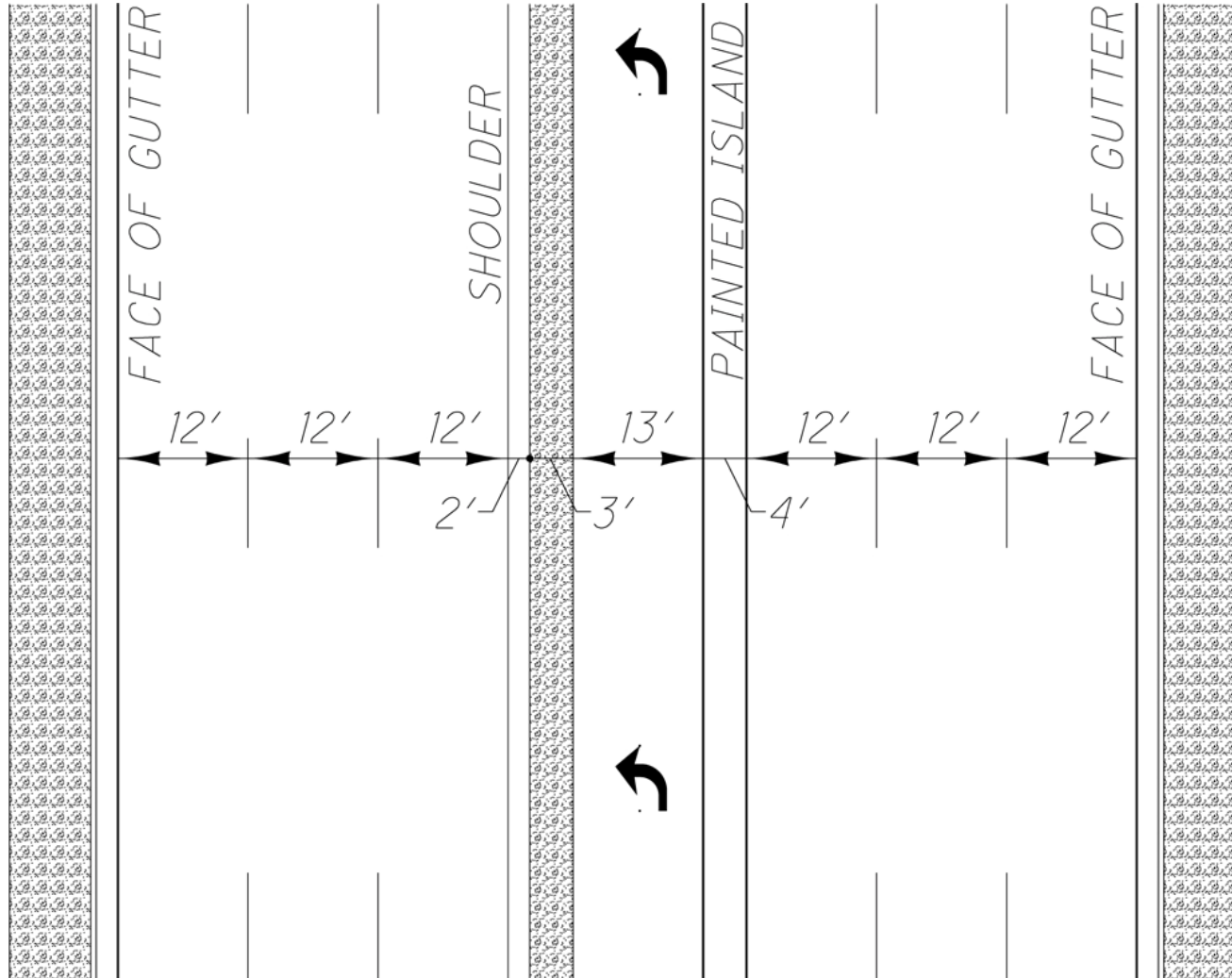
Shape The Path

SUBURBAN EXAMPLE

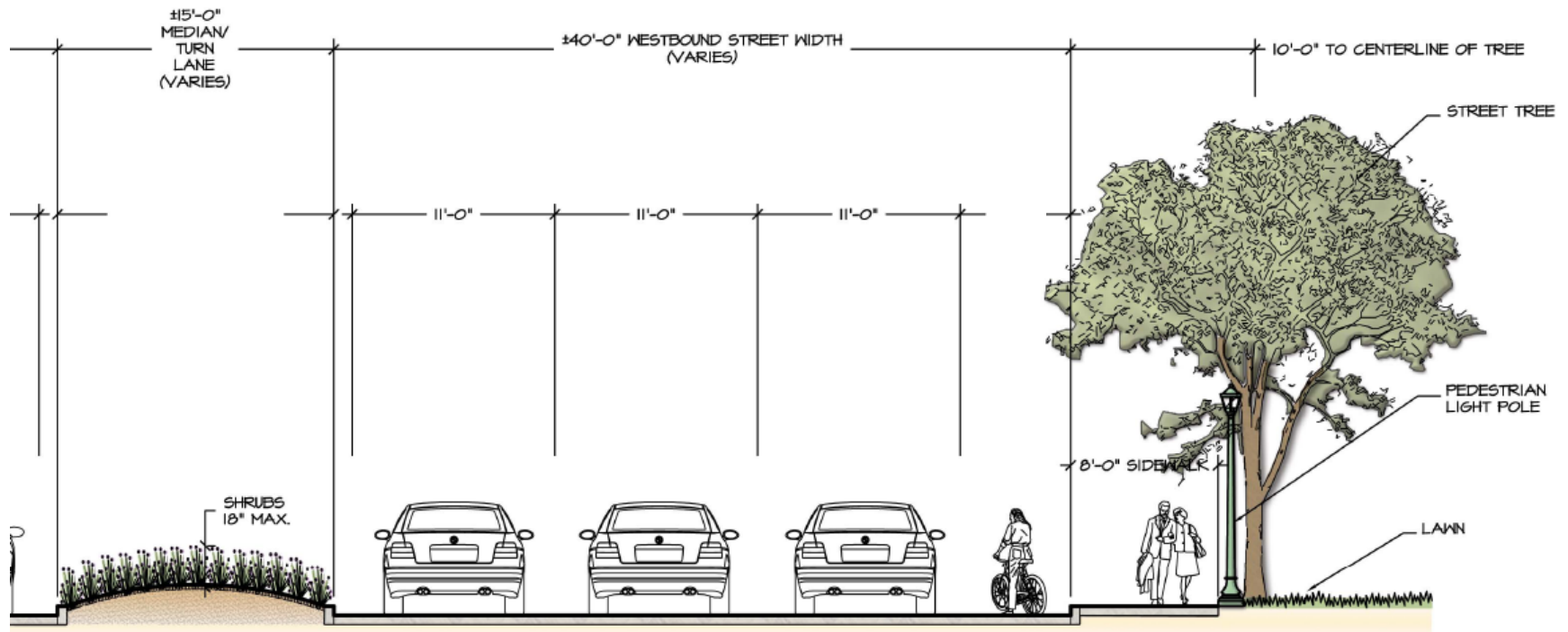




TYPICAL SECTION



COMPLETE STREET SECTION



DEDICATED BIKE LANE



- Separation of bike/vehicular traffic desirable (45 mph)
- Motor vehicles do not encroach into adjacent lanes when passing bicycles in dedicated lanes (FHWA)
- Bike lanes preferred by cyclists and FHWA

LANE WIDTHS



- Lane widths of 10 feet meet federal requirements (13% of urban arterials have 10 ft lanes)
- Accident modification factors (AMF) for narrow lanes on multilane urban arterials are negligible
- Narrow lanes serve to offset higher speeds due to increased shoulder widths (i.e., bike lanes)



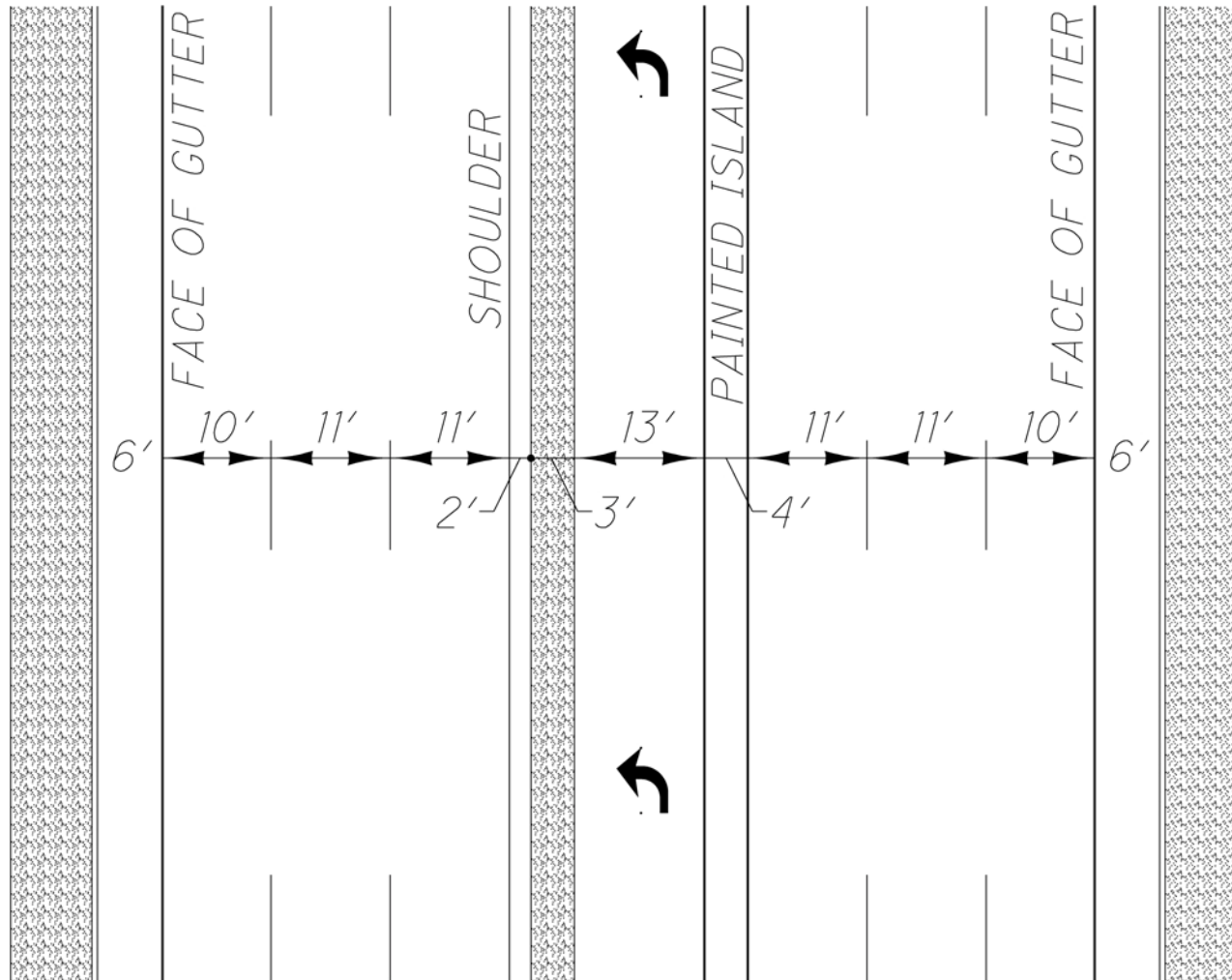
LANE WIDTH and SAFETY

- Lane widths narrower than 12 feet on urban and suburban arterials do not increase crash frequency except:
 - > Lane widths of 10 feet or less on four-lane undivided arterials
 - > Lane widths of nine feet or less on four-lane divided arterials
 - > Lane width of 10 ft or less on approaches to four-leg STOP-controlled arterial intersections

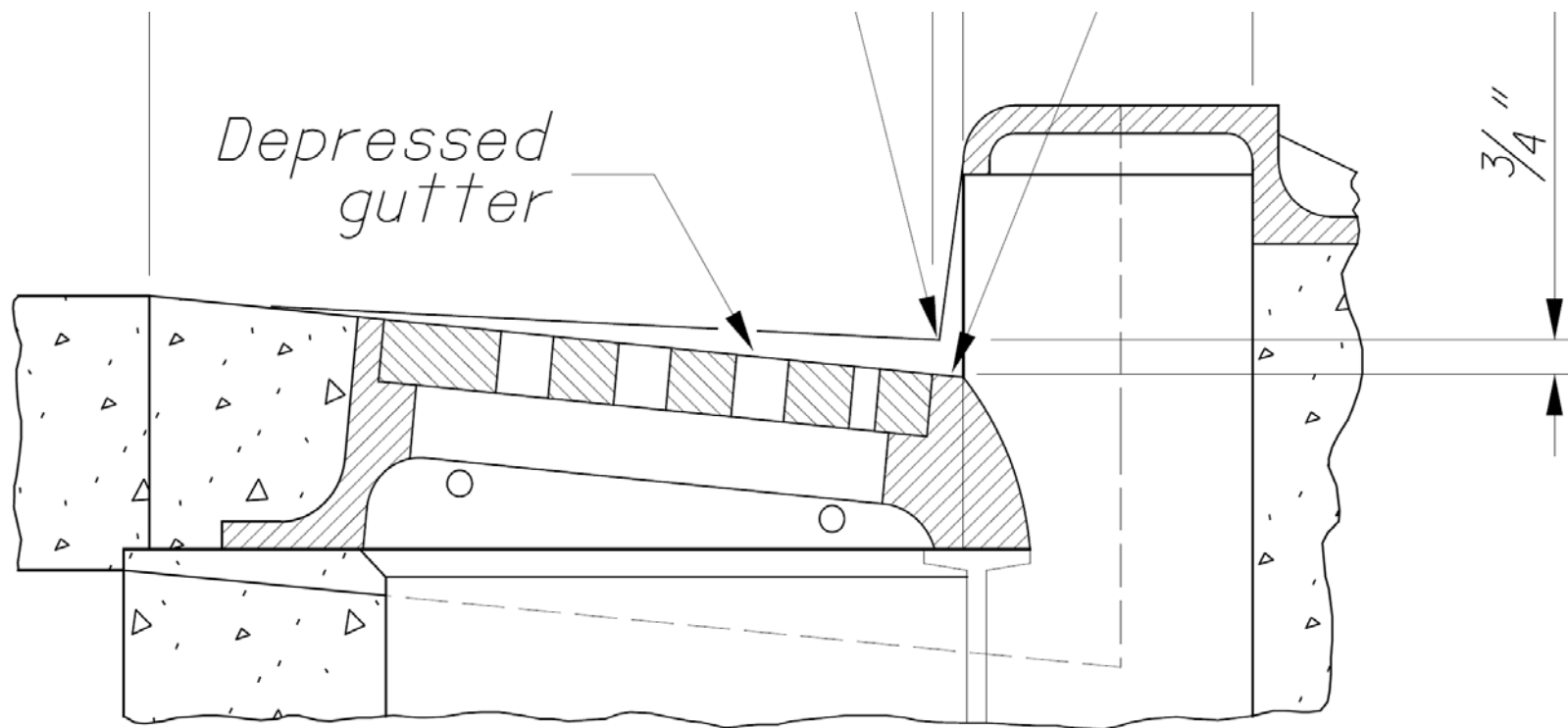
Potts, Ingrid B., Douglas W. Harwood, and Karen R. Richard. "Relationship of Lane Width to Safety for Urban and Suburban Arterials." Transportation Research Board 2007 Annual Meeting. 2007



ALTERNATE SECTION



DRAINAGE COMPROMISE



SIDEWALKS



- Section modified to a 5 ft sidewalk with a 2.5 ft buffer (minimum) – buffer increased where ROW permitted
- Patterned pavement treatment at crosswalks
- Signalized pedestrian crossings at two locations



LANDSCAPE (CLEAR ZONE)

- Posted speed of 45 MPH
- Clear zone per ODOT L&D manual = 19 feet
- Revised ODOT guidance for Minimum Lateral Offset
 - > Minimum 4 ft offset in low speed urban conditions – includes bike lanes and on-street parking

TRANSIT

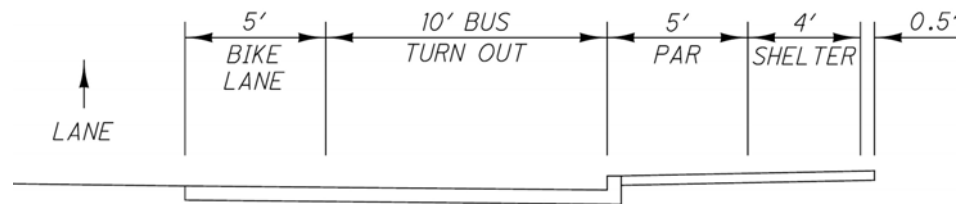


FIGURE 3
FULL BIKE LANE, BUS TURN OUT, SHELTER

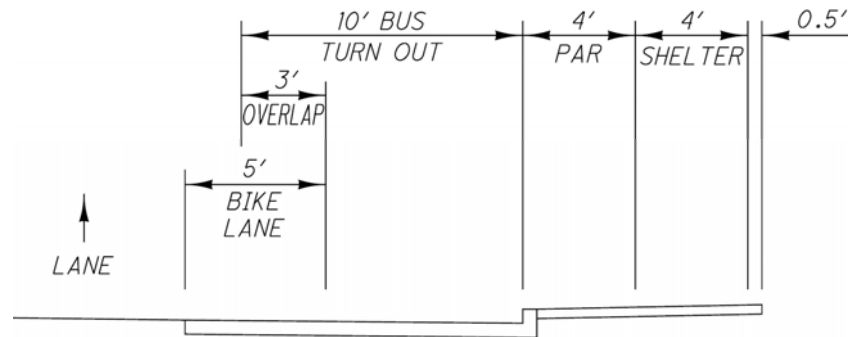


FIGURE 4
PARTIAL BIKE LANE, BUS TURN OUT, SHELTER

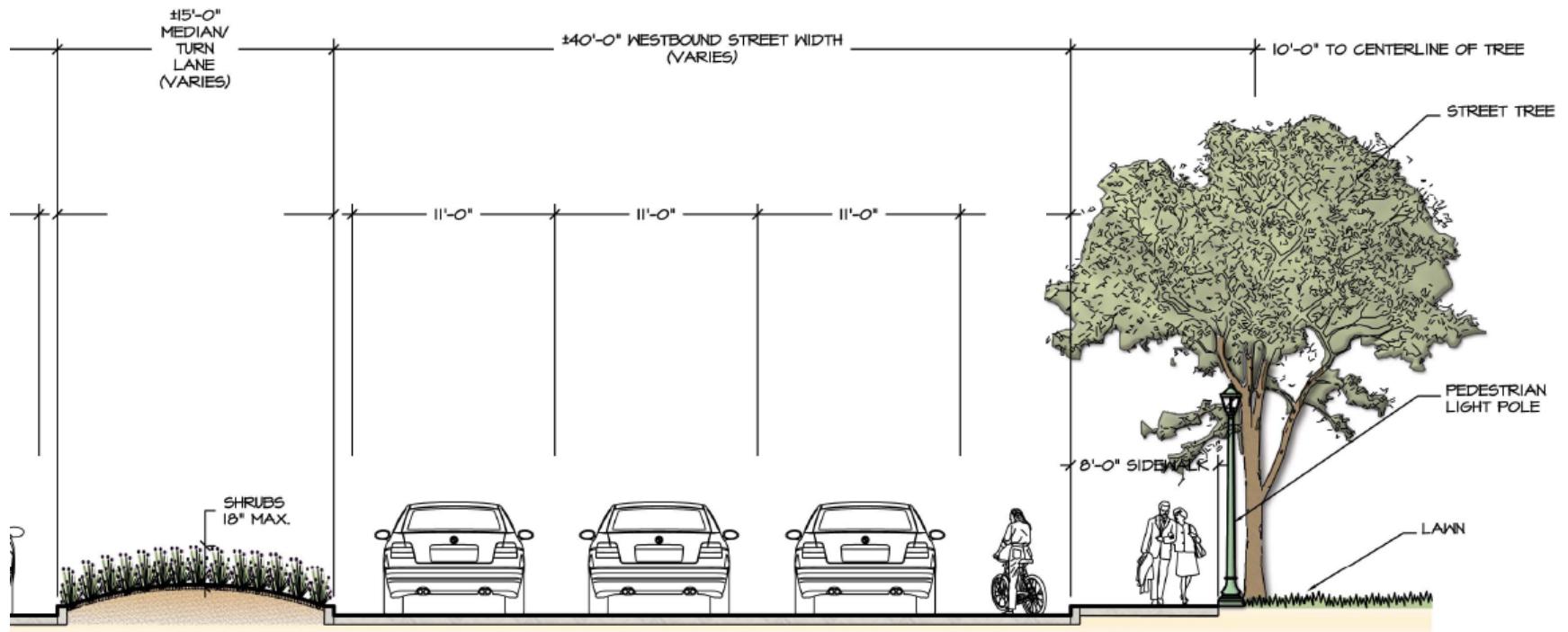
COSTS



ADDITIONAL CONSTRUCTION COSTS TO INCLUDE PROPOSED COMPLETE STREET ENHANCEMENTS	
DESCRIPTION	TOTAL COST
FRA-40-4.71 PID 76282	
Bicycle Facilities	\$25,075
Transit Facilities	\$60,672
Pedestrian Facilities	\$183,777
Landscaping	\$520,324
Lighting	\$703,954
FRA-40-4.71 SUBTOTAL	\$1,493,802

“Structural” elements resulted in a net reduction of \$32,000

COMPLETE STREET SECTION

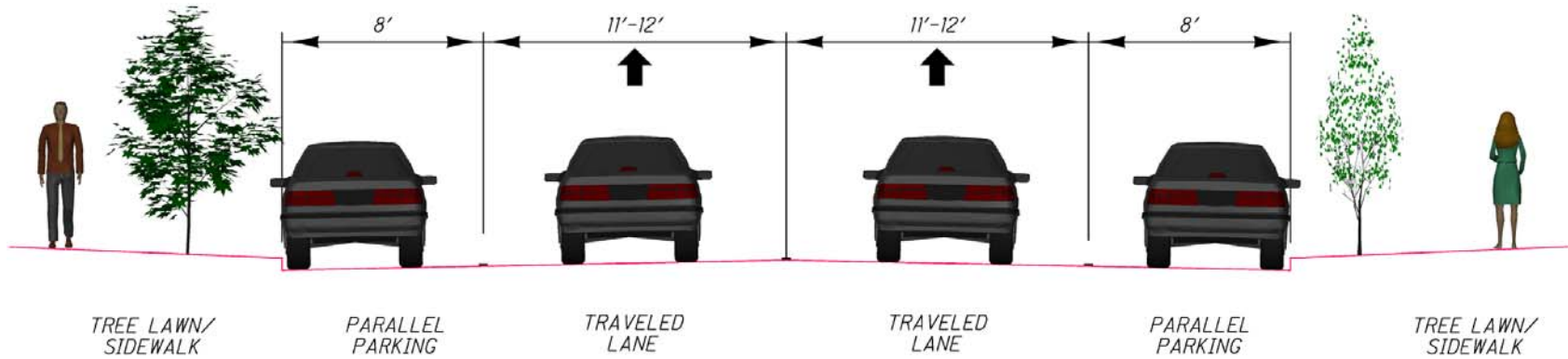


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URBAN EXAMPLE



URBAN EXAMPLE



RURAL EXAMPLE



Under development...

More to come

CONTACT INFORMATION



- Scott A. Knebel, P.E.
LJB Inc.
3100 Research Blvd.
Dayton, OH 45420
- 937-259-5067
- sknebel@LJBinc.com