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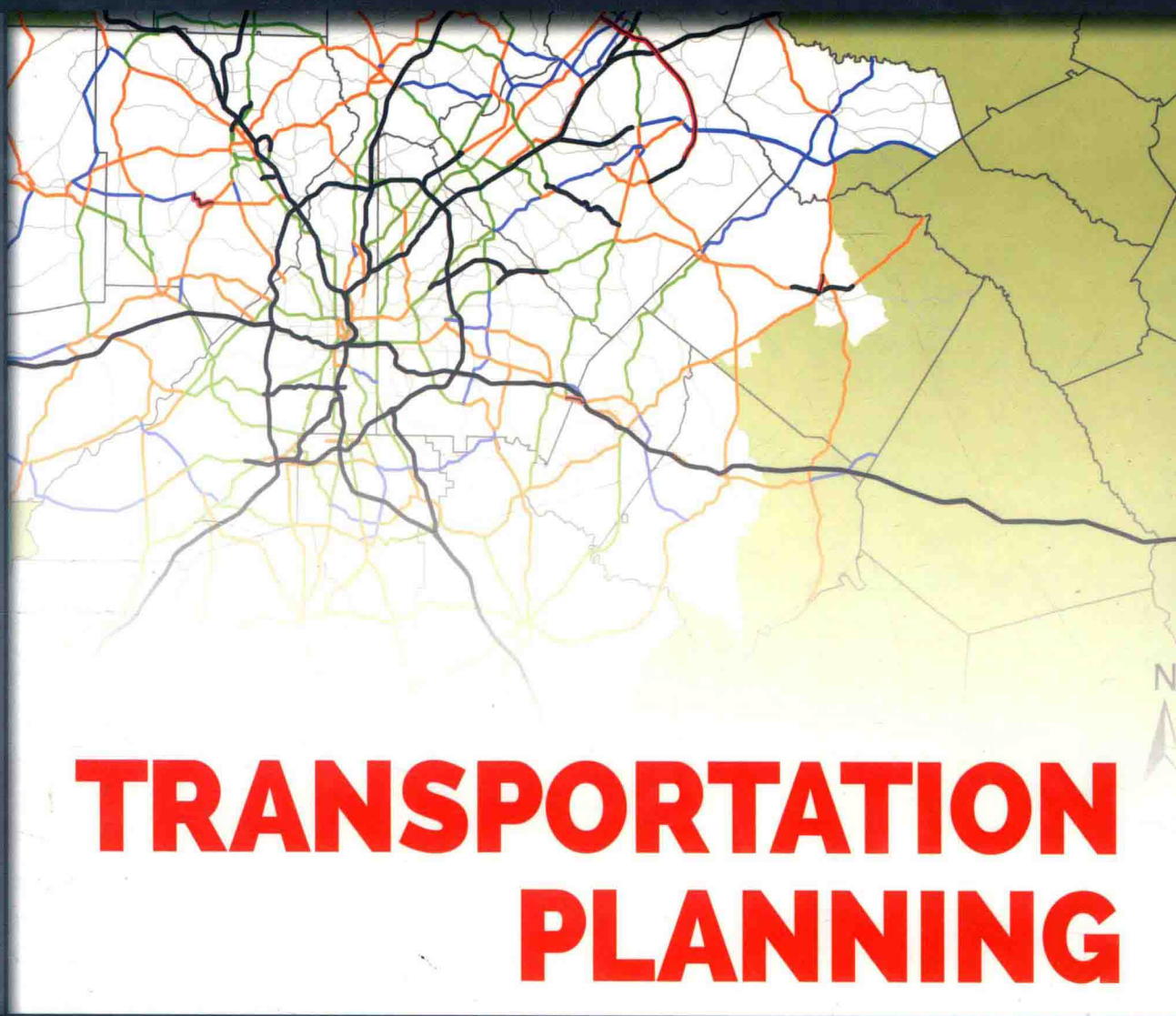

TRANSPORTATION PLANNING

HANDBOOK

FOURTH EDITION 4

WILEY

TRANSPORTATION PLANNING HANDBOOK

FOURTH EDITION

Institute of Transportation Engineers

Michael D. Meyer

WILEY

Published by John Wiley & Sons, Inc., Hoboken, New Jersey.

Published simultaneously in Canada.

Library of Congress Cataloging-in-Publication Data:

Names: Meyer, Michael D., editor. | Institute of Transportation Engineers.
Title: Transportation planning handbook / Institute of Transportation Engineers, [edited by] Michael D. Meyer.
Description: Fourth edition. | Hoboken : Wiley, 2016. | Revised edition of Transportation planning handbook, 2009. | Includes index.
Identifiers: LCCN 2016007015 | ISBN 9781118762356 (hardback) | ISBN 9781118762400 (Adobe PDF) | ISBN 9781118762394 (epub)
Subjects: LCSH: Transportation—Planning—Handbooks, manuals, etc. | BISAC: TECHNOLOGY & ENGINEERING / Civil / General.
Classification: LCC HE151 .T663 2016 | DDC 388.068/4—dc23
LC record available at https://lccn.loc.gov/2016007015

Cover Design: Wiley
Cover Image: ARC Strategic Regional Thoroughfare Plan, 2012 © Atlanta Regional Commission (ARC)

This book is printed on acid-free paper. ♾

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

TRANSPORTATION PLANNING HANDBOOK

Preface

The original intent of the update to the *Transportation Planning Handbook* (third edition) was to simply provide more recent references and add material on topics that had surfaced as an important planning topic since the publication of the third edition nine years ago. In updating each chapter, however, it became apparent that much has happened since the mid-2000s in transportation planning. Important changes have included a focus on performance-oriented planning, an increased emphasis on environmental and social justice, a continuing revolutionary change in transportation system and vehicle technology, a similar revolution in the technology of data collection, the expanding options for transportation finance, and a continuing trend in changing socio-demographic characteristics that will fundamentally affect how travel occurs. What had begun as a simple update evolved into a major rewrite when it became apparent that transportation planning is now facing many important challenges and opportunities that were just becoming apparent in the mid-2000s.

In addition to the updates of the chapters found in the third edition, new chapters have been added to this edition reflecting the importance of these topics to contemporary transportation planning. These chapters include transportation finance and funding, highway system planning, travel demand management, local/municipal transportation planning, and public engagement. These chapters were written by the editor.

Finally, the technology of publishing has changed dramatically since the mid-2000s such that we can now cross reference and link key concepts from one chapter to another. This handbook does not repeat concepts that are inherent to transportation planning whether focusing on state, metropolitan, or local planning contexts. For example, Chapter 1 presents an organizing framework for transportation planning that outlines the major steps inherent in any planning process. The chapters on statewide, metropolitan, and local transportation planning simply reference this framework rather than repeat the framework in each chapter. Thus, those who are using individual chapters for teaching and/or reference should be aware that each chapter might reference material in other chapters that is needed to obtain a complete picture of the substance and concepts in a targeted chapter.

The experience in updating this handbook reflects the dynamic nature of transportation planning. As noted by the editor in other publications and in previous editions of the handbook, transportation planning relates to the key policy issues and decision contexts of the day. Although transportation planners in the mid-2000s would recognize much of what planners are doing today, they would be surprised by planning interest in climate change, autonomous vehicles, 3D printing (and its impact on logistics), cloud sourcing as a tool for public engagement, and many other capabilities and issues that have been enabled by changing socio-demographic characteristics and new technologies. The planning process outlined in this handbook is one that is future-oriented, anticipating societal and technological characteristics that will affect future transportation system performance. In addition, it is one that is flexible to allow policy issues and new analysis capabilities to be included as they become important topics to planners and decision makers. In this way, transportation planning will continue to stay relevant to the decisions that decision makers today and in the future will be making to improve the vitality of our communities.

Acknowledgments

The preparation and production of the fourth edition of the Transportation Planning Handbook has been a collaborative and intensive effort. One person in particular has been instrumental in working with the editor in all aspects of the handbook preparation … from obtaining resource information to reviewing chapters for consistency and quality. This handbook could not have been prepared without the work of Adam N. Rosbury, who deserves much credit for the final product.

The fourth edition has also greatly benefited from the efforts of numerous individuals who helped create the overall outline for the handbook and who volunteered to review individual chapters and in the process greatly improved the quality of the handbook. An initial advisory panel reviewed early versions of the new handbook outline and provided feedback on some of the early chapters. Panel members included:

Thomas W. Brahms

Steven B. Gayle

Jamie Henson

Aliyah Horton

Leslie Meehan

Michael D. Meyer

Richard A. Retting

Donald R. Samdahl

Sam D. Zimbabwe

The following subject matter experts served as volunteer reviewers of the draft handbook chapters:

Bernard Alpern

Joel Anders

Amit Armstrong

William Bachman

Saeed Asadi Bagloee

Eileen Barron

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Julie M. Whitcher

Cain Williamson

Philip L. Winters

Tom M. Worker-Braddock

Linda Wu

KC Yellapu

Jiguang ZhaoAmit Armstrong

ITE staff members have also been an important contributor to handbook development. Thomas W. Brahms articulated the original vision for the handbook and provided input on the handbook outline. Courtney L. Day was instrumental in coordinating the chapter review process and in interfacing with the publisher.

Finally, the concept of this handbook was to update the chapters in the third edition of the handbook and to add several new chapters that reflected the changing professional interests since 2009. Thus, much of the material in this handbook was produced by the original authors, updated to reflect more recent references and examples. The original authors included:

Marsha Bomar Anderson

Song Bai

Sandra K. Beaupre

Greg Benz

Wayne Berman

Stephen B. Colman

Jeffrey M. Cosello

Paula Dowell

Anne E. Dunning

Leon Goodman

Jane Hayse

Susan Herbel

Jeremy Klop

Herbert S. Levinson

Jerome Lutin

Michael D. Meyer

Debbie Niemeier

Matthew Ridgway

Jerry B. Schutz

Mary S. Smith

Vukan R. Vuchic

The editor takes responsibility for changes and additions to the fourth edition of the Transportation Planning Handbook.

Michael D. Meyer, Ph.D., P.E., M.ITE,
and F.ASCE, Editor

About the Editor

Dr. Michael D. Meyer is a senior advisor to WSP/Parsons Brinckerhoff, Inc., Co-founding Principal of Transport Studio, LLC, and president of Modern Transport Solutions, LLC. He was the Frederick R. Dickerson Professor of Civil Engineering and Director of the Georgia Transportation Institute at the Georgia Institute of Technology until 2012 when he retired. From 1983 to 1988, Dr. Meyer was Director of Transportation Planning and Development for Massachusetts where he was responsible for statewide planning, project development, traffic engineering and operations, and transportation research. As Director, Dr. Meyer spent considerable time with the state's transportation planners developing statewide, metropolitan, and corridor-level transportation plans. In addition, he worked closely with local officials in developing institutional collaborations for compatible land-use and development strategies. Prior to this, he was a professor in the Department of Civil & Engineering at M.I.T. He is currently an adjunct professor at Denver University's Transportation Institute.

Dr. Meyer has written over 200 technical articles and has authored or co-authored 28 books or book chapters, many on transportation planning and policy, including a major college textbook on transportation planning. Dr. Meyer has given over 300 speeches or keynote conference addresses over the past 20 years and testified to Congressional committees on a variety of topics relating to transportation policy and planning, including most recently the importance of incorporating sustainability into transportation decision making. He was one of the first researchers in the United States to examine the role of performance measures in transportation planning and decision making, and more recently he has been one of the first transportation professionals to write extensively on the relationship between climate change and transportation system performance. He has received numerous professional awards, and was chair of the Transportation Research Board Executive Committee in 2006.

Table of Contents

Introduction to Transportation Planning[1]

I. INTRODUCTION

The economic health and quality of life of a nation's communities depend on a well-functioning and safe transportation system. For example, following housing costs, transportation is one of the biggest expenses faced by an average household in the United States and in many other countries. This is usually measured by the actual out-of-pocket costs associated with owning and operating vehicles or paying for transit fares. When one considers the value of time it takes to travel from one location to another, often in congested conditions, this cost increases significantly. The cost of freight and goods movement is also an economic cost passed on to consumers that will vary depending on the price of transportation.

The accessibility and mobility provided by transportation systems can influence land use patterns and, thus, over time affect how we live. The best example of this relationship is the large-scale suburbanization of U.S. metropolitan areas and of those in many other countries after World War II when massive investment was made in suburban freeways. Today, transportation investment is often an integral part of economic and development plans, usually including transit, pedestrian, bicyclist facilities, and actions to manage transportation demand. The importance of transportation investment in transforming communities raises questions of who is benefiting and who is carrying additional burdens after the system has changed. These are questions that are part of many transportation planning studies.

The public is also concerned about the environmental impacts linked to transportation systems and their operation. This has been manifested in many environmental laws and regulations that affect how transportation planning is conducted and the types of data and tools that must be used.

These, along with many other reasons, suggest that the transportation system is a critical component of a successful modern community and economy. Thus, anticipating the challenges and opportunities relating to transportation system performance is critical not only to future transportation system effectiveness, but also to the economic and social well-being of our communities.

This handbook examines many facets of transportation planning. Transportation planning can be a highly technical process, which often relies on computer models and other sophisticated tools to simulate the complex interactions of transportation system performance. It is a public relationship-oriented process in that transportation planners often interact with a wide range of stakeholders and members of the public. Transportation planning can also become intertwined with the politics of any given decision.

Some transportation planners and engineers focus on transportation supply—the facilities and services needed to handle expected demands and characteristics of the infrastructure to provide such service. Others are more interested in influencing travel behavior to promote more cost-effective and environmentally sustainable options for travelers.

Given the breadth of topics and issues that transportation planners can become involved in, transportation planning necessarily includes a wide range of interests, skills, and expertise. Perhaps the most important characteristic of any transportation planning process is to remain flexible given the dynamic nature of community planning and decision making, and the importance of transportation planning providing input into this process. This need for flexibility will be particularly important as the types of investment decisions for transportation systems evolve over the next several decades in response to changing demographic and technology factors.

[1] The original chapter in Volume 3 of this Handbook was written by Michael D. Meyer, WSP/Parsons Brinckerhoff. Changes made to this updated chapter are solely the responsibility of the editor.