

CURRENT PRACTICE AND CONSIDERATIONS IN AT-GRADE MANAGED LANE ACCESS DESIGN

 15TH INTERNATIONAL MANAGED
LANES CONFERENCE

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Presentation by:

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ADVERTISEMENT FOR SESSION 13

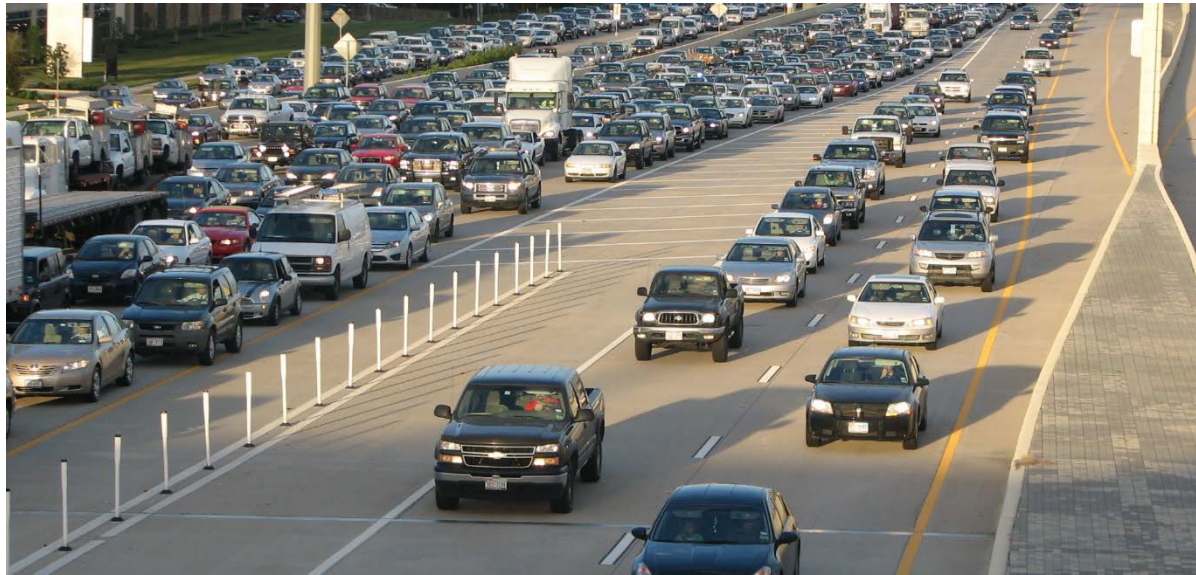
Introducing the NCHRP 15-49 Implementation Guide

Speaker	Presentation Title	Chapter
Kay Fitzpatrick	Overview of NCHRP Guidelines	
Chuck Fuhs	Introduction to Managed Lanes	1
Nick Wood	Planning Considerations	2
Marcus Brewer	Design Elements	3
Susan Chrysler	Traffic Control Devices	4
David Ungemah	Implementation and Deployment	5
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INTRODUCTION

Practitioner survey: access is a design-related guidance gap that needs to be filled

- Changes in operational strategies
- Changes in technology
- Considerations for higher volumes
- Considerations for dual-lane treatments
- Location of access points



Source: Marcus Brewer



STUDY OBJECTIVE

Study 5R.4 of NCHRP Project 15-49 created to answer the following questions:

- What are appropriate ways to evaluate and consider **impacts of restricted and continuous at-grade access**?
- What level of **operational analysis** is needed during the planning phase to determine operational feasibility?
- What are appropriate criteria for determining **ingress/egress locations and impacts on pricing demand**?
- What are preferred approaches to at-grade access for **different levels of demand associated with single and multi-lane concurrent-flow treatments**?

RESEARCH METHODOLOGY

Research approach had three main activities:

- Survey of recent practice by practitioners
 - Telephone / e-mail questionnaire
- Compilation of existing policies
 - Review of current literature, manuals, and guidance
- Develop findings and conclusions
 - Identify common design decisions and potential trends
 - Identify revisions to guidance and future research needs



Source: Chuck Fuhs

SURVEY OF RECENT PRACTICE

8 practitioners invited from 10 facilities in 6 regions

- Atlanta, San Francisco-Oakland-San Jose Bay Area, Houston, Los Angeles, Salt Lake City, Seattle
- Public and private sector, identified through previous contacts
- 10 total questionnaires distributed; 8 returned

11 total questions in 3 categories

- Location of access on limited-access facilities
- Comparison/conversion of limited access to continuous access
- Comparison of shared weave zone and unidirectional access

RESULTS: LOCATION (1/4)

Question 1: “What is the variation in distances between access points on your facility(ies)?”

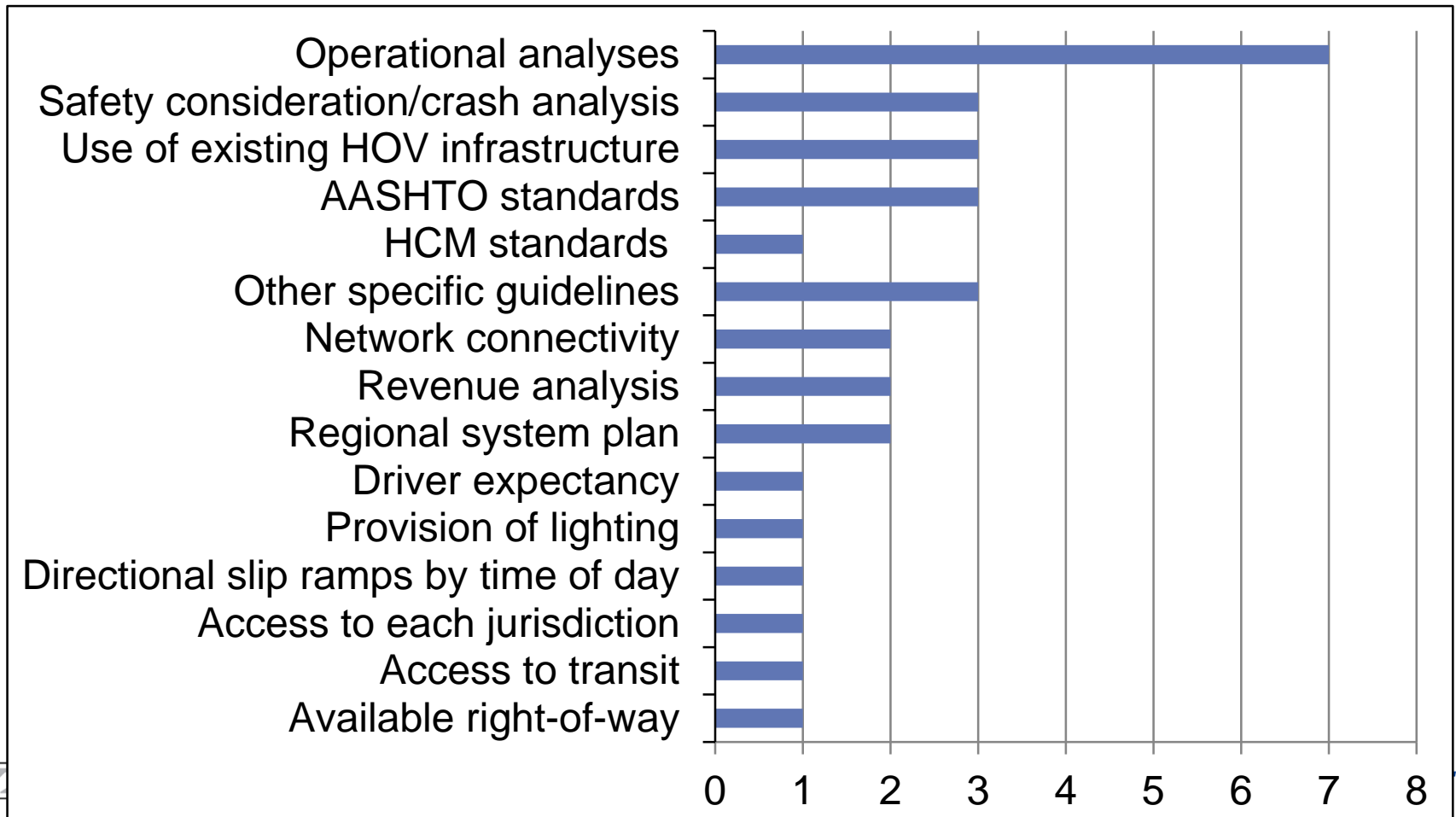
- Wide range of distances: <1 mi – 7.4 mi
- Typical answer between 1 and 3 mi

Source: Marcus Brewer



RESULTS: LOCATION (2/4)

Question 2: “What factor(s) led to the decision(s) to provide this access?”



RESULTS: LOCATION (3/4)

Question 3: “What is the typical weave distance between ML access and GP access (e.g., XX ft per lane change)?”

- Wide range of distances: 500 ft to >1 mi
- Typical answer between 600 and 1200 ft

Question 4: “Do you periodically review (or have you reviewed) the existing access points to determine whether they meet their intended purpose or whether changes could be made?”

- 4 of 5 had at least one review (2 routine, 2 driver feedback)
- Changes made as a result of all 4 reviews

RESULTS: LOCATION (4/4)

Question 5: “Based on the location, design, and performance of the existing access points, what are some tools/guidelines/information sources you did not have in the original design that would have been beneficial?”

- National guidance for weave distance per lane based on congestion (3 facilities)
- Congestion-based guidelines for length of weaving area
- Change in policy to facilitate open access
- Coordinate with agency to verify consistent expectations
- Better understanding of friction effects from “virtual buffer”
- Project scope to allow for redesign of access locations using current policy
- Understanding driver expectations at access points

RESULTS: CONVERSION (1/2)

Question 1: “What factor(s) led to the decision to provide continuous access on some of your project(s)?”

- Change in policy based on difficulty of analyzing limited access (2 facilities)
- Change in policy based on drivers’ preference, validated by operational and safety analyses

Question 2: “What are appropriate ways to evaluate and consider effects of restricted versus continuous at-grade access?”

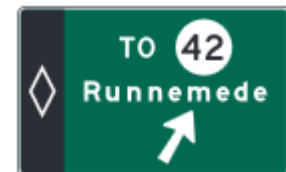
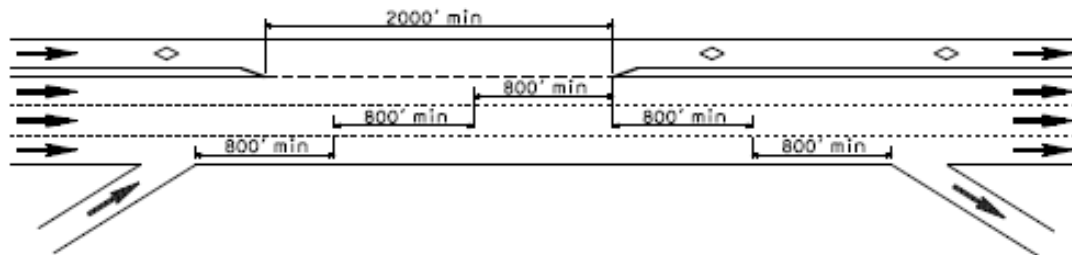
- Safety, gap acceptance, revenue; hypothesis that more drivers use the lanes with easier access
- Operational characteristics, specifically the traffic density in the ML and adjacent GP lanes

RESULTS: CONVERSION (2/2)

Question 3: “What are some tools, guidelines, or information sources you did not have during the conversion process that would have been beneficial?”

- Best way to configure access openings (length and striping patterns) for buffer-separated facilities
- Signing scheme for continuous access based on driver decision-making
- Better guidance on the placement of lighting relative to the access point and to the driver’s decision point

COMBINED INGRESS-EGRESS
WEAVE ZONE
(not to scale)



OR



RESULTS: SHARED/UNIDIRECTIONAL

Question 1: “Are there differences in preferred at-grade access for single-lane versus multi-lane treatments?”

- Little to no difference in preference; variations due to other factors

Question 2: “Does the preferred access treatment change at a particular volume or level of demand?”

- No clear pattern; perhaps longer merge lanes or weave zones for higher demand, but other factors also have effect

Question 3: “What are some tools/guidelines/information sources you did not have that would have been beneficial?”

- Similar to responses in previous categories.
- National guidelines on weaving distance and weave zone length
- Providing continuous access as baseline condition
- Results from ongoing study within respondent’s agency

EXISTING GUIDANCE

Type of access to provide

- Caltrans, NDOT, FHWA discuss existing and planned geometrics and operational effects

Distance between access points

- AASHTO, Caltrans, NDOT provide spacing guidelines; Caltrans, NDOT have “per-lane-change” distances

Evaluation of limited vs. continuous

- AASHTO, FHWA, Caltrans, NDOT refer to site-specific characteristics (e.g., operations, cost, safety, enforcement)

Preferred access treatments for certain conditions

- Caltrans mandates operational analysis with specific required components

General

- Much existing can be traced to AASHTO HOV Guide, NCHRP Report 414, and Fuhs’ HOV Facilities Manual

SUGGESTIONS FOR PRACTICE

Promote weaving distance of 1000 ft / lane change

Promote existing guidance for length of access openings, whether unidirectional or shared weaving zones

Clarify role and description of various at-grade access (e.g., weave lanes and weave zones) and their context

Develop list of potential factors (e.g., operational, economic) that could inform decision on location and type of access, prioritize those factors based on the needs of the project

FULL DETAILS IN UPCOMING
RESEARCH REPORT

QUESTIONS?

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