

# NCHRP

NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM

## 2008 Summary of Progress



Gen.Col.  
TE  
153  
.N25  
2008

**TRANSPORTATION RESEARCH BOARD 2008 EXECUTIVE COMMITTEE\***

**MEMBERS**

**Debra L. Miller**, *Secretary, Kansas DOT, Topeka*

**Adib K. Kanafani**, *Cahill Professor of Civil Engineering, University of California, Berkeley*

**EXECUTIVE DIRECTOR: Robert E. Skinner, Jr.**, *Transportation Research Board*

**MEMBERS**

**J. Barry Barker**, *Executive Director, Transit Authority of River City, Louisville, KY*

**Allen D. Biehler**, *Secretary, Pennsylvania DOT, Harrisburg*

**John D. Bowe**, *President, Americas Region, APL Limited, Oakland, CA*

**Larry L. Brown, Sr.**, *Executive Director, Mississippi DOT, Jackson*

**Deborah H. Butler**, *Executive Vice President, Planning, and CIO, Norfolk Southern Corporation, Norfolk, VA*

**William A.V. Clark**, *Professor, Department of Geography, University of California, Los Angeles*

**David S. Ekern**, *Commissioner, Virginia DOT, Richmond*

**Nicholas J. Garber**, *Henry L. Kinnier Professor, Department of Civil Engineering, University of Virginia, Charlottesville*

**Jeffrey W. Hamiel**, *Executive Director, Metropolitan Airports Commission, Minneapolis, MN*

**Edward A. (Ned) Helme**, *President, Center for Clean Air Policy, Washington, DC*

**Will Kempton**, *Director, California DOT, Sacramento*

**Susan Martinovich**, *Director, Nevada DOT, Carson City*

**Michael D. Meyer**, *Professor, School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta*

**Michael R. Morris**, *Director of Transportation, North Central Texas Council of Governments, Arlington*

**Neil J. Pedersen**, *Administrator, Maryland State Highway Administration, Baltimore*

**Pete K. Rahn**, *Director, Missouri DOT, Jefferson City*

**Sandra Rosenbloom**, *Professor of Planning, University of Arizona, Tucson*

**Tracy L. Rosser**, *Vice President, Corporate Traffic, Wal-Mart Stores, Inc., Bentonville, AR*

**Rosa Clausell Rountree**, *Executive Director, Georgia State Road and Tollway Authority, Atlanta*

**Henry G. (Gerry) Schwartz, Jr.**, *Chairman (retired), Jacobs/Sverdrup Civil, Inc., St. Louis, MO*

**C. Michael Walton**, *Ernest H. Cockrell Centennial Chair in Engineering, University of Texas, Austin*

**Linda S. Watson**, *CEO, LYNX Central Florida Regional Transportation Authority, Orlando*

**Steve Williams**, *Chairman and CEO, Maverick Transportation, Inc., Little Rock, AR*

**EX OFFICIO MEMBERS**

**Thad Allen** (Adm., U.S. Coast Guard), *Commandant, U.S. Coast Guard, Washington, DC*

**Joseph H. Boardman**, *Federal Railroad Administrator, U.S.DOT*

**Rebecca M. Brewster**, *President and COO, American Transportation Research Institute, Smyrna, GA*

**Paul R. Brubaker**, *Research and Innovative Technology Administrator, U.S.DOT*

**George Bugliarello**, *President Emeritus and University Professor, Polytechnic Institute of New York University, Brooklyn; Foreign Secretary, National Academy of Engineering, Washington, DC*

**Sean T. Connaughton**, *Maritime Administrator, U.S.DOT*

**LeRoy Gishi**, *Chief, Division of Transportation, Bureau of Indian Affairs, U.S. Department of the Interior, Washington, DC*

**Edward R. Hamberger**, *President and CEO, Association of American Railroads, Washington, DC*

**John H. Hill**, *Federal Motor Carrier Safety Administrator, U.S.DOT*

**John C. Horsley**, *Executive Director, American Association of State Highway and Transportation Officials, Washington, DC*

**Carl T. Johnson**, *Pipeline and Hazardous Materials Safety Administrator, U.S.DOT*

**J. Edward Johnson**, *Director, Applied Science Directorate, National Aeronautics and Space Administration, John C. Stennis Space Center, MS*

**David Kelly**, *Acting Administrator, National Highway Traffic Safety Administration, U.S.DOT*

**Thomas J. Madison, Jr.**, *Administrator, Federal Highway Administration, U.S.DOT*

**William W. Millar**, *President, American Public Transportation Association, Washington, DC*

**James S. Simpson**, *Federal Transit Administrator, U.S.DOT*

**Robert A. Sturgell**, *Acting Administrator, Federal Aviation Administration, U.S.DOT*

**Robert I. Van Antwerp** (Lt. Gen., U.S. Army), *Chief of Engineers and Commanding General, U.S. Army Corps of Engineers, Washington, DC*

\*Membership as of November 2008.



# **NCHRP**

**NATIONAL  
COOPERATIVE  
HIGHWAY  
RESEARCH  
PROGRAM**

## **2008 Summary of Progress**

---

Research sponsored by the American Association of State Highway and Transportation Officials  
in cooperation with the Federal Highway Administration

---

**TRANSPORTATION RESEARCH BOARD**

WASHINGTON, D.C.

2008

[www.TRB.org](http://www.TRB.org)

## **NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM**

Systematic, well-designed research provides the most effective approach to the solution of many problems facing highway administrators and engineers. Often, highway problems are of local interest and can best be studied by highway departments individually or in cooperation with their state universities and others. More predominantly, however, the need for more efficient, economical, and safer highway transportation and the importance of meshing with other modes and other societal concerns lead to national problems of increasing complexity. A coordinated program of high-quality cooperative research provides a highly effective approach to such problems.

In recognition of these needs, the highway administrators of the American Association of State Highway and Transportation Officials (AASHTO) initiated in 1962 an objective national highway research program employing modern scientific techniques. AASHTO's program is supported on a continuing basis by funds from participating member states of the Association and receives the full cooperation and support of the Federal Highway Administration, United States Department of Transportation.

The Transportation Research Board of the National Academies was requested by the Association to administer AASHTO's research program because of the Board's recognized objectivity and understanding of modern research practices. The Board is uniquely suited for this purpose: it maintains an extensive committee structure from which authorities on any highway transportation subject may be drawn; it possesses avenues of communications and cooperation with federal, state, and local governmental agencies, universities, and industry; its relationship to its parent organization, the National Academies, a private, nonprofit institution, is an insurance of objectivity; and it maintains a full-time research correlation staff of specialists in highway transportation matters to bring the findings of research directly to those who are in a position to use them.

Research programs are developed annually by AASHTO on the basis of research needs identified by chief administrators of the highway and transportation departments, by committees of AASHTO, and by the Federal Highway Administrator. The programs are then referred for administration through the Transportation Research Board, and research projects addressing the specific needs are defined by the Board on the basis of the AASHTO problem statements. The projects are advertised widely for proposals, and qualified agencies are selected on the basis of research plans offering the greatest probabilities of success. The research is carried out under contract, and administration and surveillance are responsibilities of a Board-appointed staff.

The needs for highway research are many, and the National Cooperative Highway Research Program is an efficient mechanism for providing timely solutions to problems of mutual concern to many responsible groups. The Program, however, is intended to complement rather than to substitute for or duplicate other highway research programs.

### **ADDRESS INFORMATION**

#### **TRANSPORTATION RESEARCH BOARD**

500 Fifth Street, NW  
Washington, D.C. 20001  
Phone: 202-334-3224

[www.trb.org](http://www.trb.org)

#### **ON THE COVER**

The cover photographs of the Intercounty Connector (ICC) in Maryland were provided courtesy of the ICC Program Management Office. For additional information on the project, visit [www.iccproject.com](http://www.iccproject.com).



# THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Charles M. Vest is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, on its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both the Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. Charles M. Vest are chair and vice chair, respectively, of the National Research Council.

The **Transportation Research Board** is one of six major divisions of the National Research Council. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation. [www.TRB.org](http://www.TRB.org)

[www.national-academies.org](http://www.national-academies.org)

## COOPERATIVE RESEARCH PROGRAMS STAFF

### Director

Christopher W. Jenks

### Deputy Director

Crawford F. Jencks

### Senior Program Officers

Gwen Chisholm Smith  
Wassem Dekelbab  
B. Ray Derr  
Lawrence D. Goldstein  
Marc Greenberger  
Amir N. Hanna  
Edward T. Harrigan  
Christopher Hedges  
Andrew C. Lemer  
Charles W. Niessner  
S. A. Parker  
David A. Reynaud  
William C. Rogers  
Michael R. Salamonc, ACRP Manager  
Theresia Schatz  
Dianne S. Schwager  
Nanda Srinivasan  
Lori L. Sundstrom

### Administrative Coordinator

Adrienne C. Blackwell

### Administrative Assistant

Cynthia E. Butler

### Program Associate

Joseph J. Brown-Snell  
Sheila A. Moore

### Senior Program Assistants

Megan A. Chamberlain  
Emily R. Greenwood  
Thu M. Le  
Danna Powell  
Charlotte Thomas

### Program Assistant

Curtis Johnson

### Director of Publications

Eileen P. Delaney

### Senior Editor

Hilary Freer

### Editors

Natalie Barnes  
Margaret B. Hagood

### Assistant Editors

Ellen M. Chafee  
Maria Sabin Crawford

### Information Technology Specialist

Roy N. Mesler

# NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

## CHAIRS OF PROJECT PANELS BY FIELD

### *Administration*

A. J. Arceneaux  
D. A. Hillmer  
Y. Llorc  
M. R. Shinn

### *Design*

R. G. Albright  
C. F. Bard  
B. Benton  
J. O. Brewer  
J. Buchan  
J. D. Camp  
H. A. Capers  
G. A. Christian  
R. S. Christie  
W. R. Cox  
P. B. Demosthenes  
M. E. Dougherty  
J. C. Durkos  
L. E. Engbrecht  
M. Farrar  
D. A. Focke  
S. Gupta  
K. D. Hall  
D. Harmelink  
S. E. Hida  
B. V. Johnson  
K. A. King  
D. Kingsbury  
J. N. Lee  
H. I. Ling  
L. Lockett  
M. P. McClelland  
B. Merrill  
A. Meza  
M. W. Mueller  
B. J. Newton  
D. Noyce  
C. M. Ochoa  
E. T. Paulis  
M. R. Pope  
R. A. Pratt  
L. Risch  
K. Robinson  
R. J. Seitz  
G. W. Sharpe  
J. Siddiqi  
L. F. Sutherland  
W. Thomas  
B. G. Thompson  
E. P. Wasserman  
T. M. Welch  
A. P. Yannotti

### *Maintenance*

J. Brandenburg  
E. J. Denehy

J. Horner  
D. P. Johnston  
E. Potter  
J. Rowen  
P. Weykamp

### *Materials and Construction*

T. B. Aschenbrener  
M. F. Balbierer  
J. W. Brumfield  
W. A. Bulley  
G. Burke  
J. Butterfield  
B. Choubane  
D. Dorgan  
E. L. Dukatz  
F. Fec  
C. A. Franco  
G. C. Fredrick  
M. Gipson  
A. J. Gisi  
R. L. Green  
C. Hahin  
D. W. Head  
T. M. Hearne  
M. Heitzman  
D. P. Johnston  
C. L. Jones  
P. Kemp  
B. Khaleghi  
J. E. Kliewer  
W. Kling  
L. K. Laird  
R. B. Leahy  
P. V. Liles  
D. I. Lippert  
D. A. Maurer  
L. L. Michael  
D. J. Miller  
L. N. Mohammad  
C. L. Monismith  
M. W. Mueller  
J. A. Musselman  
W. N. Nickas  
G. C. Page  
H. R. Paul  
L. M. Pierce  
L. A. Scofield  
J. S. Uhlmeier  
E. P. Wasserman

### *Pooled Fund Studies*

J. J. Collins

### *Soils and Geology*

A. A. Ardani

J. E. Bischoff  
S. R. Davis  
N. D. Dennis  
D. Dwyer  
C. Hahin  
D. V. Jenkins  
W. M. Medford  
W. Oliva  
R. Renna  
D. Stolpa  
R. M. Wahab

### *Special Projects*

G. R. Allen  
T. Andrews  
C. Braceras  
D. R. Brisk  
M. K. Campbell  
H. A. Capers  
J. M. Contestabile  
J. Corbin  
D. L. Dean  
J. Dockendorf  
D. S. Ekern  
L. R. Evans  
R. Faught  
L. Ferguson  
F. R. Giles  
M. Harker  
G. I. Hoffman  
J. G. Honefanger  
S. A. Howard  
K. F. Hurst  
A. O. Jaber  
E. I. Kalivoda  
L. M. King  
C. Klika  
A. W. Lake  
S. Q. Larson  
C. Leggett  
C. K. Leuderalbert  
G. Levi  
H. E. Linnenkohl  
S. Lodahl  
R. C. Long  
S. M. Lund  
J. M. Lutin  
J. Mason  
G. Murthy  
C. Nelson  
L. Oman  
N. J. Pedersen  
J. C. Quarrelles  
F. Quon  
P. Rahn  
S. Rawlins  
A. D. Rawson  
N. J. Richardson  
N. Ross  
S. Sillick

J. M. Sime  
D. Slimmer  
B. Smith  
J. Sollenberger  
C. S. Sorrell  
K. T. Steudle  
M. E. Tardif  
J. S. Thiel  
J. F. Tynan  
N. M. Walker  
J. L. Western  
M. J. Zezeski

### *Traffic*

R. B. Albin  
B. Ananthanarayanan  
W. M. Bretherton  
S. C. Brich  
K. T. Briggs  
T. E. Bryer  
R. W. Bryson  
B. Caicedo-Maddison  
M. O. Christensen  
M. M. Christensen  
B. H. Cottrell  
L. Depuc  
W. Ealding  
D. S. Ekern  
O. A. Elrahman  
B. K. Gage  
D. B. Gross  
J. W. Hall  
S. Herbel  
T. Hicks  
E. Hilton  
C. E. Howard  
T. A. Jerman  
S. G. Jewell  
J. C. Jones  
K. Kar  
W. C. Kloos  
J. R. Kreideweis  
P. H. Masters  
C. F. McDevitt  
C. C. McGhee  
D. S. McLeod  
J. S. Miller  
J. C. Milton  
R. J. Nelson  
B. K. Ostrom  
T. A. Parlante  
E. T. Paulis  
J. L. Powell  
S. Rawlins  
H. R. Ressel  
R. Retting  
L. F. Sutherland  
J. Thai  
M. L. Tischer  
D. S. Turner

I. van Schalkwyk  
D. W. Vaughn  
T. C. Werner  
L. F. Yernack  
J. R. Young

### *Transportation Planning*

M. Bridges  
T. Brigham  
K. R. Buckeye  
N. Compin  
G. A. D'Avino  
A. Dunning  
W. Fletcher  
G. Gerstle  
J. S. Gillespie  
R. Hall  
W. R. Hauser  
E. R. Heltzel  
J. A. Henkel  
T. Hill  
C. E. Howard  
R. E. Hull  
B. Jensen  
T. J. Kane  
M. E. Kidner  
G. P. King  
J. Klugge  
W. W. Kober  
J. R. Kreideweis  
M. C. Larson  
J. D. Laughlin  
W. D. Lee  
C. Leggett  
P. V. Liles  
C. C. Linkes  
Y. Llorc  
J. M. Lutin  
S. Marlow  
S. S. Mastran  
G. McVoy  
J. L. Mettillie  
M. R. Morris  
M. F. Muriello  
M. B. Nelson  
R. E. Paaswell  
T. L. Parker  
K. D. Polcak  
G. S. Rutherford  
C. Selness  
S. Strachl  
M. I. Tisher  
N. Volmer  
R. E. Wade  
M. Waters  
D. G. Williams  
J. Zamurs  
J. Zmud





## CONTENTS

<b>1</b>	Summary of Progress
	Introduction, 1
	How NCHRP Programs Are Formulated, 2
	Programs Received to Date, 2
	Financing the Program, 3
	How NCHRP Is Organized to Administer Research Programs, 3
	Figure S-1 NCHRP Classification System, 4
	Table S-1 Affiliations of Panel Members on Active Projects, 5
	How the Projects Are Placed Under Contract, 5
	Table S-2 Agency Distribution of FY 1963 Through FY 2009 Projects, 6
	Keeping Track of Research in Progress, 7
	Systematic Planning for Getting Research Results from NCHRP Projects into Practice, 9
	Implementing Research Results, 10
	Documenting Success, 10
	Summary, 15
	Staff News, 15
<b>17</b>	Table 1 Reports
<b>30</b>	Table 2 Syntheses of Highway Practice: Project 20-5
<b>37</b>	Table 3 Research Results Digests
<b>42</b>	Table 4 Legal Research Digests
<b>44</b>	Table 5 Web-Only Documents
<b>48</b>	Table 6 CRP CD-ROMs
<b>51</b>	Table 7 Summary of Status Through December 31, 2008, for FY 1963 Through FY 2009 Projects
<b>136</b>	How to Obtain Publications and Other Materials





## NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

# SUMMARY OF PROGRESS

DECEMBER 31, 2008

### INTRODUCTION

NCHRP was established in 1962 to provide a continuing program of highway research. It is sponsored by member departments of AASHTO in cooperation with the FHWA, U.S. DOT, and is carried out under a three-way agreement among these agencies and the National Academies. AASHTO annually proposes specific research problems for inclusion in the NCHRP fiscal year activities. At least two-thirds of the member departments must approve the research problems and agree to their financial support before they can be brought into the Program. Following balloting by the member departments, the approved problems are referred to the Academies, where they are reviewed to determine their acceptability to the Academies for administration by TRB. Each State annually contracts with the Academies to commit a portion of its Federal-Aid Highway State Planning and Research (SPR) funds. In recent years, these funds have made available a cooperative pool of, on average, about \$35 million for NCHRP each year through 2008. For programming purposes, funds available for 2009 and 2010 are estimated to be \$36.7 million each.

Each research project in the Program is assigned to a panel made up of persons knowledgeable in the particular problem area. The panel analyzes the problem, outlines the particular project and its objectives, and then prepares a research project statement by which proposals are solicited from qualified research agencies. The panels review the proposals, recommend contract awards, and provide counsel to the NCHRP staff members responsible for surveillance of work under the research contracts. Finally, the panels review final reports for acceptability and for accomplishment of the approved research plan. Currently, there are more than 2,100 members on these panels coming from the States, the District of Columbia, Australia, and Canada.

A professional staff is assigned to NCHRP by TRB. Project managers with training and experience in the many research areas encompassed by the Program are responsible for administrative and technical surveillance of the contracts. If necessary, meetings involving the staff, panel, and agency personnel are held to review project progress and provide guidance for ongoing work.

Most research findings are published in the *NCHRP Report* series, in the *NCHRP Synthesis* series, as a *Research Results Digest*, on CD-ROMs, or on the NCHRP website. Each State transportation chief executive receives a copy on publication, and as many as 4,000 copies are issued through the TRB Publications Office.

Periodic reports, along with the NCHRP website, are available to the sponsors to provide them with current information on the specifics of technical progress of the projects, as

well as the specifics of administrative matters relating to Program operation. This information is supplemented by publication of this annual *Summary of Progress*, which is made available at the end of each year to the sponsors and the public at large.

## **HOW NCHRP PROGRAMS ARE FORMULATED**

NCHRP programs are initiated annually, and there are several steps between initiation and the publication of final reports. Each fiscal year's program must start with the identification of critical problems by State highway and transportation departments, AASHTO committees, and the FHWA.

The many problems (usually exceeding 125) received from these sources each year are screened to determine the following:

- If the proposed problem represents an immediate research need and is of interest to many States.
- If the problem can be handled effectively under a cooperative program.
- If similar efforts are already under way or if satisfactory answers are already available. In these respects, submitters are strongly encouraged to search the relevant literature stored in TRB's automated Transportation Research Information Services (TRIS) and Research in Progress (RiP) databases.
- The probability of success.

The technical merits of the problems that survive are evaluated in depth by the AASHTO Standing Committee on Research (SCOR) and the AASHTO Research Advisory Committee (RAC). Final priorities are determined each year at a meeting of SCOR to formulate the recommended research programs for NCHRP. After the program is approved by the AASHTO Board of Directors, the program is referred by FHWA to TRB for execution.

## **PROGRAMS RECEIVED TO DATE**

In recent years, each year's program has consisted of 28 to 45 new projects, each with funding usually ranging between \$250,000 and \$600,000 and a number of project continuations funded in earlier years. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) resulted in a funding level of approximately \$17 million for NCHRP for fiscal years 1992 through 1997. The Transportation Equity Act for the 21<sup>st</sup> Century (TEA-21) of 1998 increased funding by more than 50 percent on average in fiscal years 1998 through 2003. Congress passed extensions of TEA-21, resulting in \$35.4 million of FY 2004 funds. The most recent federal legislation—the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)—provides \$33 million for FY 2005, \$32.7 million for FY 2006, \$36.5 million for FY 2007, \$36.7 million for FY 2008, and an estimated \$36.7 million for FY 2009.

In 2008, AASHTO referred the FY 2009 program of research problems to TRB for execution. From all programs through FY 2008, 1,202 research contracts have resulted, totaling some \$424.8 million, and the FY 2009 program will increase that number by

another 31 new contracts and 21 continuations, for some \$28.2 million. The subject matter of the projects addresses the full spectrum of concern within the highway industry and demonstrates AASHTO's interest in acquiring answers to the many acute problems facing administrators and engineers. The FY 2010 program will be formulated in March 2009 by SCOR. Proposals will be solicited starting in August 2009. AASHTO's initial steps toward developing the FY 2011 research program will be taken in mid-2009.

## **FINANCING THE PROGRAM**

Each year, each State contracts with the National Academies to support the Program. The agreement commits the State to 5.5 percent of its 2-percent Federal-Aid Highway SPR funds. From these contributions, a cooperative pool of \$36.7 million was made available for NCHRP's administrative and contract research operations in FY 2008. A similar amount of money is anticipated for FY 2009. Funds are scheduled to become available so that research can begin near the first of each year—for example, projects in the FY 2009 program are scheduled to begin in early 2009.

## **HOW NCHRP IS ORGANIZED TO ADMINISTER RESEARCH PROGRAMS**

All problems are assigned to specific problem areas within each of the eight broad research fields shown in Figure S-1 and are given related NCHRP project numbers.

Each project is assigned to a panel of outstanding individuals who are very knowledgeable in the project area and who are looked to for technical guidance and counsel throughout the research and reporting phases. A broad search is made for these individuals, and TRB usually receives about four to five times as many nominees as can be used in the available panel positions. The panels are in existence for the life of their projects. Members do not act as consultants or advisors to project investigators; they may not submit proposals for research. All members serve without compensation, and their total yearly contribution to the Program adds up to thousands of staff-days. The panel members are drawn from all walks of professional life, and, as shown in Table S-1, heavy dependence is placed on the States for providing members.

The duties and responsibilities of project panels include the following:

- Defining the scope of problems assigned by AASHTO and drafting project statements requesting proposals for studies,
- Evaluating proposals and making recommendations regarding selection of research agencies,
- Monitoring research progress,
- Providing guidance regarding technical aspects of the research,
- Reviewing and evaluating project reports as to the accomplishment of objectives and suitability for publication, and
- Making recommendations as to whether studies should be continued.



**Figure S-1. NCHRP Classification System.**

PROBLEM AREAS	
<p><b>RESEARCH FIELD A</b> ADMINISTRATION</p> <p>2 Economics 11 Law 19 Finance</p>	<p><b>RESEARCH FIELD B</b> TRANSPORTATION PLANNING</p> <p>8 Forecasting 25 Impact Analysis (SEEE*)</p> <p>* Social, Environmental, Economic, Energy</p>
<p><b>RESEARCH FIELD C</b> DESIGN</p> <p>1 Pavements 12 Bridges 15 General Design 16 Roadside Development 22 Vehicle Barrier Systems</p>	<p><b>RESEARCH FIELD D</b> MATERIALS AND CONSTRUCTION</p> <p>4 General Materials 9 Bituminous Materials 10 Specs, Procedures, and Practices 18 Concrete Materials</p>
<p><b>RESEARCH FIELD E</b> SOILS AND GEOLOGY</p> <p>21 Testing and Instrumentation 23 Properties 24 Mechanics and Foundations</p>	<p><b>RESEARCH FIELD F</b> MAINTENANCE</p> <p>6 Snow and Ice Control 13 Equipment 14 Maintenance of Way and Structures</p>
<p><b>RESEARCH FIELD G</b> TRAFFIC</p> <p>3 Operations and Control 5 Illumination and Visibility 7 Traffic Planning 17 Safety</p>	<p><b>SPECIAL PROJECTS</b></p> <p>20 Encompasses all projects not readily identified with other problem areas</p>

**Table S-1. Affiliations of Panel Members on Active Projects.**

AFFILIATION	NO. OF PANEL MEMBERS*
State agencies	1,201
Federal agencies	142
Local, transit agencies, MPOs	74
Educational institutions	258
Industry, consultants, and associations	508
All	2,183

\* Does not include liaison representatives.

### HOW THE PROJECTS ARE PLACED UNDER CONTRACT

NCHRP does not award grants for research. Rather, the Program calls for contract research with specific objectives that, if achieved, will result in solutions that are practical and readily usable. As NCHRP gets each year's program under way, the project panels meet to write research project statements based on the research problems referred by AASHTO.

These statements are then issued electronically on the worldwide web. Anyone interested in receiving research project statements must periodically browse the NCHRP website or register electronically on the same website (<http://trb.org>). Those who have registered electronically receive an e-mail notification of every project statement posting. Announcements are also made through the weekly TRB E-Newsletter. Because NCHRP operates on a fixed schedule, proposals must be submitted according to fixed deadlines.

Contracts have been let to agencies headquartered in more than 47 States, the District of Columbia, Canada, and England. The types of agencies selected to conduct NCHRP research are listed in Table S-2. The opportunity to propose is open to anyone possessing extensive, demonstrated capability and experience in the problem area. Because the projects call for practical remedies to pressing operational problems, it is expected that only the highest level of agency capability will be applied in meeting the commitments of the proposal—capability cannot be developed at project expense. Consonant with the goal of providing practical, readily usable solutions to pressing problems, time and experience have led to the development of fairly stringent specifications for proposals and agency attributes that are acceptable to the mission-oriented nature of NCHRP. Proposals must comply with the format in the current brochure, *Information and Instructions for Preparing Proposals*.

**Table S-2. Agency Distribution of FY 1963 Through FY 2009 Projects.**

TYPE OF AGENCY	CONTRACTS	
	No.*	%
Educational institutions	466	32.9
Research institutes	83	5.9
Industry, consultants	704	49.7
Associations	9	0.6
State agencies	6	0.4
Federal and governmental agencies	37	2.6
Administrative	112	7.9
All	1,417	100.0

\* Contract totals do not include the individual topics and tasks for Projects 8-36, 20-5, 20-6, 20-7, 20-30, 20-36, and 20-44.

The staff and panel members evaluate all proposals in a uniform manner, with primary consideration given to

- The proposer's demonstrated understanding of the problem;
- The merit of the proposed research approach and experiment design;
- The experience, qualifications, and objectivity of the research team in the same or a closely related problem area;
- The plan for ensuring application of results; and
- The adequacy of facilities.

The proposed budget total is not one of the primary factors because the funds available for research are announced in the project statement. Specific budget items are reviewed to better determine staff allocations and distribution of resources. When the proposed cost exceeds the funds stated to be available, the proposal is rejected on receipt.

A panel meeting is held to select an agency for each project, and a review is made of all known aspects of performance of the proposers on other research projects under NCHRP or elsewhere. The successful proposals are retained by the panel members for use in monitoring the research. Proposals are considered to be privileged, and the information in them is not released outside TRB. Policy also holds that panel deliberations and meeting notes are privileged.

Following the selection meetings, a list of recommended research agencies is transmitted to AASHTO for its review and approval. Contracts between the Academies and the research agencies are executed, and research is begun. Again, it should be emphasized

that NCHRP is a program of contract research—it does not operate on a grant basis. Further, proposals can be received only in response to advertised project statements because the funds available each year to the Program are earmarked in their entirety for research problems specified by the sponsor—AASHTO.

In order to support AASHTO's interests, needs, and capital investments, a contract is not signed with the selected agency until the staff and project panel are satisfied that the proposed scope of work provides the best probability for success in meeting AASHTO's needs. In the period between agency selection and contract execution, a concerted effort is made to resolve questions and clarify technical issues emanating from the selection process. This action usually results in an addendum to the research plan in the agency's approved proposal; therefore, both the proposal and the addendum are incorporated in the contract as the binding scope of work. Furthermore, soon after contract execution, the agency is required to submit a Working Plan (an amplified version of the research plan), against which project progress is monitored by the staff and project panel.

The policy of NCHRP is to provide a debriefing, if requested, to unsuccessful proposers to indicate the technical areas in which their proposals were judged weak or deficient and how the weaknesses or deficiencies were factors in the proposers not having been selected.

NCHRP projects included in the 48 fiscal year programs conducted to date are listed in Table 7.

## **KEEPING TRACK OF RESEARCH IN PROGRESS**

Once research starts, administrative and technical surveillance of its progress is performed by NCHRP staff, consisting of 30 (full-time equivalents)—12 professional and 18 support. In-depth surveillance by project managers with wide-ranging expertise contributes much to the probability of project success and can be one of the most significant of the several elements influencing how well objectives are met. It is recognized, however, that a delicate balance must be maintained in the practical exercise of surveillance. It must be penetrating enough to be effective, but neither so complex nor so burdensome as to distract the researchers from their primary efforts or add unreasonably to the agency's cost of doing business.

In addition to reviewing monthly progress schedules and quarterly progress reports, the project managers maintain frequent telephone and e-mail contacts and periodically visit the research agencies throughout the contract periods. They talk with each principal investigator about the project's status to learn whether the research is being pursued in line with the approved research plan, and they provide guidance in all technical and administrative matters. They provide liaison in whatever manner is required to keep their project panels abreast of progress and to acquire panel guidance and counsel in technical matters, particularly as regards the relationships between research objectives and the needs of the practicing engineer. Because the agency's proposal is incorporated in its entirety in the contract, the agency's approved budget is among the items subject to the terms of the agreement. The principal investigator has flexibility in managing the budget up to the point of not materially departing from the approved research plan or exceeding the contract's maximum allowable cost. Major changes to account for promising new

leads or unproductive lines of study must be approved in advance by the staff and project panel and are authorized through a contract amendment. Agency invoices are checked by the staff for deviations from the approved budget. Based on all surveillance activities, the staff members prepare progress reports, which are sent to AASHTO's member departments. Finally, the staff and panels evaluate the completed research to determine the degree of technical compliance with the contract so that recommendations for contract close-out can be made.

A point heavily stressed with the research agencies at the time of the first surveillance visit is that they must orient their thinking toward presentation of their research results in a form that is directly usable by practicing engineers. Further, to enable an easy determination of the usefulness of the results to practice, each final report generally includes a "Summary of Findings" and a chapter on "Interpretation, Appraisal, and Application of Results." The detailed research techniques and analyses of interest primarily to researchers are offered in appendixes. Such specification of the style and organization of reports guides the researcher in presenting results so that maximum use by AASHTO's member departments may be obtained.

NCHRP publications consist of the following:

- Project reports in the regular *NCHRP Report* series,
- Reports in the *NCHRP Synthesis of Highway Practice* series,
- *Annual Summary of Progress* through December 31,
- *NCHRP Research Results Digests*,
- *NCHRP Legal Research Digests*,
- NCHRP IDEA Annual Progress Report,
- Semiannual progress reports (which are made available on the worldwide web),
- Published NCHRP reports on the worldwide web,
- Unedited agency reports on the worldwide web, and
- CD-ROMs.

Publications are distributed widely through NCHRP and through TRB's selective distribution process; the print order for reports in the formal NCHRP series ranges from 1,800 to 4,000 copies. In addition to AASHTO and the chief executive officers of State DOTs, copies automatically go to the following:

- Individual TRB members who have selected publications in the particular subject area of the report,
- About 100 libraries,
- TRB representatives in the State highway and transportation departments,
- Educational institutions,
- Liaison representatives, and
- Appropriate panels and committees.

For each published report, NCHRP staff writes a foreword that (1) identifies the fields of specialty of those individuals likely to be most interested in the results and (2) suggests how the results fit into present knowledge and practice. Furthermore, TRB's Technical Activities Staff members follow the progress of the work and can, therefore, discuss the potential application of research results during their periodic visits to State highway and

transportation departments. All published reports are offered for sale through TRB's Publications Office and are entered in the National Technical Information Service (NTIS). Since 2001, published reports also have been made available electronically on the worldwide web. For ready availability to interested parties, unpublished reports are available in hardcopy or on the NCHRP website.

## **SYSTEMATIC PLANNING FOR GETTING RESEARCH RESULTS FROM NCHRP PROJECTS INTO PRACTICE**

### **Promoting Useful Results**

As mentioned previously, many activities take place between initiation of research programs and execution of research contracts. Many additional activities occur before formal publication of the final reports is realized. Throughout the process, NCHRP looks for opportunities to increase the probability that results will be applied. Beyond the sponsor's initial contribution of setting the goals for a program of applied research dedicated to solving pressing operational problems, NCHRP tries to further increase the probability by

- Establishing the agency and personnel qualifications that are mandatory if the goals are to be achieved. Emphasis is placed on the importance of a record of successful past performance in endeavors similar to those to be undertaken. Further, it is also stipulated that proposals are not acceptable if they do not contain specific statements as to how the anticipated results can be used to improve practice.
- Making use of panel members who not only are experts in the particular problem area, but also have a complete understanding of the needs of the practitioners—to define the research problem and its objectives in the form of a precise project statement on which fully responsive research proposals can be based. Experts drawn from the highway and transportation departments play a major role in this task.
- Exercising extreme care in the process of selecting research agencies to ensure not only that the proposed research plan is the best possible in addressing the specifics of the objectives, but that it also culminates in the best promise for providing the practitioner with a product that is both usable and readily implementable.
- Establishing—on the basis of staff and project panel review of and suggested modifications to the research plan—a clear meeting of the minds as to what specifically is expected from the project and the researchers in order to meet the needs of the practitioner.
- Acquiring an amplified research plan that is intended to detail comprehensively the approved research plan and to include a specific schedule of events for the major tasks. This document is used by the staff in the day-to-day surveillance of the project's progress and by the project panel as required.

- Carrying out project surveillance sufficient to keeping the research in line with the approved research plan, constantly keeping the researchers aware of the needs of the practitioner, and ensuring that all project developments through final reporting center on these needs.
- Requiring research reports in a format designed specifically to first meet the needs of the busy administrator and the practitioner and then to meet the needs of other researchers.

## **NCHRP Reporting of Research Results**

In an applied research program such as that of NCHRP, the sponsor rightfully expects not only results that are accurate, but also findings that can be readily put into practice. This means that the final research reports must be presented in language understandable to both administrators and engineers and in such a format as to permit easy assimilation. Research agencies for NCHRP are required to report their results in a form that succinctly summarizes the findings for the busy administrator and also informs the practitioner of the application of the findings. The detailed research techniques and analyses in which a researcher would be interested are presented in appendixes so that readers do not have to struggle to extract the findings. The Program specifies the style and organization of all reports to guide the researchers in their writing so that maximum use by AASHTO's member departments may be obtained.

## **IMPLEMENTING RESEARCH RESULTS**

Over the years, Program staff and various AASHTO committees have worked together to structure the research findings into the best possible form for immediate use by the practitioner. Such joint efforts are highly desirable and represent the ultimate in the steps that the Program can take to facilitate implementation of the findings.

AASHTO has provided NCHRP with frequent opportunities for staff and project researchers to go before the various committees of the Association to present their findings and recommendations directly to the user community.

## **DOCUMENTING SUCCESS**

For the past several years, NCHRP has addressed the challenge of documenting or showcasing successful research products. Several approaches are being tried and NCHRP will continue to explore new and better ways to meet this challenge.

The NCHRP maintains a list of "NCHRP Products for AASHTO Committees," which can be found on the NCHRP website. The list categorizes projects and products based on the interests of relevant committees. Instances are highlighted when the committee has taken action on the research results or recommendations, for example, adapting and/or adopting the results as a specification or guide.

Every 4 years, the NCHRP surveys project panels of completed research to identify known applications of research results. The 2008 survey results are on the Cooperative

Research Programs Overview page of the TRB website. Another such survey will be conducted in 2012.

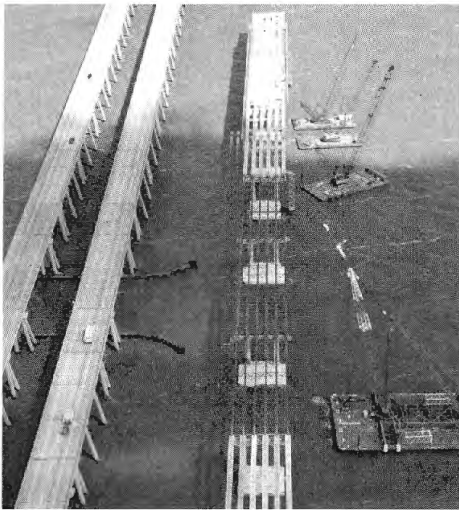
NCHRP also showcases known applications in a series of success stories, *Impacts on Practice*, and posts them on the NCHRP website. Three examples follow:

- Delivering value across a transportation agency
- Better designs mean longer pavement life
- Snow and ice control— one storm at a time



# Delivering value across a transportation agency

**B**ill Temple, chief engineer of the Louisiana Department of Transportation and Development, can name off the top of his head a dozen NCHRP research reports that his office uses on a regular basis to get its work done. Topics range from Superpave testing to pavement drainage issues, from access management to design-build contracting. However, when Temple did some asking around Louisiana DOTD, he found that his list was just the tip of the iceberg.



NCHRP research contributed to the accelerated design and construction of the new I-10 Twin Spans Bridge.

## Serving Louisiana DOTD's engineers

To get a broader picture of how Louisiana DOTD uses NCHRP research, Temple asked division heads throughout the agency to identify NCHRP research products that they commonly rely upon. He received an impressive response, with some 150 reports cited by the Engineering Office alone, and 40 more by other areas of the agency.

Each part of the Engineering Office—spanning research, project development, construction, systems engineering, and traffic engineering—has examples to share. For instance, Project Development makes extensive use of NCHRP's load and resistance factor design research for bridge and structural design. Discussing recent rebuilding efforts on the Interstate 10 Twin Spans Bridge, Skip Paul, the director of the Louisiana Transportation Research Center, says, "The agency's design team never could have completed this work without relying on NCHRP research."

Systems Engineering is another frequent user of NCHRP research, calling upon many studies to support its mechanistic-empirical testing of state pavement materials and implementation of new design strategies. And NCHRP research studies are a standard reference for Pavement and Geotechnical Services' life cycle cost analyses. The list goes on.

## Benefits across the agency

NCHRP's impact reaches beyond engineering and into virtually all areas of the agency. To name just a few:

- Highway Safety relies on NCHRP 500 Series guides for safety implementation and for data collection and analysis.
- Intelligent Transportation Systems has incorporated NCHRP research on traffic management centers into its statewide plans.
- Legal commonly uses NCHRP research on data management resources.

## Small investment, large return

Louisiana DOTD enjoys a wide range of benefits from what Temple describes as a "flow of NCHRP material that arrives at our agency all year long." He estimates that Louisiana's annual voluntary contribution to NCHRP could by itself fund only a few research studies of a similar scope and magnitude. Pointing to all these NCHRP projects, Temple notes, "NCHRP is an extremely smart way for our department to leverage our research funding." Complementing the

"The agency's design team never could have completed this work without relying on NCHRP research."

program's full-scale research projects is a variety of other research products cited by Louisiana DOTD division heads, including NCHRP synthesis reports, series 20-07 "quick response" studies, and Innovations Deserving Exploratory Analysis reports.

## Growing intellectual capacity

Beyond practical guidance, NCHRP research delivers additional benefits to Louisiana DOTD. "NCHRP assembles the best and brightest around the table when investigating a topic," says chief engineer Temple. Louisiana DOTD actively encourages employees to participate on Transportation Research Board technical committees and on NCHRP research project panels. Says research director Paul, "This not only helps us address areas of concern, but we also build a network of contacts among experts and grow our intellectual capacity to be worldwide leaders in our field."

"NCHRP is an extremely smart way for our department to leverage our research funding."



Skip Paul (left), research director for Louisiana DOTD, is one of many users of NCHRP research reporting to Bill Temple (right), the agency's chief engineer.

## NCHRP – Transportation research that works

Objective national highway research since 1962 • Focused on practical problems of state DOTs • Contract researchers competitively selected • Overseen by balanced panels of technical experts • Reviewed by TRB highway specialists

**ACKNOWLEDGEMENT OF SPONSORSHIP** Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

**DISCLAIMER** The opinions and conclusions expressed or implied in reports are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Academies, or the program sponsors.

# Better designs mean longer pavement life

A lot has changed on our highways since the 1950s—traffic volumes, pavement materials, truck weights, and customer expectations. So when it came time for AASHTO to update its pavement design guidance to state DOTs, engineers needed a new approach.



engineer at Montana DOT. “But some of our traffic is getting heavier, especially around the Interstates, and we’re realizing that we need to use thicker slabs in those locations. The MEPDG has been very useful for those situations.”

Calibrating the MEPDG software to local site conditions and materials is

NCHRP met that need in the early 2000s with Project 1-37A, which created the Mechanistic-Empirical Pavement Design Guide. The MEPDG software uses numerical models to analyze traffic, climate, subgrade composition, and laboratory measurements of materials properties to predict the performance of various pavement designs over their entire service life. This precise, scientific methodology will allow DOTs to build longer-lasting pavements more cost-effectively.

By contrast, traditional pavement design methods—including the 1972, 1986, and 1993 AASHTO design guides that many DOTs still rely on—are based on empirical equations developed using 1950s AASHTO Road Test data. The guides have served the nation’s DOTs well over the years, but the Road Test data has limitations in its application to today’s truck traffic or to sites with varying climates and subgrade materials.

With its performance-based models, the MEPDG—completed in 2004 by a research team at Applied Research Associates—is helping pavement designers meet the challenges of the 21st century.

“We’ve always used 9 inches of concrete and 6 inches of gravel for all our concrete pavements,” says Dan Hill, pavement design

key to successful pavement design. Missouri was one of the first states to complete its local calibration and the first state to use the MEPDG to design its pavements, and Missouri DOT has now let more than \$1 billion in construction contracts for pavements designed using the guide. The software’s ability to predict localized pavement distresses has allowed the department to save money by using less material in areas where thicker pavements are not necessary.

“The fact that we can now design thinner pavements really provided us with the tangible benefits that we needed to justify the cost of doing the local calibration,” says John Donahue, MoDOT pavement engineer.

Ohio DOT is completing its local calibration, and engineers there are looking forward to transitioning to the MEPDG software.

“The MEPDG should give us better predictions of pavement performance in our state, which will help with pavement management

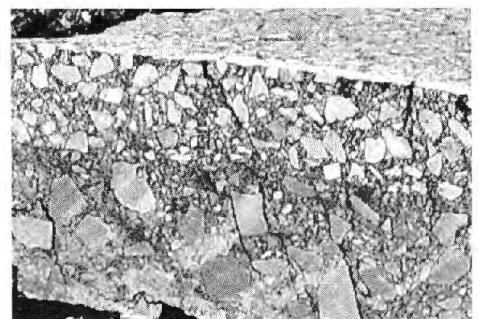
“The fact that we can now design thinner pavements really provided us with the tangible benefits that we needed to justify the cost of doing the local calibration.”

and budgeting,” says Roger Green, a pavement research engineer at Ohio DOT.

“One of the greatest impacts of the MEPDG is that states are starting to look very carefully at the data that goes into their designs,” says Harold Von Quintus, a principal engineer at ARA who helped develop the guide. “It’s been a wake-up call in making sure that the values they use to design pavements are accurate for each site.”

Donahue can attest to that. “In some areas, we were designing 14-inch concrete pavements—we even had some 20-inch asphalt sections. We didn’t have a justifiable reason not to do it,” he says. “We didn’t have a better design method at our fingertips. Now we do.”

The MEPDG and the accompanying software are available for evaluation online at <http://www.trb.org/mepdg/>. The software and the manual have been provisionally adopted by AASHTO.



The MEPDG software helps designers select appropriate pavement layer thicknesses for specific site conditions.

## NCHRP—Transportation research that works

Objective national highway research since 1962 • Focused on practical problems of state DOTs • Contract researchers competitively selected • Overseen by balanced panels of technical experts • Reviewed by TRB highway specialists

**ACKNOWLEDGEMENT OF SPONSORSHIP** Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

**DISCLAIMER** The opinions and conclusions expressed or implied in reports are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Academies, or the program sponsors.



# Snow and ice control—one storm at a time

Experienced snowplow drivers often hit on the right snow and ice control practices for each winter storm. But in the past, state DOTs lacked standard guidelines, based on solid research, to help field supervisors and drivers of all experience levels choose the most appropriate strategy for different locations and conditions.

That changed in 2004, when NCHRP published *Report 526: Snow and Ice Control: Guidelines for Materials and Methods*. The guide helps agencies choose winter maintenance strategies to meet level-of-service objectives and pavement condition goals for different highway types—ensuring that materials are used cost-effectively and waste is minimized.

“We conducted rigorous field testing across dozens of state and local agencies.”

To create the guide, investigators conducted extensive fieldwork, working with 24 agencies to evaluate five combinations of snow removal tactics and anti-icing and deicing strategies. They studied these methods over three winters to assess their effectiveness in different climate, site, and traffic conditions.

“We conducted rigorous field testing across dozens of state and local agencies,” says principal investigator Bob Blackburn, formerly of the Midwest Research Institute. “The states invested a lot of effort to collect data for us.”

The result was a set of detailed guidelines that gave state DOTs and local agencies a scientific methodology for addressing



Weather station data shape appropriate storm response.

complex challenges, such as how to design a salt application rate to account for dilution caused by precipitation, traffic, and accumulated snow and ice on the road surface. The guidelines codified the experiences of field personnel across the country.

“Core winter maintenance solutions such as anti-icing, prewetting, and Road Weather Information Systems were defined and developed through the 1980s and 1990s,” says Paul Pisano, team leader for road weather management at FHWA. “But as we refined and improved our use of these approaches over time, we needed updated guidance that reflected those changes. *Report 526* brought it all together.”

The report includes a step-by-step procedure that field supervisors can use to determine the best treatment plan for a variety of conditions. Project panel member Joe Doherty of New York State DOT says targeting the guidelines to field staff was key.

“Often guidelines are written for the top DOT engineering staff,” Doherty says, “but the field supervisors are the people who really call the shots during the storms. So the more you can target them, the more effective you can be at improving practices.”

To make the guidelines even more accessible to field personnel, AASHTO incorporated portions of *Report 526* into its computer-based training modules on snow and ice control.

“Computer-based training lends itself so well to technology transfer for research,” says Lee Smithson, who helped develop the training module through AASHTO’s Snow and Ice



The correct salt application rate saves money.

Pooled Fund Cooperative Program. “It takes solid research and puts it in the language of the people who are using it out in the field.”

“It’s a critical way to get the message out there,” Pisano agrees.

“This NCHRP research has made a difference.”

The benefits of the training continue long after the instruction is complete: Field personnel can use the software during winter weather events to compute salt application rates and design treatment plans.

“This NCHRP research has made a difference,” Smithson says. “Once you get tech transfer on it, it does work.”

*NCHRP Report 526* is available online at [http://www.nchrp.org/news/brake\\_detail.asp?id=130](http://www.nchrp.org/news/brake_detail.asp?id=130). Hard copies may be purchased from the TRB Bookstore at [www.trb.org/bookstore](http://www.trb.org/bookstore).

## NCHRP—Transportation research that works

Objective national highway research since 1962 • Focused on practical problems of state DOTs • Contract researchers competitively selected • Overseen by balanced panels of technical experts • Reviewed by TRB highway specialists

**ACKNOWLEDGEMENT OF SPONSORSHIP** Work was sponsored by the American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the National Cooperative Highway Research Program, which is administered by the Transportation Research Board of the National Academies.

**DISCLAIMER** The opinions and conclusions expressed or implied in reports are those of the research agencies. They are not necessarily those of the Transportation Research Board, the National Academies, or the program sponsors.

## SUMMARY

NCHRP is a unique contract research effort designed to respond to the needs of State highway and transportation departments through the resolution of pressing transportation problems. Although TRB administers the Program, the research content is solely the prerogative of AASHTO and its member departments. The Program is one of applied research, and every possible effort is made to help administrators and engineers put the findings to early use. Program policy ensures maximum exposure of the research while in progress in the hope that research results will, in fact, more quickly find their way into practice in the form of policies, procedures, specifications, and standards of State highway and transportation departments.

## STAFF NEWS

- Senior Program Officer **David B. Beal** retired in November. David joined TRB in 1996 and was responsible for all bridge- and structures-related research of the NCHRP—much of this research has supported the adoption of various AASHTO specifications affecting the design and construction of bridges throughout our nation and elsewhere.
- **Waseem Dekelbab** joined the CRP staff as the Senior Program Officer responsible for bridge- and structures-related research of the NCHRP. Waseem has a Ph.D. in structural engineering and is a registered professional engineer in Michigan.
- **Adrienne Blackwell** was promoted to Administrative Coordinator after 8 years with the NCHRP as a Senior Program Assistant.
- **Megan Chamberlain** was promoted to Senior Program Assistant.
- **Curtis Johnson** became a member of the CRP staff as a Program Assistant.



TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
*	4-3(2)	A Critical Review of Literature Treating Methods of Identifying Aggregates Subject to Destructive Volume Change When Frozen in Concrete and a Proposed Program of Research—Intermediate Report, 81 p.
1	6-8	Evaluation of Methods of Replacement of Deteriorated Concrete in Structures, 56 p.
2	1-1	An Introduction to Guidelines for Satellite Studies of Pavement Performance, 19 p.
2A		Guidelines for Satellite Studies of Pavement Performance, 85 p.
3	3-5	Improved Criteria for Traffic Signals at Individual Intersections—Interim Report, 36 p.
4	6-2	Non-Chemical Methods of Snow and Ice Control on Highway Structures, 74 p.
5	10-3	Effects of Different Methods of Stockpiling Aggregates—Interim Report, 48 p.
6	3-4	Means of Locating and Communicating with Disabled Vehicles—Interim Report, 56 p.
7	1-2	Comparison of Different Methods of Measuring Pavement Condition—Interim Report, 29 p.
8	4-4	Synthetic Aggregates for Highway Construction, 13 p.
9	3-2	Traffic Surveillance and Means of Communicating with Drivers—Interim Report, 28 p.
10	1-4	Theoretical Analysis of Structural Behavior of Road Test Flexible Pavements, 31 p.
11	3-6	Effect of Control Devices on Traffic Operations—Interim Report, 107 p.
12	4-3(1)	Identification of Aggregates Causing Poor Concrete Performance When Frozen—Interim Report, 47 p.
13	2-5	Running Cost of Motor Vehicles as Affected by Highway Design—Interim Report, 43 p.
14	10-5	Density and Moisture Content Measurements by Nuclear Methods—Interim Report, 32 p.
15	4-3(2)	Identification of Concrete Aggregates Exhibiting Frost Susceptibility—Interim Report, 66 p.
16	6-3	Protective Coatings to Prevent Deterioration of Concrete by Deicing Chemicals, 21 p.
17	10-1	Development of Guidelines for Practical and Realistic Construction Specifications, 109 p.
18	2-2	Community Consequences of Highway Improvement, 37 p.
19	6-1	Economical and Effective Deicing Agents for Use on Highway Structures, 19 p.
20	5-4	Economic Study of Roadway Lighting, 77 p.
21	1-5	Detecting Variations in Load-Carrying Capacity of Flexible Pavements, 30 p.
22	1-3(2)	Factors Influencing Flexible Pavement Performance, 69 p.
23	6-4	Methods for Reducing Corrosion of Reinforcing Steel, 22 p.
24	7-1	Urban Travel Patterns for Airports, Shopping Centers, and Industrial Plants, 116 p.
25	10-7	Potential Uses of Sonic and Ultrasonic Devices in Highway Construction, 48 p.
26	13-1	Development of Uniform Procedures for Establishing Construction Equipment Rental Rates, 33 p.
27	6-5	Physical Factors Influencing Resistance of Concrete to Deicing Agents, 41 p.
28	3-2	Surveillance Methods and Ways and Means of Communicating with Drivers, 66 p.
29	3-2	Digital-Computer-Controlled Traffic Signal System for a Small City, 82 p.
30	1-4(2)	Extension of AASHO Road Test Performance Concepts, 33 p.
31	8-5	A Review of Transportation Aspects of Land-Use Control, 41 p.
32	3-5	Improved Criteria for Traffic Signals at Individual Intersections, 134 p.
33	2-4	Values of Time Savings of Commercial Vehicles, 74 p.
34	10-2	Evaluation of Construction Control Procedures—Interim Report, 117 p.
35	1-3(3)	Prediction of Flexible Pavement Deflections from Laboratory Repeated-Load Tests, 117 p.
36	15-1	Highway Guardrails—A Review of Current Practice, 33 p.
37	1-7	Tentative Skid-Resistance Requirements for Main Rural Highways, 80 p.
38	9-3	Evaluation of Pavement Joint and Crack Sealing Materials and Practices, 40 p.
39	1-8	Factors Involved in the Design of Asphaltic Pavement Surfaces, 112 p.
40	3-4(1)	Means of Locating Disabled or Stopped Vehicles, 40 p.
41	3-6	Effect of Control Devices on Traffic Operations, 83 p.
42	14-1	Interstate Highway Maintenance Requirements and Unit Maintenance Expenditure Index, 144 p.
43	10-5	Density and Moisture Content Measurements by Nuclear Methods, 38 p.
44	7-2	Traffic Attraction of Rural Outdoor Recreational Areas, 28 p.
45	5-5	Development of Improved Pavement Marking Materials—Laboratory Phase, 24 p.
46	10-3	Effects of Different Methods of Stockpiling and Handling Aggregates, 102 p.
47	2-3	Accident Rates as Related to Design Elements of Rural Highways, 173 p.
48	7-4	Factors and Trends in Trip Lengths, 70 p.
49	20-4	National Survey of Transportation Attitudes and Behavior—Phase I Summary Report, 71 p.
50	3-8	Factors Influencing Safety at Highway-Rail Grade Crossings, 113 p.
51	3-3	Sensing and Communication Between Vehicles, 105 p.
52	10-6	Measurement of Pavement Thickness by Rapid and Nondestructive Methods, 82 p.

\* Special publication

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
53	7-6	Multiple Use of Lands Within Highway Rights-of-Way, 68 p.
54	15-1(2)	Location, Selection, and Maintenance of Highway Guardrails and Median Barriers, 63 p.
55	20-2	Research Needs in Highway Transportation, 66 p.
56	11-3	Scenic Easements—Legal, Administrative, and Valuation Problems and Procedures, 174 p.
57	8-2	Factors Influencing Modal Trip Assignment, 78 p.
58	7-5	Comparative Analysis of Traffic Assignment Techniques with Actual Highway Use, 85 p.
59	1-6	Standard Measurements for Satellite Road Test Program, 78 p.
60	5-2	Effects of Illumination on Operating Characteristics of Freeways, 148 p.
61	1-9	Evaluation of Studded Tire-Performance Data and Pavement Wear Measurement, 66 p.
62	7-1	Urban Travel Patterns for Hospitals, Universities, Office Buildings and Capitols, 144 p.
63	2-6	Economics of Design Standards for Low-Volume Rural Roads, 93 p.
64	7-7	Motorists' Needs and Services on Interstate Highways, 88 p.
65	4-3(1)	One-Cycle Slow-Freeze Test for Evaluating Aggregate Performance in Frozen Concrete, 21 p.
66	4-3(2)	Identification of Frost-Susceptible Particles in Concrete Aggregates, 62 p.
67	9-1	Relation of Asphalt Rheological Properties to Pavement Durability, 45 p.
68	3-10	Application of Vehicle Operating Characteristics to Geometric Design and Traffic Operations, 38 p.
69	10-2A	Evaluation of Construction Control Procedures—Aggregate Gradation Variations and Effects, 58 p.
70	8-1	Social and Economic Factors Affecting Intercity Travel, 68 p.
71	7-3	Analytical Study of Weighing Methods for Highway Vehicles in Motion, 63 p.
72	11-2	Theory and Practice in Inverse Condemnation for Five Representative States, 44 p.
73	3-5	Improved Criteria for Traffic Signal Systems on Urban Arterials, 55 p.
74	4-6	Protective Coatings for Highway Structural Steel, 64 p.
74A	4-6	Protective Coatings for Highway Structural Steel— Literature Survey, 275 p.
74B	4-6	Protective Coatings for Highway Structural Steel—Current Highway Practices, 102 p.
75	2-9	Effect of Highway Landscape Development on Nearby Property, 82 p.
76	1-5(2)	Detecting Seasonal Changes in Load-Carrying Capabilities of Flexible Pavements, 37 p.
77	15-6	Development of Design Criteria for Safer Luminaire Supports, 82 p.
78	3-7	Highway Noise—Measurement, Simulation, and Mixed Reactions, 78 p.
79	17-1	Development of Improved Methods for Reduction of Traffic Accidents, 163 p.
80	2-10	Oversize-Overweight Permit Operation on State Highways, 120 p.
81	8-6	Moving Behavior and Residential Choice— A National Survey, 129 p.
82	20-4	National Survey of Transportation Attitudes and Behavior—Phase II Analysis Report, 89 p.
83	12-2	Distribution of Wheel Loads on Highway Bridges, 56 p.
84	3-9	Analysis and Projection of Research on Traffic Surveillance, Communication, and Control, 48 p.
85	5-5	Development of Formed-in-Place Wet Reflective Markers, 28 p.
86	12-8	Tentative Service Requirements for Bridge Rail Systems, 62 p.
87	11-1(5)	Rules of Discovery and Disclosure in Highway Condemnation Proceedings, 28 p.
88	11-1(2)	Recognition of Benefits to Remainder Property in Highway Valuation Cases, 24 p.
89	7-4	Factors, Trends, and Guidelines Related to Trip Length, 59 p.
90	12-5	Protection of Steel in Prestressed Concrete Bridges, 86 p.
91	16-1	Effects of Deicing Salts on Water Quality and Biota— Literature Review and Recommended Research, 70 p.
92	11-1(6)	Valuation and Condemnation of Special Purpose Properties, 47 p.
93	3-13	Guidelines for Medial and Marginal Access Control on Major Roadways, 147 p.
94	11-1(9)	Valuation and Condemnation Problems Involving Trade Fixtures, 22 p.
95	5-6	Highway Fog, 48 p.
96	8-4	Strategies for the Evaluation of Alternative Transportation Plans, 111 p.
97	1-4(1)A	Analysis of Structural Behavior of AASHO Road Test Rigid Pavements, 35 p.
98	4-2	Tests for Evaluating Degradation of Base Course Aggregates, 98 p.
99	5-3	Visual Requirements in Night Driving, 38 p.
100	4-8	Research Needs Relating to Performance of Aggregates in Highway Construction, 68 p.
101	6-9	Effect of Stress on Freeze-Thaw Durability of Concrete Bridge Decks, 70 p.
102	12-7	Effect of Weldments on the Fatigue Strength of Steel Beams, 114 p.
103	10-4	Rapid Test Methods for Field Control of Highway Construction, 89 p.
104	11-1	Rules of Compensability and Valuation Evidence for Highway Land Acquisition, 77 p.
105	15-5	Dynamic Pavement Loads of Heavy Highway Vehicles, 94 p.
106	18-1	Revibration of Retarded Concrete for Continuous Bridge Decks, 67 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
107	11-1(10)	New Approaches to Compensation for Residential Takings, 27 p.
108	15-2	Tentative Design Procedure for Riprap-Lined Channels, 75 p.
109	12-9	Elastomeric Bearing Research, 53 p.
110	3-11	Optimizing Street Operations Through Traffic Regulations and Control, 100 p.
111	2-5A and 2-7	Running Costs of Motor Vehicles as Affected by Road Design and Traffic, 97 p.
112	11-3(2)	Junkyard Valuation—Salvage Industry Appraisal Principles Applicable to Highway Beautification, 41 p.
113	3-14	Optimizing Flow on Existing Street Networks, 414 p.
114	11-1(1)	Effects of Proposed Highway Improvements on Property Values, 42 p.
115	15-1(2)	Guardrail Performance and Design, 70 p.
116	15-3	Structural Analysis and Design of Pipe Culverts, 155 p.
117	3-7	Highway Noise—A Design Guide for Highway Engineers, 79 p.
118	15-1(2)	Location, Selection, and Maintenance of Highway Traffic Barriers, 96 p.
119	11-3(1)	Control of Highway Advertising Signs—Some Legal Problems, 72 p.
120	8-7	Data Requirements for Metropolitan Transportation Planning, 90 p.
121	8-5	Protection of Highway Utility, 115 p.
122	2-11	Summary and Evaluation of Economic Consequences of Highway Improvements, 324 p.
123	3-12	Development of Information Requirements and Transmission Techniques for Highway Users, 239 p.
124	3-5	Improved Criteria for Traffic Signal Systems in Urban Networks, 86 p.
125	10-5A	Optimization of Density and Moisture Content Measurements by Nuclear Methods, 86 p.
126	11-4	Divergences in Right-of-Way Valuation, 57 p.
127	6-10	Snow Removal and Ice Control Techniques at Interchanges, 90 p.
128	1-11	Evaluation of AASHO Interim Guides for Design of Pavement Structures, 111 p.
129	15-1(2)	Guardrail Crash Test Evaluation—New Concepts and End Designs, 89 p.
130	5-7	Roadway Delineation Systems, 349 p.
131	19-2(4)	Performance Budgeting System for Highway Maintenance Management, 213 p.
132	1-3(1)	Relationships Between Physiographic Units and Highway Design Factors, 161 p.
133	7-8	Procedures for Estimating Highway User Costs, Air Pollution, and Noise Effects, 127 p.
134	11-1(8)	Damages Due to Drainage, Runoff, Blasting, and Slides, 24 p.
135	4-10	Promising Replacements for Conventional Aggregates for Highway Use, 53 p.
136	15-4	Estimating Peak Runoff Rates from Ungauged Small Rural Watersheds, 85 p.
137	16-2	Roadside Development—Evaluation of Research, 78 p.
138	21-1	Instrumentation for Measurement of Moisture—Literature Review and Recommended Research, 60 p.
139	1-10	Flexible Pavement Design and Management—Systems Formulation, 64 p.
140	1-10	Flexible Pavement Design and Management—Materials Characterization, 118 p.
141	19-3	Changes in Legal Vehicle Weights and Dimensions—Some Economic Effects on Highways, 184 p.
142	11-5	Valuation of Air Space, 48 p.
143	8-10	Bus Use of Highways—State of the Art, 406 p.
144	3-7	Highway Noise—A Field Evaluation of Traffic Noise Reduction Measures, 80 p.
145	3-17	Improving Traffic Operations and Safety at Exit Gore Areas, 120 p.
146	8-9	Alternative Multimodal Passenger Transportation Systems—Comparative Economic Analysis, 68 p.
147	12-7	Fatigue Strength of Steel Beams with Welded Stiffeners and Attachments, 85 p.
148	20-7	Roadside Safety Improvement Programs on Freeways—A Cost-Effectiveness Priority Approach, 64 p.
149	12-8	Bridge Rail Design—Factors, Trends, and Guidelines, 49 p.
150	20-7	Effect of Curb Geometry and Location on Vehicle Behavior, 88 p.
151	1-12(2)	Locked-Wheel Pavement Skid Tester Correlation and Calibration Techniques, 100 p.
152	5-8	Warrants for Highway Lighting, 117 p.
153	22-2	Recommended Procedures for Vehicle Crash Testing of Highway Appurtenances, 19 p.
154	1-12	Determining Pavement Skid Resistance Requirements at Intersections and Braking Sites, 64 p.
155	8-10	Bus Use of Highways—Planning and Design Guidelines, 161 p.
156	8-8(3)	Transportation Decision-Making—A Guide to Social and Environmental Considerations, 135 p.
157	20-7	Crash Cushions of Waste Materials, 73 p.
158	20-7	Selection of Safe Roadside Cross Sections, 57 p.
159	3-15	Weaving Areas—Design and Analysis, 119 p.
160	1-10A	Flexible Pavement Design and Management—Systems Approach Implementation, 53 p.
161	14-2	Techniques for Reducing Roadway Occupancy During Routine Maintenance Activities, 55 p.
162	17-2A	Methods for Evaluating Highway Safety Improvements, 150 p.



TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
163	12-10	Design of Bent Caps for Concrete Box-Girder Bridges, 124 p.
164	4-7	Fatigue Strength of High-Yield Reinforcing Bars, 90 p.
165	12-11	Waterproof Membranes for Protection of Concrete Bridge Decks—Laboratory Phase, 70 p.
166	4-10A	Waste Materials as Potential Replacements for Highway Aggregates, 94 p.
167	8-7A	Transportation Planning for Small Urban Areas, 71 p.
168	10-8	Rapid Measurement of Concrete Pavement Thickness and Reinforcement Location—Field Evaluation of Nondestructive Systems, 63 p.
169	7-10	Peak-Period Traffic Congestion—Options for Current Programs, 65 p.
170	16-1	Effects of Deicing Salts on Plant Biota and Soils—Experimental Phase, 88 p.
171	5-6A	Highway Fog—Visibility Measures and Guidance Systems, 40 p.
172	4-8(2)	Density Standards for Field Compaction of Granular Bases and Subbases, 73 p.
173	3-7	Highway Noise—Generation and Control, 174 p.
174	3-7	Highway Noise—A Design Guide for Prediction and Control, 193 p.
175	3-16	Freeway Lane Drops, 72 p.
176	1-13(2)	Studded Tires and Highway Safety—Feasibility of Determining Indirect Effects, 42 p.
177	8-17	Freight Data Requirements for Statewide Transportation Systems Planning—Research Report, 196p.
178	8-17	Freight Data Requirements for Statewide Transportation Systems Planning—User's Manual, 155 p.
179	8-18	Evaluating Options in Statewide Transportation Planning/Programming—Issues, Techniques, and Their Relationships, 91 p.
180	12-13	Cathodic Protection for Reinforced Concrete Bridge Decks—Laboratory Phase, 135 p.
181	12-14	Subcritical Crack Growth and Fracture of Bridge Steels, 82 p.
182	6-11	Economic Evaluation of Ice and Frost on Bridge Decks, 73 p.
183	1-13	Studded Tires and Highway Safety—An Accident Analysis, 70 p.
184	1-14	Influence of Combined Highway Grade and Horizontal Alignment on Skidding, 33 p.
185	3-19	Grade Effects on Traffic Flow Stability and Capacity, 110 p.
186	8-12A	Travel Estimation Procedures for Quick Response to Urban Policy Issues, 70 p.
187	8-12A	Quick-Response Urban Travel Estimation Techniques and Transferable Parameters—User's Guide, 229 p.
188	12-12	Fatigue of Welded Steel Bridge Members Under Variable-Amplitude Loadings, 113 p.
189	20-10	Quantifying the Benefits of Separating Pedestrians and Vehicles, 127 p.
190	18-2	Use of Polymers in Highway Concrete, 77 p.
191	20-12	Effect of Air Pollution Regulations on Highway Construction and Maintenance, 81 p.
192	4-8(3)	Predicting Moisture-Induced Damage to Asphaltic Concrete, 46 p.
193	20-13	Beneficial Effects Associated with Freeway Construction—Environmental, Social, and Economic, 110 p.
194	3-18(2)	Traffic Control in Oversaturated Street Networks, 152 p.
195	9-4	Minimizing Premature Cracking in Asphaltic Concrete Pavement, 51 p.
196	14-4	Reconditioning Heavy-Duty Freeways in Urban Areas, 60 p.
197	3-25	Cost and Safety Effectiveness of Highway Design Elements, 237 p.
198	20-16	State Laws and Regulations on Truck Size and Weight, 117 p.
199	8-18	Evaluating Options in Statewide Transportation Planning/Programming—Techniques and Applications, 190 p.
200	20-14	Monitoring Carbon Monoxide Concentrations in Urban Areas, 41 p.
201	10-10	Acceptance Criteria for Electroslag Weldments in Bridges, 44 p.
202	14-3	Improved Pavement-Shoulder Joint Design, 103 p.
203	20-7, Task 7	Safety at Narrow Bridge Sites, 63 p.
204	10-11	Bridge Deck Joint-Sealing Systems—Evaluation and Performance Specification, 46 p.
205	7-10(2)	Implementing Packages of Congestion-Reducing Techniques—Strategies for Dealing with Institutional Problems of Cooperative Programs, 128 p.
206	12-15 & 12-5(2)	Detection and Repair of Fatigue Damage in Welded Highway Bridges, 85 p.
207	4-12	Upgrading of Low-Quality Aggregates for PCC and Bituminous Pavements, 91 p.
208	8-16	Market Opportunity Analysis for Short-Range Public Transportation Planning—Procedures for Evaluating Alternative Service Concepts, 80 p.
209	8-16	Market Opportunity Analysis for Short-Range Public Transportation Planning—Transportation Services for the Transportation Disadvantaged, 52 p.
210	8-16	Market Opportunity Analysis for Short-Range Public Transportation Planning—Economic, Energy, and Environmental Impacts, 45 p.
211	8-16	Market Opportunity Analysis for Short-Range Public Transportation Planning—Goals and Policy Development, Institutional Constraints, and Alternative Organizational Arrangements, 161 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
212	8-16	Market Opportunity Analysis for Short-Range Public Transportation Planning—Method and Demonstration, 132 p.
*	20-3D	Freeway Traffic Management, 68 p.
213	9-4A	Bayesian Methodology for Verifying Recommendations to Minimize Asphalt Pavement Distress, 52 p.
214	20-7, Task 13	Design and Traffic Control Guidelines for Low-Volume Rural - Roads, 41 p.
215	20-7, Task 15	Pavement Management System Development , 32 p.
216	811	The No-Action Alternative—Research Report, 72 p.
217	8-11	The No-Action Alternative Impact Assessment Guidelines, 174 p.
218A	20-15	Ecological Effects of Highway Fills on Wetlands—Research Report, 34 p.
218B	20-15	Ecological Effects of Highway Fills on Wetlands—User's Manual, 99 p.
219	17-3	Application of Traffic Conflict Analyses at Intersections, 109 p.
220	16-3	Erosion Control During Highway Construction—Research Report, 30 p.
221	16-3	Erosion Control During Highway Construction—Manual on Principles and Practices, 108 p.
222	12-20	Bridges on Secondary Highways and Local Roads- Rehabilitation and Replacement, 132 p.
223	14-5	Maintenance Levels-of-Service Guidelines, 118 p.
224	1-17	Guidelines for Recycling Pavement Materials, 137 p.
225	4-11	Plastic Pipe for Subsurface Drainage of Transportation Facilities, 153 p.
226	12-21	Damage Evaluation and Repair Methods for Prestressed Concrete Bridge Members, 66 p.
227	12-15(3)	Fatigue Behavior of Full-Scale Welded Bridge Attachments, 47 p.
228	1-18	Calibration of Response-Type Road Roughness Measuring Systems, 81 p.
229	8-23	Methods for Analyzing Fuel Supply Limitation on Passenger Travel, 132 p.
230	22-2(4)	Recommended Procedures for the Safety Performance Evaluation of Highway Appurtenances, 42 p.
231	8-22	State Transportation Finance Within the Context of Energy Constraints, 86 p.
232	3-22A	Guidelines for Selection of Ramp Control Systems, 108 p.
233	3-27	Selecting Traffic Signal Control at Individual Intersections, 133 p.
234	12-13A	Galvanic Cathodic Protection for Reinforced Concrete Bridge Decks—Field Evaluation, 64 p.
235	3-21(2)	Effectiveness of Changeable Message Displays in Advance of High-Speed Freeway Lane Closures, 49 p.
236	17-4, 17-4(2)	Evaluation of Traffic Controls for Highway Work Zones, 189 p.
237	10-14	Locating Voids Beneath Pavement Using Pulsed Electromagnetic Wave Techniques, 40 p.
238	20-14A	Estimating Exceedances and Design Values from Data Collected by Urban Ozone Monitoring Networks, 121 p.
239	22-2(3)	Multiple-Service-Level Highway Bridge Railing Selection Procedures, 161 p.
240	20-10(2)	A Manual to Determine Benefits of Separating Pedestrians and Vehicles, 56 p.
241	8-21	Guidelines for Using Vanpools and Carpools as a TSM Technique, 154 p.
242	10-13	Ultrasonic Measurement of Weld Flaw Size, 76 p.
243	12-20	Rehabilitation and Replacement of Bridges on Secondary Highways and Local Roads, 46 p.
244	12-19A	Concrete Sealers for Protection of Bridge Structures, 138 p.
245	20-18	Methodology for Evaluating Highway Air Pollution Dispersion Models, 85 p.
246	4-8(3)	Predicting Moisture-Induced Damage to Asphaltic Concrete—Field Evaluation, 50 p.
247	17-5	Effectiveness of Clear Recovery Zones, 68 p.
248	10-20	Elastomeric Bearings Design, Construction, and Materials, 82 p.
249	3-20A	Peak-Hour Traffic Signal Warrant, 71 p.
250	8-14A	New Approaches to Understanding Travel Behavior, 142 p.
251	10-16	Assessment of Deficiencies and Preservation of Bridge Substructures Below the Waterline, 80 p.
252	10-19	Adding Dust Collector Fines to Asphalt Paving Mixtures, 90 p.
253	8-13(2)	Application of Disaggregate Travel Demand Models, 207 p.
254	1-22	Shoulder Geometrics and Use Guidelines, 71 p.
255	8-26	Highway Traffic Data for Urbanized Area Project Planning and Design, 191 p.
256	5-9	Partial Lighting of Interchanges, 81 p.
257	18-2(3)	Long-Term Rehabilitation of Salt-Contaminated Bridge Decks, 32 p.
258	10-18	Control of Air Content in Concrete, 84 p.
259	9-5	Design of Emulsified Asphalt Paving Mixtures, 97 p.
260	20-17A	Application of Statewide Freight Demand Forecasting Techniques, 210 p.
261	8-27	Cost-Effectiveness of Transportation Services for Handicapped Persons—Research Report, 130 p.
262	8-27	Planning Transportation Services for Handicapped Persons—User's Guide, 74 p.
263	7-11	Simplified Procedures for Evaluating Low-Cost TSM Projects User's Manual, 209 p.

TABLE I REPORTS

NO.	PROJECT	TITLE, PAGES
264	25-1	Guidelines for the Management of Highway Runoff on Wetlands, 166 p.
265	10-23	Removal of Lead-Based Bridge Paints, 72 p.
266	8-24	Forecasting Inputs to Transportation Planning, 117 p.
267	12-15(4)	Steel Bridge Members Under Variable Amplitude Long Life Fatigue Loading, 26 p.
268	1-20	Influence of Asphalt Temperature Susceptibility on Pavement Construction and Performance, 62 p.
269	1-20	Paving with Asphalt Cements Produced in the 1980s, 28 p.
270	15-8	Parameters Affecting Stopping Sight Distance, 169 p.
271	12-17A	Guidelines for Evaluation and Repair of Damaged Steel Bridge Members, 64 p.
272	10-22	Performance of Weathering Steel in Bridges, 164 p.
273	14-5(2)	Manual for the Selection of Optimal Maintenance Levels of Service, 81 p.
274	10-17	Use of Antistripping Additives in Asphaltic Concrete Mixtures—Laboratory Phase, 50 p.
275	1-23	Pavement Roughness and Rideability, 69 p.
276	12-22	Thermal Effects in Concrete Bridge Superstructures, 99 p.
277	1-19	Portland Cement Concrete Pavement Evaluation System (COPES), 175 p.
278	12-19B	Cathodic Protection of Concrete Bridge Substructures, 60 p.
279	3-30	Intersection Channelization Design Guide, 153 p.
280	12-21	Guidelines for Evaluation and Repair of Damaged Prestressed Concrete Bridge Members, 84 p.
281	1-21	Joint Repair Methods for Portland Cement Concrete Pavements—Design and Construction Guidelines, 83 p.
282	2-13	Multilane Design Alternatives for Improving Suburban Highways, 71 p.
283	7-11A	Training Aid for Applying <i>NCHRP Report 263</i> —Simplified Procedures for Evaluating Low-Cost TSM Projects, 34 p.
284	10-25	Evaluation of Procedures Used to Measure Cement and Water Content in Fresh Concrete, 76 p.
285	14-6	Evaluating Alternative Maintenance Strategies, 86 p.
286	12-15(5)	Evaluation of Fatigue Tests and Design Criteria on Welded Details, 66 p.
287	12-24	Load Distribution and Connection Design for Precast Stemmed Multibeam Bridge Superstructures, 137 p.
288	3-31	Evaluating Grade-Separated Rail-Highway Crossing Alternatives, 87 p.
289	22-4	Performance of Longitudinal Traffic Barriers, 169 p.
290	24-2	Reinforcement of Earth Slopes and Embankments, 323 p.
291	1-10B	Development of Pavement Structural Subsystems, 59 p.
292	10-15	Strength Evaluation of Existing Reinforced Concrete Bridges, 133 p.
293	12-28(4)	Methods of Strengthening Existing Highway Bridges, 114 p.
294A	20-19	Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas—Research Report, 92 p.
294B	20-19	Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas—State-of-the-Art Report, 165 p.
295	20-21	Automated Field Survey Data Collection System, 107 p.
296	10-32	Durability of In-Place Concrete Containing High-Range Water-Reducing Admixtures, 63 p.
297	12-32	Evaluation of Bridge Deck Protective Strategies, 80 p.
298	10-20	Performance of Elastomeric Bearings, 100 p.
299	12-28(3)	Fatigue Evaluation Procedures for Steel Bridges, 94 p.
300	12-28(2)	Bridge Management Systems, 74 p.
301	12-28(1)	Load Capacity Evaluation of Existing Bridges, 104 p.
302	12-25	Fatigue and Fracture Evaluation for Rating Riveted Bridges, 86 p.
303	3-34	Feasibility of a National Heavy Vehicle Monitoring System, 68 p.
304	10-28	Determining Deteriorated Areas in Portland Cement Concrete Pavements Using Radar and Video Imaging, 107 p.
305	4-17	Environmental Monitoring and Evaluation of Calcium Magnesium Acetate (CMA), 160 p.
306	12-28(8)	Correlation of Bridge Load Capacity Estimates with Test Data, 75 p.
307	2-14	Public and Private Partnerships for Financing Highway Improvements, 83 p.
308	1-23(2)	Pavement Roughness and Rideability—Field Evaluation, 48 p.
309	15-9	Protection of Pipelines Through Highway Roadbeds, 21 p.
310	20-22	Dealing with Hazardous Waste Sites—A Compendium for Highway Agencies, 107 p.
311	25-2	Predicting Stop-and-Go Traffic Noise Levels, 97 p.
312	12-28(5)	Condition Surveys of Concrete Bridge Components—User's Manual, 84 p.
313	4-15	Corrosion Protection of Prestressing Systems in Concrete Bridges, 25 p.
314	10-22	Guidelines for the Use of Weathering Steel in Bridges, 98 p.
315	10-33	Potential Benefits of Geosynthetics in Flexible Pavement Systems, 56 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
316	24-3	Laboratory Evaluation of Piles Installed with Vibratory Drivers, 51 p.
317	10-34	Transient Protection, Grounding, and Shielding of Electronic Traffic Control Equipment, 84 p.
318	22-6	Roadside Safety Design for Small Vehicles, 70 p.
319	12-28(10)	Recommended Guidelines for Redundancy Design and Rating of Two-Girder Steel Bridges, 142 p.
320	17-7	Guidelines for Converting STOP to YIELD Control at Intersections, 49 p.
321	12-27	Welded Repair of Cracks in Steel Bridge Members, 46 p.
322	12-29	Design of Precast Prestressed Bridge Girders, 97 p.
323	3-38(2)	Travel Characteristics at Large-Scale Suburban Activity Centers, 106 p.
324	2-15	Evaluation of Safety Roadside Rest Areas, 129 p.
325	10-20	Low Temperature Behavior and Acceptance Criteria for Elastomeric Bridge Bearings, 69 p.
326	15-10	Development of a Roadway Design/Graphics Interface System, 18 p.
327	10-27	Determining Asphaltic Concrete Pavement Structural Properties by Nondestructive Testing, 105 p.
328	8-24A	Forecasting the Basic Inputs to Transportation Planning at the Zonal Level, 55 p.
329	20-24(1)	Using Market Research to Improve Management of Transportation Systems, 75 p.
330	3-38(5)	Effective Utilization of Street Width on Urban Arterials, 49 p.
331	8-28	Strategic Planning and Management Guidelines for Transportation Agencies, 49 p.
332	10-26A	Framework for Development of Performance-Related Specifications for Hot-Mix Asphaltic Concrete, 118 p.
333	12-28(7)	Guidelines for Evaluating Corrosion Effects in Existing Steel Bridges, 140 p.
334	14-10	Improvements in Data Acquisition Technology for Maintenance Management Systems, 51 p.
335	10-31	Acceptance Criteria for Steel Bridge Welds, 26 p.
336	12-28(6)	Distortion-Induced Fatigue Cracking in Steel Bridges, 43 p.
337	17-6A	Service Vehicle Lighting and Traffic Control Systems for Short Term and Moving Operations, 56 p.
338	9-6(1)	Asphalt-Aggregate Mixture Analysis System AAMAS, 185 p.
339	3-28C	Effects of the Quality of Traffic Signal Progression on Delay, 100 p.
340	3-38(1)	Assessment of Advanced Technologies for Relieving Urban Traffic Congestion, 98 p.
341	20-26	Bond and Insurance Coverages for Highway Construction Contractors, 47 p.
342	2-17(1)	Primer on Transportation, Productivity and Economic Development, 127 p.
343	24-4	Manuals for the Design of Bridge Foundations: Shallow Foundations, Driven Piles, Retaining Walls and Abutments, Drilled Shafts, Estimating Tolerable Movements, Load Factor Design Specifications and Commentary, 308 p.
344	14-9(3)	Maintenance Contracting, 111 p.
345	3-40	Single Point Urban Interchange Design and Operations Analysis, 101 p.
346	5-11	Implementation Strategies for Sign Retroreflectivity Standards, 44 p.
347	20-24(3)	Civil Engineering Careers: Awareness, Retention, and Curriculum, 118 p.
347—	20-24(3)	Civil Engineering Careers: A User's Guide for Awareness, Retention, and Curriculum Programs, 108 p.
<b>Part II</b>		
348	3-38(7)	Access Management Guidelines for Activity Centers, 112 p.
349	14-9(2)	Maintenance Considerations in Highway Design, 82 p.
350	22-7	Recommended Procedures for the Safety Performance Evaluation of Highway Features, 132 pp.
351	20-28	Hazardous Wastes in Highway Rights of Way, 114 p.
352	12-28(12)	Inelastic Rating Procedures for Steel Beam and Girder Bridges, 112 p.
353	1-25(1)	Effects of Heavy-Vehicle Characteristics on Pavement Response and Performance, 126 p.
354	12-15(5)	Resistance of Welded Details Under Variable Amplitude Long-Life Fatigue Loading, 32 p.
355	12-31	Notch Toughness Variability in Bridge Steel Plates, 62 p.
356	10-29	Anchorage Zone Reinforcement for Post-Tensioned Concrete Girders, 204 p.
357	20-24(6)A	Measuring State Transportation Program Performance, 96 p.
358	17-8	Traffic Barriers and Control Treatments for Restricted Work Zones, 112 p.
359	20-27	Adaptation of Geographic Information Systems for Transportation, 70 p.
360	14-9(6)	Professional Development of Maintenance Engineers and Managers, 116 p.
361	14-10	Field Demonstrations of Advanced Data Acquisition Technology for Maintenance Management, 116 p.
362	15-12	Roadway Widths for Low-Traffic-Volume Roads, 112 p.
363	14-9(4)	Role of Highway Maintenance in Integrated Management Systems, 148 p.
364	20-24(5)	Public Outreach Handbook for Departments of Transportation, 42 p.
365	8-29(2)	Travel Estimation Techniques for Urban Planning, 170 p.
366	14-9(1)	Guidelines for Effective Maintenance-Budgeting Strategies, 48 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
367	15-13	Long-Term Performance of Geosynthetics in Drainage Applications, 60 p.
368	12-33	Calibration of LRFD Bridge Design Code, 210 p.
369	3-43	Use of Shoulders and Narrow Lanes to Increase Freeway Capacity, 78 p.
370	10-37	Performance of Epoxy-Coated Reinforcing Steel in Highway Bridges, 154 p.
371	20-24(9)	State Departments of Transportation—Strategies for Change, 134 p.
372	1-30	Support Under Concrete Pavements, 50 p.
373	10-17	Use of Antistripping Additives in Asphaltic Concrete Mixtures, 52 p.
374	17-9	Effect of Highway Standards on Safety, 82 p.
375	15-14(2)	Median Intersection Design, 100 p.
376	20-24(10)	Customer-Based Quality in Transportation, 56 p.
377	20-24(7)	Alternatives to Motor Fuel Taxes for Financing Surface Transportation Improvements, 158 p.
378	21-4	Recommended Guidelines for Sealing Geotechnical Exploratory Holes, 50 p.
379	25-3	Guidelines for the Development of Wetland Replacement Areas, 448 p.
380	12-37	Transverse Cracking in Newly Constructed Bridge Decks, 126 p.
381	20-36	Report on the 1995 Scanning Review of European Bridge Structures, 30 p.
382	20-33	Facilitating the Implementation of Research Findings: A Summary Report, 18 p.
383	15-14(1)	Intersection Sight Distance, 108 p.
384	10-40	Plasma Arc Cutting of Bridge Steels, 92 p.
385	3-37(2)	Comparison of the 1994 <i>Highway Capacity Manual's</i> Ramp Analysis Procedures and the FRESIM Model, 118 p.
386	4-18	Design and Evaluation of Large-Stone Asphalt Mixes, 142 p.
387	3-55(2)	Planning Techniques to Estimate Speeds and Service Volumes for Planning Applications, 146 p.
388	8-30	A Guidebook for Forecasting Freight Transportation Demand, 164 p.
389	2-17(3)	Macroeconomic Analysis of the Linkages Between Transportation Investments and Economic Performance, 83 p.
390	10-42	Constructability Review Process for Transportation Facilities, 88 p.
391	10-42	Constructability Review Process for Transportation Facilities—Workbook, 184 p.
392	4-22	Pavement Marking Materials: Assessing Environment-Friendly Performance, 60 p.
393	24-5	Design and Construction Guidelines for Downdrag on Uncoated and Bitumen-Coated Piles, 118 p.
394	25-7	Improving Transportation Data for Mobile Source Emission Estimates, 128 p.
395	3-49	Capacity and Operation Effects of Midblock Left-Turn Lanes, 135 p.
396	21-3	Instrumentation for Measuring Scour at Bridge Piers and Abutments, 110 p.
397A	21-3	Sonar Scour Monitor: Installation, Operation, and Fabrication Manual, 38 p.
397B	21-3	Magnetic Sliding Collar Scour Monitor: Installation, Operation, and Fabrication Manual, 40 p.
398	7-13	Quantifying Congestion, Vol. 1, 102 p.; Vol. 2, 104 p.
399	8-31A	Long-Term Availability of Multimodal Corridor Capacity, 196 p.
400	3-42	Determination of Stopping Sight Distances, 122 p.
401	8-32(5)	Guidance Manual for Managing Transportation Planning Data, 32 p.
402	12-40	Fatigue Design of Modular Bridge Expansion Joints, 122 p.
403	25-10	Guidance for Estimating the Indirect Effects of Proposed Transportation Projects, 209 p.
404	8-32(1)	Innovative Practices for Multimodal Transportation Planning for Freight and Passengers, 67 p.
405	4-19	Aggregate Tests Related to Asphalt Concrete Performance in Pavements, 103 p.
406	12-36(2)	Redundancy in Highway Bridge Superstructures, 44 p.
407	12-41	Rapid Replacement of Bridge Decks, 52 p.
408	10-46	Corrosion of Steel Piling in Nonmarine Applications, 204 p.
409	9-7	Quality Control and Acceptance of Superpave-Designed Hot Mix Asphalt, 209 p.
410	18-3	Silica Fume Concrete for Bridge Decks, 110 p.
411	17-10	Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 114 p.
412	10-38	Fatigue-Resistant Design of Cantilevered Signal, Sign and Light Supports, 246 p.
413	3-53	Development of an <i>HOV Systems Manual</i> , 45 p.
414	3-53	HOV Systems Manual, 811 p.
415	10-41	Evaluation of Unbonded Portland Cement Concrete Overlays, 82 p.
416	20-24(7)A	Alternative Approaches to the Taxation of Heavy Vehicles, 132 p.
417	12-39	Highway Infrastructure Damage Caused by the 1993 Upper Mississippi River Basin Flooding, 161 p.
418	2-19	Research on the Relationship Between Economic Development and Transportation Investment, 63 p.
419	2-17(6)	Tourism Travel and Transportation System Development, 66 p.
420	3-52	Impacts of Access Management Techniques, 157 p.
421	2-20	Economic Trends and Multimodal Transportation Requirements, 197 p.
422	14-12	Maintenance QA Program Implementation Manual, 117 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
423A	8-32(3)	Land Use Impacts of Transportation: A Guidebook, 165 p.
424	12-38	Improved Design Specifications for Horizontally Curved Steel Girder Highway Bridges, 130 p.
425	9-8	Designing Stone Matrix Asphalt Mixtures for Rut-Resistant Pavements, 99 p.
426	24-6	CAESAR: An Expert System for Evaluation of Scour and Stream Stability, 24 p.
427	4-25	Implementation Plan for Automating Highway-Materials Testing, 49 p.
428	20-33(2)	Guidebook to Highway Contracting for Innovation: The Role of Procurement and Contracting Approaches in Facilitating the Implementation of Research Findings, 46 p.
429	4-24	HDPE Pipe: Recommended Material Specifications and Design Requirements, 49 p.
430	17-12	Improved Safety Information to Support Highway Design, 172 p.
431	2-18(2)	Valuation of Travel-Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation, 74 p.
432	10-20A	High-Load Multi-Rotational Bridge Bearings, 400 p.
433	8-32(4)	Guidelines for Developing and Maintaining Successful Partnerships for Multimodal Transportation Projects, 26 p.
434	10-47	Guidelines for Longitudinal Pavement Profile Measurement, 75 p.
435	8-34	Guidebook for Transportation Corridor Studies: A Process for Effective Decision-Making, 252 p.
436	2-22	Guidance for Communicating the Economic Impacts of Transportation Investments, 140 p.
437	15-15	Collection and Presentation of Roadway Inventory Data, 75 p.
438	20-07(89)	Recommended LRFD Specifications for Plastic Pipe and Culverts, 63 p.
439	15-16A	Superelevation Distribution Methods and Transition Designs, 167 p.
440	17-15	Accident Mitigation Guide for Congested Rural Two-Lane Highways, 164 p.
441	9-11	Segregation in Hot-Mix Asphalt Pavements, 95 p.
442	20-46	Systems Approach to Evaluating Innovations for Integration into Highway Practice, 123 p.
443	B25-9	Primer Environmental Impact of Construction and Repair Materials on Surface and Ground Waters, 17 p.
444	9-13	Compatibility of a Test for Moisture-Induced Damage with Superpave Volumetric Mix Design, 96 p.
445	12-39	Debris Forces on Highway Bridges, 85 p.
446	B8-32(2)A	A Guidebook for Performance-Based Transportation Planning, 106 p.
447	D10-39A	Testing and Inspection Levels for Hot-Mix Asphaltic Concrete Overlays, 128 p.
448	25-9	Environmental Impact of Construction and Repair Materials on Surface and Ground Waters (Proj.), 128 p.
449	10-51	Elastomeric Bridge Bearings: Recommended Test Methods, 117 p.
450	20-32(2)	Transportation Research Thesaurus and User's Guide, 60 p.
451	10-49	Guidelines for Warranty, Multi-Parameter, and Best Value Contracting, 168 p.
452	9-12	Recommended Use of Reclaimed Asphalt Pavement in the Superpave Mix Design Method: Technician's Manual, 49 p.
453	4-23	Performance-Related Tests of Aggregates for Use in Unbound Pavement Layers, Aggregates/Unbound Pavement, 55 p.
454	12-46	Calibration of Load Factors for LRFR Bridge Evaluation, 56 p.
455	9-20	Recommended Performance-Related Specification for Hot-Mix Asphalt Construction: Results of the WesTrack Project, 500 p.
456	25-19	Guidebook for Assessing the Social and Economic Effects of Transportation Projects, 242 p.
457	3-58	Assessing Traffic Control Signal Installations Using Capacity Analysis and Simulation, 131 p.
458	12-47	Redundancy in Highway Bridge Substructures, 98 p.
459	9-10	Characterization of Modified Asphalt Binders in Superpave Mix Design, Superpave Protocols for Modified Asphalt Binders, 169 p.
460	20-27(3)	Guidelines for Implementation of Multimodal Transportation Location Referencing Systems, 82 p.
461	24-9	Static and Dynamic Lateral Loading of Pile Groups, 117 p.
462	8-33	Quantifying Air Quality and Other Benefits and Costs of Transportation Control Measures, 61 p.
463	2-21	Economic Implications of Congestion, 70 p.
464	9-14	The Restricted Zone in the Superpave Aggregate Gradation Specification, 67 p.
465	9-19	Simple Performance Test for Superpave Mix Design, 105 p.
466	25-10(2)	Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects, 99 p.
467	10-52	Performance Testing for Modular Bridge Joint Systems, 84 p.
468	1-34A	Contribution of Pavement Structural Layers to Rutting of Hot-Mix Asphalt Pavements, 157 p.
469	10-38(2)	Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports, 269 p.
470	3-57	Traffic Control Devices for Passive Railroad-Highway Grade Crossings, 62 p.
471	22-11	Evaluation of Roadside Features to Accommodate Vans, Minivans, Pickup Trucks, and 4-Wheel Drive Vehicles, 94 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
472	12-49	Comprehensive Specification for the Seismic Design of Bridges, 48 p.
473	12-45	Recommended Specification for Large-Span Culverts, 148 p.
474	25-13	Assessment of Impacts of Bridge-Deck Runoff Contaminants in Receiving Waters, 2 Volumes: Volume 1–70 p., Volume 2–94 p.
475	17-17(2)	A Procedure for Assessing & Planning Nighttime Highway Construction and Maintenance, 48 p.
476	17-17(2)	Guidelines for Design and Operation of Nighttime Traffic Control for Highway Maintenance and Construction, 120 p.
477	24-13	Recommended Practice for Evaluation of Metal-Tensioned Systems in Geotechnical Applications, 124 p.
478	9-16	Relationship of Superpave Gyrotory Compaction Properties to HMA Rutting Behavior, 60 p.
479	25-15	Short-Term Monitoring for Compliance with Air Quality Standards, 62 p.
480	15-19	A Guide to Best Practices for Context Sensitive Solutions, 125 p.
481	25-23	EIM & DSS Implementation Handbook, 153 p.
482	25-16	Guidance for Selecting Compensatory Wetlands Mitigation Options, 47 p.
483	12-43	Life-Cycle Cost Analysis for Bridges, 96 p.
484	4-28	Feasibility Study for an All-White Pavement Marking System, 95 p.
485	12-50	Bridge Software: Validation Guidelines & Examples, 265 p.
486	3-56	Systemwide Impact of Safety and Traffic Operations Design Decisions for 3R Projects, 136 p.
487	20-53	Using Customer Needs to Drive Transportation Decisions, 105 p.
488	3-50(2)	Additional Investigations on Driver Information Overload, 108 p.
489	12-48	Design of Highway Bridges for Extreme Events, 174 p.
490	22-13[2]	In-Service Performance of Barrier Systems, 196 p.
491	17-16	Crash Experience Warrant for Traffic Signals, 50 p.
492	22-09(2)	Roadside Safety Analysis Program (RSAP) Engineer's Manual, 66 p.
493	3-54	Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control, 84 p.
494	17-10(2)	Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 50 p.
495	12-51	Effect of Truck Weight on Bridge Network Costs, 186 p.
496	18-7	Prestress Losses in Pretensioned High-Strength Concrete Bridge Girders, 72 p.
497	8-39	Financing and Improving Land Access to U.S. Intermodal Cargo Hubs, 150 p.
498	5-13(2)	Illumination Guidelines for Nighttime Highway Work, 74 p.
499	1-34C	Effects of Subsurface Drainage on Performance of Asphalt and Concrete Pavements, 52 p.
500	17-18(3)	Guidance for Implementation of the AASHTO Strategic Highway Safety Plan <ul style="list-style-type: none"> <li>• Vol. 1: A Guide for Addressing Aggressive-Driving Collisions, 62 p.</li> <li>• Vol. 2: A Guide for Addressing Collisions Involving Unlicensed Drivers and Drivers with Suspended or Revoked Licenses, 74 p.</li> <li>• Vol. 3: A Guide for Addressing Collisions with Trees in Hazardous Locations, 63 p.</li> <li>• Vol. 4: A Guide for Addressing Head-On Collisions, 65 p.</li> <li>• Vol. 5: A Guide for Addressing Unsignalized Intersection Collisions, 157 p.</li> <li>• Vol. 6: A Guide for Addressing Run-Off-Road Collisions, 105 p.</li> <li>• Vol. 7: A Guide for Reducing Work Zone Collisions on Horizontal Curves, 177 p.</li> <li>• Vol. 8: A Guide for Reducing Collisions Involving Utility Poles, 72 p.</li> <li>• Vol. 9: A Guide for Reducing Collisions Involving Older Drivers, 108 p.</li> <li>• Vol. 10: A Guide for Reducing Collisions Involving Pedestrians, 136 p.</li> <li>• Vol. 11: A Guide for Increasing Seatbelt Use, 68 p.</li> <li>• Vol. 12: A Guide for Reducing Collisions at Signalized Intersections, 132 p.</li> <li>• Vol. 13: A Guide for Reducing Collisions Involving Heavy Trucks, 118 p.</li> <li>• Vol. 14: A Guide for Reducing Crashes Involving Distracted and Drowsy Drivers, 100 p.</li> <li>• Vol. 15: A Guide for Enhancing Rural Emergency Medical Services, 126 p.</li> <li>• Vol. 16: A Guide for Reducing Alcohol-Related Collisions, 98 p.</li> <li>• Vol. 17: A Guide for Reducing Work Zone Collisions, 172 p.</li> <li>• Vol. 18: A Guide for Reducing Collisions Involving Bicycles, 182 p.</li> <li>• Vol. 19: A Guide for Reducing Collisions Involving Young Drivers, 104 p.</li> <li>• Vol. 20: A Guide for Reducing Head-On Crashes on Freeways, 104 p.</li> <li>• Vol. 21: Safety Data and Analysis in Developing Emphasis Area Plans, 108 p.</li> <li>• Vol. 22: A Guide for Addressing Collisions Involving Motorcycles, 132 p.</li> </ul>
501	17-18(5)	Integrated Safety Management Process, 158 p.
502	15-17	Geometric Design Consistency on High-Speed Rural Two-Lane Roadways, 81 p.
503	4-27	Application of Fiber-Reinforced Polymer Composites to the Highway Infrastructure, 88 p.

TABLE I REPORTS

NO.	PROJECT	TITLE, PAGES
504	15-18	Design Speed, Operating Speed, and Posted Speed Practices, 94 p.
505	15-21	Review of Truck Characteristics as Factors in Roadway Design, 183 p.
506	20-47(1)	Quality and Accuracy of Positional Data in Transportation, 100 p.
507	24-17	Load and Resistance Factor Design (LRFD) for Deep Foundations, 78 p.
508	9-17	Accelerated Laboratory Rutting Tests: Evaluation of the Asphalt Pavement Analyzer, 105 p.
509	1-39	Equipment for Collecting Traffic Load Data, 58 p.
510	20-58	Interim Planning for a Future SHRP, 96 p.
511	14-13	Guide for Customer-Driven Benchmarking of Maintenance Activities, 282 p.
512	10-56	Accelerated Pavement Testing: Data Guidelines, 46 p.
513	9-29	Simple Performance Tester for Superpave Mix Design, 160 p.
514	10-59A	Bonded Repair and Retrofit of Concrete Structures Using FRP Composites: Recommended Construction Specifications and Process Control Manual, 94 p.
515	21-07	Portable Scour Monitoring Equipment, 93 p.
516	24-15	Pier and Contraction Scour in Cohesive Soils, 120 p.
517	12-57	Extending Span Ranges of Precast Prestressed Concrete Girders, 592 p.
518	5-17	Safety Evaluation of Permanent Raised Pavement Markers, 60 p.
519	12-53	Connection of Simple-Span Precast Concrete Girders for Continuity, 202 p.
520	3-63	Sharing Information between Public Safety and Transportation Agencies for Traffic Incident Management, 92 p.
521	25-20(2)	Identification of Research Needs Related to Highway Runoff Management, 165 p.
522	19-4	A Review of DOT Compliance with GASB 34 Requirements, 49 p.
523	14-14	Optimal Timing of Pavement Preventive Maintenance Treatment Applications, 75 p.
524	17-21	Safety of U-Turns at Unsignalized Median Openings, 133 p.
525		Surface Transportation Security:
	20-59(6)	• Vol. 1: Responding to Threats: A Field Personnel Manual, 20 p.
	20-59(10)	• Vol. 2: Information Sharing and Analysis Centers: Overview and Supporting Software Features, 228 p.
	8-36(24)	• Vol. 3: Incorporating Security into the Transportation Planning Process, 68 p.
	20-59(2)	• Vol. 4: A Self-Study Course on Terrorism-Related Risk Management of Highway Infrastructure, 3 p.
	20-59(14)	• Vol. 5: Guidance for Transportation Agencies on Managing Sensitive Information, 55 p.
	20-59(11)	• Vol. 6: Guide for Emergency Transportation Operations, 64 p.
	20-59(6A & B)	• Vol. 7: System Security Awareness for Transportation Employees, Stand-Alone CD: CRP-CD 59
	20-59(21)	• Vol. 8: Continuity of Operations (COOP) Planning Guidelines for Transportation Agencies (joint report with TCRP Report 86, Vol. 8), 84 p.
	20-59(18)	• Vol. 9: Guidelines for Transportation Emergency Training Exercises (joint report with TCRP Report 86, Vol. 9), 179 p.
	20-59(19)	• Vol. 10: A Guide to Transportation's Role in Public Health Disasters, 134 p.
	20-59(9)	• Vol. 11: Disruption Impact Estimating Tool—Transportation (DIETT): A Tool for Prioritizing High-Value Transportation Choke Points, 31 p.
	20-67	• Vol. 12: Making Transportation Tunnels Safe and Secure Exercises (joint report with TCRP Report 86, Vol. 12), 168 p.
	20-59	• Vol. 13: A Guide to Traffic Control of Rural Roads in an Agricultural Emergency, 48 p.
526	6-13	Snow and Ice Control: Guidelines for Materials and Methods, 40 p.
527	12-54	Integrated Steel Box-Beam Pier Caps, 89 p.
528	24-10	Thermally Sprayed Metal Coatings to Protect Steel Piling: Final Report and Guides, 164 p.
529	24-11	Guideline and Recommended Standard for Geofabric Applications in Highway Embankments, 61 p.
530	9-29	Evaluation of Indirect Tensile Test (IDT) Procedures for Low-Temperature Performance of Hot Mix Asphalt, 52 p.
531	9-27	Relationship of Air Voids, Lift Thickness, & Permeability in Hot Mix Asphalt Pavements, 38 p.
532	8-41	Effective Methods for Environmental Justice Assessment, 374 p.
533	24-16	Handbook for Predicting Stream Meander Mitigation, 100 p.
534	10-57	Guidelines for Inspection and Strength Evaluation of Suspension Bridge Parallel Wire Cables, 280 p.
535	25-21	Predicting Air Quality Effects of Traffic-Flow Improvements, 226 p.
536	8-45	A Practitioner's Handbook—From Handshake to Compact: Guidance to Foster Collaborative, Multimodal Decision Making (joint report with TCRP Report 106), 67 p.
537	22-17	Recommended Guidelines for Curb and Curb-Barrier Installations, 97 p.



TABLE I REPORTS

NO.	PROJECT	TITLE, PAGES
538	1-39	Traffic Data Collection, Analysis, and Forecasting for Mechanistic Pavement Design, 116 p.
539	9-35	Aggregate Properties and the Performance of Superpave-Designed Hot Mix Asphalt, 98 p.
540	18-04B	Guidelines for Early Opening-to-Traffic Portland Cement Concrete for Pavement Rehabilitation, 28 p.
541	8-38	Consideration of Environmental Factors in Transportation Systems Planning, 116 p.
542	8-40(2)	Evaluating Cultural Resource Significance: Implementation Tools, 50 p.
543	12-58	Effective Slab Width for Composite Steel Bridge Members, 153 p.
544	24-19	Environmentally Sensitive Channel- and Bank-Protection Measures, 50 p.
545	20-57	Analytical Tools for Asset Management, 61 p.
546	8-44	Incorporating Safety into Long-Range Transportation Planning, 8 p.
547	9-19	Simple Performance Tests: Summary of Recommended Methods and Database, 20 p.
548	8-46	A Guidebook for Including Access Management in Transportation Planning, 76 p.
549	12-61	Simplified Shear Design of Structural Concrete Members, 62 p.
550	20-24(34)	Commuting in America III (joint report with TCRP Report 110), 196 p.
551	20-60	Performance Measures and Targets for Transportation Asset Management, 181 p.
552	7-14	Guidelines for Analysis of Investments in Bicycle Facilities, 119 p.
553	22-18	Crashworthy Work-Zone Traffic Control Devices, 119 p.
554	22-19	Aesthetic Concrete Barrier Design, 97 p.
555	4-30A	Test Methods for Characterizing Aggregate Shape, Texture, and Angularity, 84 p.
556	12-59	Design and Construction Guidelines for Geosynthetic-Reinforced Soil Bridge Abutments with a Flexible Facing, 152 p.
557	4-19(2)	Aggregate Tests for Hot-Mix Asphalt Mixtures Used in Pavements, 38 p.
558	18-6A	Manual on Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements, 60 p.
559	3-61	Communicating Changes in Horizontal Alignment, 48 p.
560	3-77	Guide to Contracting ITS Projects, 47 p.
561	10-61	Best-Value Procurement Methods for Highway Construction Projects, 216 p.
562	3-71	Improving Pedestrian Safety at Unsignalized Crossings (joint report with TCRP Report 112), 111 p.
563	12-52	Development of LRFD Specifications for Horizontally Curved Steel Girder Bridges, 81 p.
564	10-64	Field Inspection of In-Service FRP Bridge Decks, 175 p.
565	25-20(1)	Evaluation of Best Management Practices for Highway Runoff Control, 134 p.
566	18-8A	Guidelines for Concrete Mixtures Containing Supplementary Cementitious Materials to Enhance Durability of Bridge Decks, 119 p.
567	9-25/9-31	Volumetric Requirements for Superpave Mix Design, 54 p.
568	24-23	Riprap Design Criteria, Recommended Specifications, and Quality Control, 226 p.
569	20-65(6)	Comparative Review and Analysis of State Transit Funding Programs, 102 p.
570	8-47	Guidebook for Freight Policy, Planning, and Programming in Small- and Medium-Sized Metropolitan Areas, 204 p.
571	8-37	Standardization of Personal Travel Surveys, 103 p.
572	3-65	Roundabouts in the United States, 116 p.
573	9-9(1)	Superpave Mix Design: Verifying Gyration Levels in the Ndesign Table, 62 p.
574	8-49	Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction, 174 p.
575	12-63	Legal Truck Loads and AASHTO Legal Loads for Posting, 74 p.
576	20-64	TransXML: XML Schemas for Exchange of Transportation Data, 68 p.
577	6-16	Guidelines for the Selection of Snow and Ice Control Materials to Mitigate Environmental Impacts, 198 p.
578	18-10	Evaluating Air-Entraining Admixtures for Highway Concrete, 58 p.
579	12-56	Application of LRFD Bridge Design Specifications to High-Strength Structural Concrete: Shear Provisions, 198 p.
580	9-19	Specification Criteria for Simple Performance Tests for Rutting: Vol. 1 Dynamic Modulus (E*), Vol. 2 Flow Number and Flow Time, 106 p.
581	03-69	Design of Construction Work Zones on High-Speed Highways, 66 p.
582	8-52	Best Practices to Enhance the Transportation-Land Use Connection in the Rural United States, 104 p.
583	1-34D	Effects of Subsurface Drainage on Pavement Performance: Analysis of the SPS-1 and SPS-2 Field Sections, 201 p.
584	12-65	Full-Depth Precast Concrete Bridge Deck Panel Systems, 110 p.

TABLE 1 REPORTS

NO.	PROJECT	TITLE, PAGES
585	20-24(47)	Racial and Gender Diversity in State DOT's and Transit Agencies (joint report with TCRP Report 120), 52 p.
586	8-42	Rail Freight Solutions to Roadway Congestion— Final Report and Guidebook, 250 p.
587	24-18A	Countermeasures to Protect Bridge Abutments from Scour, 230 p.
588	8-48	A Guidebook for Using American Community Survey Data for Transportation Planning, 284 p.
589	9-34	Improved Conditioning and Testing Procedures for HMA Moisture Susceptibility, 79 p.
590	12-67	Multi-Objective Optimization for Bridge Management Systems, 139 p.
591	8-50	Factors that Support the Planning-Programming Linkage, 166 p.
592	12-62	Simplified Live Load Distribution Factor Equations, 138 p.
593	24-7(2)	Countermeasures to Protect Bridge Piers from Scour, 287 p.
594	8-53	Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes, 187 p.
595	12-64	Application of the LRFD Bridge Design Specifications to High-Strength Structural Concrete: Flexure and Compression Provisions, 35 p.
596	12-68	Rotation Limits for Elastomeric Bearings, 56 p.
597	24-12(01)	Development of a Recommended Practice for Use of Controlled Low-Strength Material in Highway Construction, 154 p.
598	04-31	Performance-Related Tests of Recycled Aggregates for Use in Unbound Pavement Layers, 53 p.
599	03-82	Default Values for Highway Capacity and Level of Service Analyses, 124 p.
600A	17-31	Human Factors Guidelines for Road Systems, Collection A: Chapters 1, 2, 3, 4, 5, 10, 11, 13, 22, 23, 26; 172 p.
600B	17-31	Human Factors Guidelines for Road Systems, Collection B: Chapters 6, 22 (Tutorial 3), 23 (Updated); 38 p.
601	17-33	The Impact of Legislation, Enforcement, and Sanctions of Safety Belt Use, 68 p.
602	09-23	Calibration and Validation of the Enhanced Integrated Climatic Model for Pavement Design, 62 p.
603	12-60	Transfer, Development, and Splice Length for Strand/Reinforcement in High-Strength Concrete, 122 p.
604	10-63	Heat-Straightening Repair of Damaged Steel Bridge Girders: Fatigue and Fracture Performance, 129 p.
605	15-26	Passing Sight Distance Criteria, 85 p.
606	08-43	Forecasting Statewide Freight Toolkit, 158 p.
607	18-11	Specifications and Protocols for Acceptance Tests on Processing Additions in Cement Manufacturing, 86 p.
608	19-07	GASB 34—Methods for Condition Assessment and Preservation, 125 p.
609	10-59B	Recommended Construction Specifications and Process Control Manual for Repair and Retrofit of Concrete Structures Using Bonded FRP Composites, 71 p.
610	20-78	Communication Matters: Communicating the Value of Transportation Research, in progress for 2009
611	12-70	Seismic Analysis of Retaining Walls, Buried Structures, and Embankments, 148 p.
612	16-04	Safe and Aesthetic Design of Urban Roadside Treatments, 64 p.
613	03-74	Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections, 110 p.
614	09-29	Refining the Simple Performance Tester for Use in Routine Practice, 142 p.
615	25-27	Evaluation of the Use and Effectiveness of Wildlife Crossings, 170 p.
616	03-70	Multimodal Level of Service Analysis for Urban Streets, 118 p.
617	17-25	Accident Modification Factors for Traffic Engineering and ITS Improvements, 74 p.
618	07-15	Cost-Effective Performance Measures for Travel Time Delay, Variation, and Reliability, 69 p.
619	15-28	Modernize and Upgrade CANDE for Analysis and LRFD Design of Buried Structures, 26 p.
620	12-71	Development of Design Specifications and Commentary for Horizontally Curved Concrete Box-Girder Bridges, 94 p.
621	10-62	Acceptance Tests for Surface Characteristics of Steel Strands Used in Pre-Stressed Concrete, 136 p.
622	17-33	Effectiveness of Behavioral Highway Safety Countermeasures, 50 p.
623	19-06	Identifying and Quantifying Rates of State Motor Fuel Tax Evasion, 190 p.
624	13-02	Selection and Application of Warning Lights on Roadway Operations Equipment, 48 p.
625	08-49(2)	Procedures Guide for Right-of-Way Cost Estimation and Cost Management, in progress for 2009
626	10-65	NDT Technology for Quality Assurance of HMA Pavement Construction, in progress for 2009
627	17-30	Traffic Safety Evaluation of Nighttime and Daytime Work Zones, 86 p.
628	18-12	Self-Consolidating Concrete for Precast, Prestressed Concrete Bridge Elements, in progress for 2009
629	9-29	Ruggedness Testing of the Dynamic Modulus and Flow Number Tests with the Simple Performance Tester, 132 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
1	1	Traffic Control for Freeway Maintenance, 47 p.
2	2	Bridge Approach Design and Construction Practices, 30 p.
3	4	Traffic-Safe and Hydraulically Efficient Drainage Practice, 38 p.
4	3	Concrete Bridge Deck Durability, 28 p.
5	5	Scour at Bridge Waterways, 37 p.
6	6	Principles of Project Scheduling and Monitoring, 43 p.
7	3-01	Motorist Aid Systems, 28 p.
8	9	Construction of Embankments, 38 p.
9	8	Pavement Rehabilitation—Materials and Techniques, 41 p.
10	10	Recruiting, Training, and Retaining Maintenance and Equipment Personnel, 35 p.
11	12	Development of Management Capability, 50 p.
12	3-03	Telecommunications Systems for Highway Administration and Operations, 29 p.
13	3-03	Radio Spectrum Frequency Management, 32 p.
14	7	Skid Resistance, 66 p.
15	3-02	Statewide Transportation Planning—Needs and Requirements, 41 p.
16	3-08	Continuously Reinforced Concrete Pavement, 23 p.
17	3-05	Pavement Traffic Marking—Materials and Application Affecting Serviceability, 44 p.
18	4-01	Erosion Control on Highway Construction, 52 p.
19	3-04	Design, Construction, and Maintenance of PCC Pavement Joints, 40 p.
20	4-04	Rest Areas, 38 p.
21	4-06	Highway Location Reference Methods, 30 p.
22	4-03	Maintenance Management of Traffic Signal Equipment and Systems, 41 p.
23	11	Getting Research Findings into Practice, 24 p.
24	4-02	Minimizing Deicing Chemical Use, 58 p.
25	5-01	Reconditioning High-Volume Freeways in Urban Areas, 56 p.
26	3-07	Roadway Design in Seasonal Frost Areas, 104 p.
27	5-06	PCC Pavements for Low-Volume Roads and City Streets, 31 p.
28	5-05	Partial-Lane Pavement Widening, 30 p.
29	4-09	Treatment of Soft Foundations for Highway Embankments, 25 p.
30	6-10	Bituminous Emulsions for Highway Pavements, 76 p.
31	5-08	Highway Tunnel Operations, 29 p.
32	5-13	Effects of Studded Tires, 46 p.
33	5-03	Acquisition and Use of Geotechnical Information, 40 p.
34	6-03	Policies for Accommodation of Utilities on Highway Rights-of-Way, 22 p.
35	5-02	Design and Control of Freeway Off-Ramp Terminals, 61 p.
36	6-01	Instrumentation and Equipment for Testing Highway Materials, Products, and Performance, 70 p.
37	6-06	Lime-Fly Ash-Stabilized Bases and Subbases, 66 p.
38	6-02	Statistically Oriented End-Result Specifications, 40 p.
39	6-07	Transportation Requirements for the Handicapped, Elderly, and Economically Disadvantaged, 54 p.
40	7-02	Staffing and Management for Social, Economic, and Environmental Impact Assessments, 43 p.
41	6-09	Bridge Bearings, 62 p.
42	5-04	Design of Pile Foundations, 68 p.
43	7-05	Energy Effects, Efficiencies, and Prospects for Various Modes of Transportation, 57 p.
44	7-01	Consolidation of Concrete for Pavements, Bridge Decks, and Overlays, 61 p.
45	6-05	Rapid-Setting Materials for Patching of Concrete, 13 p.
46	7-04	Recording and Reporting Methods for Highway Maintenance Expenditures, 35 p.
47	5-07	Effect of Weather on Highway Construction, 29 p.
48	7-07	Priority Programming and Project Selection, 31 p.
49	8-09	Open-Graded Friction Courses for Highways, 50 p.
50	5-09	Durability of Drainage Pipe, 37 p.
51	8-02	Construction Contract Staffing, 62 p.
52	8-08	Management and Selection Systems for Highway Maintenance Equipment, 17 p.
53	8-05	Precast Concrete Elements for Transportation Facilities, 48 p.
54	8-01	Recycling Materials for Highways, 53 p.
55	8-06	Storage and Retrieval Systems for Highway and Transportation Data, 30 p.
56	7-06	Joint-Related Distress in PCC Pavement—Cause, Prevention and Rehabilitation, 36 p.
57	9-01	Durability of Concrete Bridge Decks, 61 p.
58	10-01	Consequences of Deferred Maintenance, 24 p.
59	8-11	Relationship of Asphalt Cement Properties to Pavement Durability, 43 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
60	9-08	Failure and Repair of Continuously Reinforced Concrete Pavement, 42 p.
61	9-03	Changeable Message Signs, 37 p.
62	9-09	State Resources for Financing Transportation Programs, 34 p.
63	8-03	Design and Use of Highway Shoulders, 26 p.
64	8-12	Bituminous Patching Mixtures, 26 p.
65	9-05	Quality Assurance, 42 p.
66	9-11	Glare Screen Guidelines, 17 p.
67	10-06	Bridge Drainage Systems, 44 p.
68	10-04	Motor Vehicle Size and Weight Regulations, Enforcement, and Permit Operations, 45 p.
69	7-09	Bus Route and Schedule Planning Guidelines, 99 p.
70	9-10	Design of Sedimentation Basins, 54 p.
71	9-07	Direction Finding from Arterials to Destinations, 50 p.
72	11-01	Transportation Needs Studies and Financial Constraints, 54 p.
73	9-06	Alternative Work Schedules: Impacts on Transportation, 54 p.
74	10-11	State Transit-Management Assistance to Local Communities, 35 p.
75	11-09	Transit Boards—Composition, Roles, and Procedures, 24 p.
76	10-05	Collection and Use of Pavement Condition Data, 74 p.
77	11-08	Evaluation of Pavement Maintenance Strategies, 56 p.
78	11-02, 11-03	Value Engineering in Preconstruction and Construction, 23 p.
79	11-10	Contract Time Determination, 45 p.
80	10-03	Formulating and Justifying Highway Maintenance Budgets, 49 p.
81	11-14	Experiences in Transportation System Management, 88 p.
82	12-02	Criteria for Evaluation of Truck Weight Enforcement Programs, 74 p.
83	11-13	Bus Transit Accessibility for the Handicapped in Urban Areas, 73 p.
84	12-01	Evaluation Criteria and Priority Setting for State Highway Programs, 32 p.
85	12-09	Energy Involved in Construction Materials and Procedures, 34 p.
86	10-21	Effects of Traffic-Induced Vibrations on Bridge-Deck Repairs, 40 p.
87	12-07	Highway Noise Barriers, 82 p.
88	10-08	Underwater Inspection and Repairs of Bridge Substructures, 77 p.
89	11-06	Geotechnical Instrumentation for Monitoring Field Performance, 46 p.
90	12-12	New-Product Evaluation Procedures, 34 p.
91	12-03	Highway Accident Analysis Systems, 69 p.
92	11-04	Minimizing Reflection Cracking of Pavement Overlays, 38 p.
93	12-08	Coordination of Transportation System Management and Land Use Management, 38 p.
94	8-10	Photologging, 38 p.
95	13-05	Statewide Transportation Planning, 54 p.
96	11-07	Pavement Subsurface Drainage Systems, 38 p.
97	13-06	Transit Ownership/Operation Options for Small Urban and Rural Areas, 28 p.
98	12-04	Resealing Joints and Cracks in Rigid and Flexible Pavements, 62 p.
99	13-04	Resurfacing with Portland Cement Concrete, 90 p.
100	13-03	Managing State Highway Finance, 23 p.
101	13-11	Historic Bridges: Criteria for Decision Making, 84 p.
102	14-05	Material Certification and Material-Certification Effectiveness, 24 p.
103	13-10	Risk Assessment Process for Hazardous Materials Transportation, 36 p.
104	14-08	Criteria for Use of Asphalt Friction Surfaces, 41 p.
105	13-01	Construction Contract Claims: Causes and Methods of Settlement, 58 p.
106	14-01	Practical Guidelines for Minimizing Tort Liability, 40 p.
107	12-06	Shallow Foundations for Highway Structures, 38 p.
108	13-08	Bridge Weight Limit Posting Practice, 30 p.
109	14-12	Highway Uses of Epoxy with Concrete, 68 p.
110	14-06	Maintenance Management Systems, 49 p.
111	14-22	Distribution of Wheel Loads on Highway Bridges, 21 p.
112	15-19	Cost Effectiveness of Hot-Dip Galvanizing for Exposed Steel, 28 p.
113	14-11	Administration of Research, Development, and Implementation Activities in Highway Agencies, 49 p.
114	14-02	Management of Traffic Signal Maintenance, 133 p.
115	14-03	Reducing Construction Conflicts Between Highways and Utilities, 72 p.
116	14-04	Asphalt Overlay Design Procedures, 66 p.
117	15-01	Toll Highway Financing, 29 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
118	15-03	Detecting Defects and Deterioration in Highway Structures, 52 p.
119	15-10	Prefabricated Bridge Elements and Systems, 75 p.
120	15-08	Professional Resource Management and Forecasting, 14 p.
121	14-09	Energy Conservation in Transportation, 25 p.
122	15-07	Life-Cycle Cost Analysis of Pavements, 136 p.
123	12-11	Bridge Designs to Reduce and Facilitate Maintenance Repairs, 65 p.
124	16-02	Use of Weigh-In-Motion Systems for Data Collection and Enforcement, 34 p.
125	14-07	Maintenance Activities Accomplished by Contract, 42 p.
126	15-04	Equipment for Obtaining Pavement Condition and Traffic Loading Data, 117 p.
127	16-07	Use of Fly Ash in Concrete, 66 p.
128	15-06	Methods of Identifying Hazardous Highway Elements, 80 p.
129	16-05	Freezing and Thawing Resistance of High-Strength Concrete, 31 p.
130	15-11	Traffic Data Collection and Analysis: Methods and Procedures, 58 p.
131	15-05	Effects of Permit and Illegal Overloads on Pavements, 99 p.
132	17-01	System-Wide Safety Improvements: An Approach to Safety Consistency, 20 p.
133	17-02	Integrated Highway Information Systems, 31 p.
134	17-08	D-Cracking of Concrete Pavements, 33 p.
135	17-10	Pavement Management Practices, 139 p.
136	15-09	Protective Coatings for Bridge Steel, 107 p.
137	18-05	Negotiating and Contracting for Professional Engineering Services, 75 p.
138	18-06	Pavement Markings Materials and Application for Extended Service Life, 45 p.
139	17-11	Pedestrians and Traffic-Control Measures, 75 p.
140	15-02	Durability of Prestressed Concrete Highway Structures, 65 p.
141	16-10	Bridge Deck Joints, 66 p.
142	13-02	Methods of Cost-Effectiveness Analysis for Highway Projects, 22 p.
143	19-02	Uniformity Efforts in Oversize/Overweight Permits, 79 p.
144	17-09	Breaking/Cracking and Sealing Concrete Pavements, 39 p.
145	17-13	Staffing Considerations in Construction Engineering Management, 42 p.
146	18-01	Use of Consultants for Construction Engineering and Inspection, 64 p.
147	18-04	Treatment of Problem Foundations for Highway Embankments, 72 p.
148	18-12	Indicators of Quality in Maintenance, 114 p.
149	19-23	Partnerships for Innovation: Private-Sector Contributions to Innovation in the Highway Industry, 45 p.
150	19-08	Technology Transfer in Selected Highway Agencies, 38 p.
151	19-06	Process for Recapitalizing Highway Transportation Systems, 43 p.
152	19-04	Compaction of Asphalt Pavement, 42 p.
153	18-11	Evolution and Benefits of Preventive Maintenance, 69 p.
154	17-06	Recycling of Portland Cement Concrete Pavements, 46 p.
155	19-07	Sign Evaluation and Replacement Programs: Policies and Criteria for Freeways and Expressways, 37 p.
156	18-08	Freeway Incident Management, 23 p.
157	16-03	Maintenance Management of Street and Highway Signs, 134 p.
158	16-06	Wet Pavement Safety Programs, 54 p.
159	18-03	Design and Construction of Bridge Approaches, 45 p.
160	18-09	Cold-Recycled Bituminous Concrete Using Bituminous Materials, 105 p.
161	19-01	Computer-Aided Design and Drafting Systems, 24 p.
162	20-03	Signing Policies, Procedures, Practices, and Fees for Logo and Tourist-Oriented Directional Signing, 41 p.
163	18-02	Innovative Strategies for Upgrading Personnel in State Transportation Departments, 35 p.
164	20-02	Measure to Curtail State Fuel Tax Evasion, 14 p.
165	19-10	Transportation Telecommunications, 92 p.
166	20-08	Traffic Signal Control Equipment: State of the Art, 43 p.
167	19-12	Measurements, Specifications, and Achievement of Smoothness for Pavement Construction, 34 p.
168	18-10	Contract Management Systems, 74 p.
169	20-07	Removing Concrete from Bridges, 42 p.
170	16-09	Managing Urban Freeway Maintenance, 26 p.
171	20-01	Fabrics in Asphalt Overlays and Pavement Maintenance, 72 p.
172	19-03	Signal Timing Improvement Practices, 88 p.
173	20-5	Short-Term Maintenance Systems, 44 p.
174	13-07	Stormwater Management for Transportation Facilities, 82 p.
175	19-09	Moisture Damage in Asphalt Concrete, 90 p.
176	20-09	Bridge Paint: Removal, Containment, and Disposal, 60 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
177	18-07	Freeway Corridor Management, 64 p.
178	21-12	Truck Escape Ramps, 56 p.
179	20-12	Latex-Modified Mortars and Concertos, 58 p.
180	20-01	Performance Characteristics of Open-Graded Friction Courses, 44 p.
181	20-11	In-Service Experience with Traffic Noise Barriers, 62 p.
182	22-01	Performance and Operational Experience of Truck-Mounted Attenuates, 54 p.
183	22-09	Knowledge Based Expert Systems in Transportation, 52 p.
184	22-08	Disposal of Roadside Litter Mixtures, 52 p.
185	21-02	Preferential Lane Treatments for High-Occupancy Vehicles, 80 p.
186	21-09	Supplemental Advance Warning Devices, 84 p.
187	23-02	Rapid Test Methods for Asphalt Concrete and Portland Cement Concrete, 48 p.
188	21-03	Management Training and Development Programs, 56 p.
189	21-13	Pavement Structural Design Practices, 46 p.
190	21-14	Criteria for Qualifying Contractors for Bidding Purposes, 40 p.
191	22-13	Use of Rumble Strips to Enhance Safety, 80 p.
192	23-01	Accident Data Quality, 48 p.
193	21-10	Hot In-Place Recycling of Asphalt Concrete, 69 p.
194	24-06	Electronic Toll and Traffic Management (ETTM) Systems, 64 p.
195	23-07	Use of Warranties in Road Construction, 65 p.
196	21-11	Highway Maintenance Procedures Dealing with Hazardous Material Incidents, 60 p.
197	23-06	Corridor Preservation, 43 p.
198	22-02	Uses of Recycled Rubber Tires in Highways, 162 p.
199	22-10	Recycling and Use of Waste Materials and By-Products in Highway Construction, 84 p.
200	22-04	Underwater Bridge Maintenance and Repair, 54 p.
201	23-04	Multimodal Evaluation in Passenger Transportation, 57 p.
202	23-09	Severity Indices for Roadside Features, 54 p.
203	22-07	Current Practices in Determining Pavement Condition, 57 p.
204	23-10	Portland Cement Concrete Resurfacing, 56 p.
205	24-03	Performance and Operational Experience of Crash Cushions, 74 p.
206	20-22	Highway Tort Liability Management Programs, 40 p.
207	23-03	Managing Roadway Snow and Ice Control Operations, 85 p.
208	21-08	Development and Implementation of TCP for Highway Work Zones, 48 p.
209	24-12	Sealers for Portland Cement Concrete Highway Facilities, 68 p.
210	24-02	Road Pricing for Congestion Management: A Survey of International Practice, 65 p.
211	17-05	Design, Construction, and Maintenance of PCC Pavement Joints, 50 p.
212	23-05	Performance-Related Specification for Highway Construction and Rehabilitation, 48 p.
213	23-13	Effective Use of Park-and-Ride Facilities, 45 p.
214	24-01	Resolution of Disputes to Avoid Construction Claims, 39 p.
215	24-04	Determination of Contract Time for Highway Construction Projects, 43 p.
216	24-11	Implementation of Technology from Abroad, 44 p.
217	25-13	Consideration of the 15 Factors in the Metropolitan Planning Process, 57 p.
218	20-7/ Task 94	Mitigation of Nighttime Construction Noise, Vibrations and Other Nuisances, 93 p.
219	22-11	Photographic Enforcement of Traffic Laws, 67 p.
220	25-09	Waterproofing Membranes for Concrete Bridge Decks, 69 p.
221	24-13	Assessing the Effects of Highway-Widening Improvements on Urban and Suburban Areas, 43 p.
222	24-05	Pavement Management Methodologies to Select Projects and Recommend Preservation Treatments, 96 p.
223	25-10	Cost-Effective Preventive Pavement Maintenance, 103 p.
224	24-08	Longitudinal Occupancy of Controlled Access Right-of-Way by Utilities, 39 p.
225	24-08	Left-Turn Treatments at Intersections, 86 p.
226	26-01	Remediation of Petroleum-Contaminated Soils, 88 p.
227	25-06	Collecting and Managing Cost Data for Bridge Management Systems, 49 p.
228	23-12	Reduced Visibility Due to Fog on the Highway, 51 p.
229	25-01	Applications of 3-D and 4-D Visualization Technology in Transportation, 73 p.
230	25-02	Freight Transportation Planning in the Public Sector, 47 p.
231	25-14	Managing Contract Research Programs (Topic) 92 p.
232	26-02	Variability in Highway Pavement Construction, 38 p.
233	26-06	Land Development Regulations that Promote Access Management, 45 p.
234	26-07	Settlement of Bridge Approaches (The Bump at the End of the Bridge), 57 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
235	26-07	Application of Full-Scale Accelerated Pavement Testing, 110 p.
236	26-03	Methods for Household Travel Surveys, 57 p.
237	23-11	Changeable Message Signs, 57 p.
238	25-15	Performance Measurement in State Departments of Transportation, 69 p.
239	25-07	Pavement Subsurface Drainage Systems, 44 p.
240	25-11	Toll Plaza Design, 113 p.
241	22-12	Truck Operating Characteristics, 62 p.
242	27-01	Trenchless Installation of Conduits Beneath Roadways, 76 p.
243	27-09	Methods for Capital Programming and Project Selection, 85 p.
244	25-04	Guardrail and Median Barrier Crashworthiness, 160 p.
245	27-11	Traffic Signal Control Systems Maintenance Management Practices, 63 p.
246	27-06	Outsourcing of State Highway Facilities and Services, 69 p.
247	27-03	Stabilization of Existing Subgrades to Improve Constructability During Interstate Pavement Reconstruction, 75 p.
248	26-09	Evaluating and Measuring the Effectiveness of Training, 28 p.
249	27-04	Methods for Increasing Live Load Capacity of Existing Highway Bridges, 66 p.
250	26-04	Highway-Rail Crossing Surfaces, 56 p.
251	28-04	Lead-Based Paint Removal for Steel Highway Bridges, 115 p.
252	27-10	Response of Small Urbanized Area MPOs to ISTEA, 35 p.
253	25-16	Dynamic Effects of Pile Installation on Adjacent Structures, 86 p.
254	25-21	Service Life of Drainage Pipe, 39 p.
255	26-08	Ground Penetrating Radar for Evaluating Subsurface Conditions for Transportation Facilities, 37 p.
256	28-07	Submittal of Bid Proposals in Electronic Format, 26 p.
257	26-12	Maintenance Issues and Alternate Corrosion Protection Methods for Exposed Bridge Steel, 90 p.
258	27-16	Applications of GPS for Surveying and Other Positioning Needs in Departments of Transportation, 46 p.
259	25-12	Management of Surface Transportation Systems, 26 p.
260	27-08	Thin-Surfaced Pavements, 112 p.
261	27-02	Criteria for Highway Routing of Hazardous Materials, 38 p.
262	28-11	Tolling Practices for Highway Facilities, 54 p.
263	27-05	State DOT Management and Techniques for Materials and Construction Acceptance, 51 p.
264	28-09	Modern Roundabout Practice in the United States, 73 p.
265	27-07	Managing Product Liability to Achieve Highway Innovations, 54 p.
266	28-05	Dynamic Impact Factors for Bridges, 60 p.
267	26-11	Transportation Development Process, 48 p.
268	26-05	Relationship Between Pavement Surface Texture and Highway Traffic Noise, 85 p.
269	27-12	Road User and Mitigation Costs in Highway Pavement Projects, 47 p.
270	28-10	Transportation Management Center Functions, 68 p.
271	28-12	Traffic Signal Operations Near Highway-Rail Grade Crossings, 90 p.
272	28-01	Best Management Practices for Environmental Issues Related to Highway and Street Maintenance, 103 p.
273	28-03	Project Development Methodologies for Reconstruction of Urban Freeways and Expressways, 45 p.
274	28-06	Methods to Achieve Rut-Resistant Durable Asphalt Pavements, 61 p.
275	28-08	Historic Highway Bridge Preservation Practices, 58 p.
276	28-02	Geotechnical Related Development and Implementation of LRFD Methods, 69 p.
277	29-06	Consultants for DOT Preconstruction Engineering Work, 115 p.
278	29-08	Measuring In Situ Mechanical Properties of Pavement Subgrade Soils, 73 p.
279	29-02	Roadway Incident Diversion Practices, 84 p.
280	29-01	Seven Keys to Building a Robust Research Program, 64 p.
281	29-05	Operational Impacts of Median Width on Larger Vehicles, 68 p.
282	29-04	Project Management Information Systems, 37 p.
283	29-07	Fleet Management and Selection Systems for Highway Maintenance Equipment, 33 p.
284	29-03	Performance Survey on Open-Graded Friction Course Mixes, 38 p.
285	30-10	Maintenance of Highway Edgedrains, 62 p.
286	30-02	Multimodal Aspects of Statewide Transportation Planning, 58 p.
287	30-06	Sleep Deprivation Countermeasures for Motorist Safety, 92 p.
288	30-07	Data Sharing and Data Partnerships for Highways, 31 p.
289	30-03	Corridor Management, 58 p.
290	30-05	Procedures for Assessing Economic Development Impacts from Transportation Investments, 76 p.
291	30-11	Evaluation of Pavement Friction Characteristics, 66 p.
292	30-04	Innovative Practices to Reduce Delivery Time for Right-of-Way in Project Development, 73 p.

TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
293	30-12	Reducing and Mitigating the Impacts of Lane Occupancy During Construction and Maintenance, 60 p.
294	31-10	Configuration Management in Transportation Management Systems, 44 p.
295	31-02	Statistical Methods in Highway Safety Analysis, 75 p.
296	31-08	Impact of New Information and Communication Technologies on Transportation Agencies, 57 p.
297	31-11	Building Effective Relationships Between Central Cities and Regional, State, and Federal Agencies, 69 p.
298	31-09	Truck Trip Generation Data, 81 p.
299	31-01	Recent Geometric Design Research for Improved Safety and Operations, 134 p.
300	31-04	Performance Measures for Research, Development, and Technology Programs, 97 p.
301	31-05	Collecting, Processing, and Integrating GPS Data into GIS, 65 p.
302	31-12	Mitigation of Ecological Impacts, 100 p.
303	31-03	Assessment and Rehabilitation of Existing Culverts, 74 p.
304	32-05	Driveway Regulation Practices, 77 p.
305	32-11	Interaction Between Roadways and Wildlife Ecology, 78 p.
306	31-07	Long-Term Pavement Marking Practices, 154 p.
307	30-01	Systems Engineering Processes for Developing Traffic Signal Systems, 87 p.
308	32-12	Owner-Controlled Insurance Programs, 133 p.
309	32-09	Transportation Planning and Management for Special Events, 71 p.
310	32-03	Impact of Red Light Camera Enforcement on Crash Experience, 57 p.
311	32-07	Performance Measures of Operational Effectiveness for Highway Segments and Systems, 59 p.
312	31-06	Facilitating Partnerships in Transportation Research, 76 p.
313	34-15	State DOT Outsourcing and Private-Sector Utilization, 42 p.
314	32-02	Strategies for Managing Increasing Truck Traffic, 83 p.
315	32-10	Compensation for Contractors' Home Office Overhead, 47 p.
316	33-01	Design Exception Practices, 82 p.
317	32-01	Dealing with Truck Parking Demands, 37 p.
318	33-05	Safe and Quick Clearance of Traffic Incidents, 143 p.
319	30-08	Bridge Deck Joint Performance, 46 p.
320	33-12	Integrating Freight Facilities and Operations with Community Goals, 58 p.
321	33-06	Roadway Safety Tools for Local Agencies, 166 p.
322	33-07	Safety Management Systems, 42 p.
323	33-08	Recruiting and Retaining Individuals in Transportation Agencies, 59 p.
324	33-02	Prefabricated Bridge Element and Systems to Limit Traffic Disruption During Construction, 48 p.
325	32-04	Significant Findings from Full-Scale/Accelerated Pavement Testing, 202 p.
326	34-03	Strategic Planning and Decision Making in State Departments of Transportation, 62 p.
327	32-08	Cost-Effective Practices for Off-System and Local Interest Bridges, 130 p.
328	33-03	State Product Evaluation Programs, 36 p.
329	33-11	Integrating Tourism and Recreation Travel with Transportation Planning and Project Delivery, 53 p.
330	32-06	Public Benefits of Highway System Preservation and Maintenance, 45 p.
331	33-09	State Highway Program Letting Management, 47 p.
332	34-12	Access Management on Crossroads in the Vicinity of Interchanges, 82 p.
333	34-04	Concrete Bridge Deck Performance, 101 p.
334	34-09	Automated Pavement Distress Collection Techniques, 84 p.
335	34-11	Pavement Management Applications Using Geographic Information Systems, 65 p.
336	34-02	Road Safety Audits, 127 p.
337	34-07	Cooperative Agreements for Corridor Management, 70 p.
338	34-08	Thin and Ultra-Thin Whitetopping, 95 p.
339	34-01	Centerline Rumble Strips on Rural Roads, 63 p.
340	34-06	Convertible Roadways and Lanes, 92 p.
341	33-04	Integrated Roadside Vegetation Management, 82 p.
342	35-02	Chip Seal Best Practices, 111 p.
343	34-05	Management of Disabled Business Enterprise Issues in Construction Contracting, 97 p.
344	34-10	Winter Highway Operations, 66 p.
345	33-10	Steel Bridge Erection Practices, 78 p.
346	35-01	State Construction Quality Assurance Programs, 75 p.
347	35-09	Managing Archaeological Investigations, 56 p.
348	35-10	Improving the Safety of Older Road Users, 103 p.
349	35-05	Developing Transportation Agency Leaders, 51 p.
350	35-03	Crash Records Systems, 43 p.
351	35-06	Access Rights, 90 p.



TABLE 2 SYNTHESSES OF HIGHWAY PRACTICE: PROJECT 20-5

NO.	TOPIC	TITLE, PAGES
352	35-04	Value Engineering Applications in Transportation, 134 p.
353	35-07	Inspection and Maintenance of Bridge Stay Cable Systems, 196 p.
354	35-08	Inspection and Management of Bridges with Fracture-Critical Details, 78 p.
355	35-12	Transportation Technology Transfer: Successes, Challenges, and Needs, 85 p.
356	36-06	Pavement Markings Design and Typical Layout Details, 138 p.
357	36-08	Use of Geophysics for Transportation Projects, 108 p.
358	36-09	Statewide Travel Forecasting Models, 116 p.
359	36-01	Bridge Rating Practices and Policies for Overweight Vehicles, 108 p.
360	36-12	Rock-Socketed Shafts for Highway Structure Foundations, 136 p.
361	36-04	Visualization for Project Development, 82 p.
362	36-07	Training Programs, Processes, Policies, and Practices, 89 p.
363	36-05	Control of Invasive Species, 116 p.
364	36-11	Estimating Toll Road Demand and Revenues, 105 p.
365	37-02	Preserving and Using Institutional Memory Through Knowledge Management Practices, 113 p.
366	36-16	Tribal Transportation Programs, 132 p.
367	36-03	Technologies for Improving Safety Data, 102 p.
368	37-14	Cone Penetration Testing, 117 p.
369	37-08	State DOT Crash Reconstruction Practices, 32 p.
370	37-12	Animal-Vehicle Collision Data Collection, 107 p.
371	37-03	Managing Selected Transportation Infrastructure Assets: Signals, Lighting, Signs, Pavement Markings, Culverts, and Sidewalks, 190 p.
372	37-06	Emerging Technologies for Construction Delivery, 111 p.
373	37-01	Multi-Disciplinary Teams in Context-Sensitive Solutions, 83 p.
374	37-10	Preserving Freight and Passenger Rail Corridors and Service, 31 p.
375	37-05	Bridge Inspection Practices, 199 p.
376	38-01	Quality Assurance in Design-Build Projects, 130 p.
377	38-03	Compilation of Public Opinion Data on Tolls and Road Pricing, 57 p.
378	38-04	State Highway Cost Allocation Studies, 73 p.
379	38-12	Selection and Evaluation of Alternative Contracting Methods to Accelerate Project Completion, 75 p.
380	38-13	Applications of Illuminated, Active, In-Pavement Marker Systems, 72 p.
381	38-15	Falling Weight Deflectometer Usage, 121 p.
382	38-09	Estimating Stiffness of Subgrade and Unbound Materials for Pavement Design, 129 p.
383	38-11	Changeable Message Sign Messages During Non-Incident, Non-Roadwork Periods, 68 p.
384	38-07	Forecasting Metropolitan Commercial and Freight Travel, 130 p.
385	38-02	Information Technology for Efficient Project Delivery, 74 p.
386	38-10	High-Speed Weigh-in-Motion System Calibration Practices, in production for 2009
387	38-05	Light-Emitting Diode Traffic Signal Monitoring, Maintenance, and Replacement Issues, 32 p.

TABLE 3 RESEARCH RESULTS DIGESTS<sup>a</sup>

NO.	PROJECT	TITLE, PAGES
3	20-6	Relocation Assistance Under Chapter Five of the 1968 Federal-Aid Highway Act, 18 p.
6	20-6	Standing to Sue for Purposes of Securing Judicial Review of Exercise of Administrative Discretion in Route Location of Federal-Aid Highways, 9 p.
11	20-6	Valuation Changes Resulting from Influence of Public Improvements, 25 p.
14	12-3	Waterproof Expansion Joints for Bridges, 3 p.
19	20-6	Advance Acquisition Under the Federal-Aid Highway Act of 1968, 21 p.
20	19-1	Budgeting for State Highway Departments, 4 p.
22	20-6	Valuation in Eminent Domain as Affected by Zoning, 19 p.
25	20-6	Federal Environmental Legislation and Regulations as Affecting Highways, 35 p.
31	20-6	Proposed Legislation to Authorize Joint Development of Highway Rights-of-Way, 12 p.
32	20-6	Changes in Existing State Law Required by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, 13 p.
39	20-6	Legal Effect of Representations as to Subsurface Conditions, 17 p.
40	20-6	Appeal Bodies for Highway Relocation Assistance, 16 p.
41	20-6	Trial Strategy and Techniques to Exclude Noncompensable Damages and Improper Valuation Methods in Eminent Domain Cases, 24 p.
42	20-6	Supplemental Condemnation: A Discussion of the Principles of Excess and Substitute Condemnation, 20 p.
45	20-6	Exclusion of Increase or Decrease in Value Caused by Public Improvement for Which Lands Are Condemned, 24 p.
47	20-6	Trial Strategy and Techniques Using the Comparable Sales Approach to Valuation, 13 p.
48	10-9	Surface Condition Rating System for Bituminous Pavements, 24 p.
54	20-6	Trial Strategy and Techniques Using the Income Approach to Valuation, 31 p.
55	20-7	Side-Friction Factors in the Design of Highway Curves (Task 4), 9 p.
67	15-2	Field Evaluation of Tentative Design Procedure for Riprap-Lined Channels, 4 p.
68	20-6	The Meaning of Highway Purpose, 15 p.
76	22-3, 3A	Field Evaluation of Vehicle Barrier System, 3 p.
77	20-7	Earth-Berm Vehicle Deflector (Task 3), 3 p.
78	3-20	Traffic Signal Warrants—A Bibliography, 42 p.
79	20-6	Personal Liability of State Highway Department Officers and Employees, 22 p.
80	20-6	Liability of State Highway Departments for Design, Construction, and Maintenance Defects, 49 p.
81	22-1A	Crash Testing and Evaluation of Attenuating Bridge Railing System, 10 p.
82	1-15	Design of Continuously Reinforced Concrete Pavements for Highways, 12 p.
83	20-6	Liability of State and Local Governments for Snow and Ice Control, 16 p.
84	22-2	Breakaway Cable Terminals for Guardrails and Median Barriers, 18 p.
85	12-16	Bridge Deck Repairs, 22 p.
89	1-12(3)	Guidelines for Skid-Resistant Highway Pavement Surfaces, 12 p.
91	3-21	Motorist Response to Guide Signing, 9 p.
95	20-6	Legal Implications of Regulations Aimed at Reducing Wet-Weather Skidding Accidents on Highways, 31 p.
97	3-23	Guidelines for Uniformity in Traffic Control Signal Design Configurations, 8 p.
99	20-6	Liability of the State for Highway Traffic Noise, 14 p.
100	20-5	Safe Conduct of Traffic Through Highway Construction and Maintenance Zones, 5 p.
102	22-2	Modified Breakaway Cable Terminals for Guardrails and Median Barriers, 13 p.
103	20-6	Payment of Attorney Fees in Eminent Domain and Environmental Litigation, 24 p.
105	3-26	Selected Acoustical Parameters of Highway Noise Barriers, 8 p.
106	20-5	Use of Waste Materials in Highway Construction and Maintenance, 2 p.
108	20-6	Trial Strategy and Techniques in Highway Contract Litigation, 31 p.
109	20-6	Control of Conflicts of Interest in Highway Construction Contract Administration, 56 p.
110	20-6	Liability of State and Local Governments for Negligence Arising out of the Installation and Maintenance of Warning Signs, Traffic Lights, and Pavement Markings, 14 p.
111	20-6	Trial Aids in Highway Condemnation Cases, 11 p.
112	20-6	Legal Implications of Control of Access to Uncontrolled-Access Highways, 22 p.
113	20-6	Right to Compensation in Eminent Domain for Abrogation of Restrictive Covenants, 12 p.
114	20-11	Energy Analysis Methodology for Assessing Environmental Impacts, 7 p.
115	Var.	NCHRP Research on the Durability of Reinforced Concrete Bridge Components, 6 p.
116	20-6	Payments to Public Utilities for Relocation of Facilities in Highway Rights-of-Way, 35 p.
119	20-6	Recovery of Condemnation Blight Under Inverse Law, 11 p.
121	21-2(3)	Development and Field Evaluation of Prototype Soil Moisture Sensors, 3 p.
122	3-26	Noise Barrier Acoustical Parameters—Experimental Results, 5 p.

TABLE 3 RESEARCH RESULTS DIGESTS<sup>a</sup>

NO.	PROJECT	TITLE, PAGES
123	4-9	Evaluation of Prefomed Elastomeric Pavement Joint Sealing Systems, 7 p.
126	3-18(4)	Performance Evaluation of Signalized Network Control Strategies, 4 p.
127	8-19	The Vehicle-Miles of Travel—Urban Highway Supply Relationship, 7 p.
129	20-6	Legal Implications of Highway Department's Failure to Comply with Design, Safety, or Maintenance Guidelines, 17 p.
133	1-16	Evaluation of Winter-Driving Traction Aids, 7 p.
134	20-6	Procedural Aspects of Inverse Condemnation—Title on Interest Acquired by Transportation and Other Public Agencies, 13 p.
135	20-6	Liability of the State for Injury-Producing Defects in Highway Surface, 14 p.
136	20-6	State Highway Programs Versus the Spending Powers of Congress, 18 p.
137	20-6	The Effects of Federal and State Public Information Acts on Highway and Transportation Department Activities, 23 p.
138	20-6	Legal Aspects of Historic Preservation in Highway Programs, 27 p.
141	20-6	Liability of State Highway Departments for Defects in Design, Construction, and Maintenance of Bridges, 20 p.
145	20-6	First Amendment Aspects of Control of Outdoor Advertising, 31 p.
146	20-6	Minority and Disadvantaged Business Enterprise Requirements in Public Contracting, 31 p.
147	20-6	Mineral Rights in Rights-of-Way: Acquisition, Valuations, and Disposition, 15 p.
149	20-6	Exaction of Right-of-Way by Exercise of Police Power, 13 p.
150	20-6	Planning and Precondemnation Activities as Constituting a Taking Under Inverse Law, 14 p.
151	20-6	Liability of State for Injury or Damage Occurring in Motor Vehicle Accident Caused by Trees, Shrubbery, or Other Vegetative Obstruction Located in Right-of-Way or Growing on Adjacent Private Property, 20 p.
152	20-6	Enforceability of the Requirement of Notice in Highway Construction Contracts, 17 p.
153	20-6	Liability of the State for Injuries Caused by Obstruction or Defects in Highway Shoulder or Berm, 19 p.
154	20-6	Trial Strategy and Techniques in Enforcing Laws Relating to Truck Weights and Sizes, 35 p.
157	20-6	Supplement to Licensing and Qualification of Bidders in Selected Studies in Highway Law, 19 p.
158	20-6	Legal Procedural Issues Related to Relocation Assistance, 25 p.
160	20-6	Acquisition of Uneconomic Remnants Under 23 U.S.C. 109(f), 13 p.
161	2-14	Public and Private Partnerships for Financing Highway Improvements, 34 p.
163	20-6	Supplement to Competitive Bidding and Award of Construction Contracts in <i>Selected Studies in Highway Law</i> , 32 p.
164	20-6	Rights of Abutting Property Owner Upon Conversion of Uncontrolled-Access Road into Limited-Access Highway, 14 p.
165	20-6	Legal Techniques for Reserving Right-of-Way for Future Projects Including Corridor Protection, 44 p.
167 <sup>b</sup>	Var.	NCHRP Research on Bridge Engineering, 8 p.
169	10-24	Rapid Replacement of Portland Cement Concrete Pavement Segments, 11 p.
170	20-24	Research Program Design Administration of Highway and Transportation Agencies, 5 p.
171	10-20	Pot Bearings and PTFE Surfaces, 14 p.
173	20-24(2)	Guidelines for Establishing Executive Management Information Systems for State Departments of Transportation, 7 p.
174	10-25A	Determination of Water-Cement Ratio in Fresh Concrete, 4 p.
175	Var.	NCHRP Research on Construction Engineering, 7 p.
177	Var.	NCHRP Research on Maintenance Engineering, 7 p.
178	4-16	Service Life and Cost of Pavement Marking Materials, 16 p.
179	2-14	Financing Highway Improvements Through Public and Private Partnerships, 7 p.
180	20-27	Implementation of Geographic Information Systems (GIS) in State DOTs, 31 p.
181	1-27	Video Image Processing for Evaluating Pavement Surface Distress, 4 p.
182 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
183	20-24	Administration of Highway and Transportation Agencies "Project 20-24 Series," 6 p.
184	Var.	NCHRP Research on Pavements, 8 p.
185	20-23	NCHRP Supports Advances in Differential GPS Satellite Surveying, 4 p.
186	20-7	Data Interchange Standards for Bridge Management Systems and Integrated Highway Information Systems, 20 p.
187	12-26	Distribution of Wheel Loads on Highway Bridges, 32 p.
188	10-30(3)	Ultrasonic Nondestructive Testing for Deterioration of High-Strength Steel Components Embedded in Concrete, 4 p.
189	21-3	Instrumentation for Measuring Scour at Bridge Piers and Abutments, 8 p.
190 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
191	20-27	Management Guide for Implementation of Geographic Information Systems (GIS) in State DOTs, 48 p.

TABLE 3 RESEARCH RESULTS DIGESTS<sup>a</sup>

NO.	PROJECT	TITLE, PAGES
192	3-41	Procedures for Determining Work Zone Speed Limits, 48 p.
193	20-24	Administration of Highway and Transportation Agencies "Project 20-24 Series," 8 p.
194	22-5A	Low-Service-Level Guardrail Systems, 14 p.
195 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
196	20-24(3)A	A Unique, Hands-on Educational Program for High School Mathematics and Science Classes, 6 p.
197	10-35	Fatigue Behavior of Welded and Mechanical Splices in Reinforcing Steel, 12 p.
198	12-33	Development of Comprehensive Bridge Specifications and Commentary, 26 p.
199	20-23	Rapid Static Surveying Using the Global Positioning System, 6 p.
200	2-17(1)	Objectives and Decision Criteria for Infrastructure Investment, 20 p.
201	15-11A, 11	BRI-STARS (BRIdge Stream Tube Model for Alluvial River Simulation), 4 p.
202	2-17(5)	Congestion Impacts on Business and Strategies to Mitigate Them, 12 p.
203 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
204	20-36	Winter Maintenance Technology and Practices—Learning from Abroad, 16 p.
205	5-12	Requirements for Application of Light Emitting Diodes (LEDs) to Traffic Control Signals, 12 p.
206	20-25(2)	Training for Highway Construction Personnel, 6 p.
207	20-33	On the Implementation of Research Findings in Surface Transportation, 8 p.
208	10-32A	Durability Testing of High-Strength Concrete Containing High-Range, Water-Reducing Admixtures, 10 p.
209 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
210	20-5	Effects of Highway Bypasses on Rural Communities and Small Urban Areas, 22 p.
211	2-17(6)	Current State Practices in the Transportation-Tourism Interface, 10 p.
212 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 8 p.
213	21-5	Nondestructive Testing of Unknown Subsurface Bridge Foundations—Results of NCHRP Project 21-5, 42 p.
214	3-39(2)	On-Site Evaluation and Calibration Procedures for Weigh-In-Motion Systems, 4 p.
215	10-37B	Protocol for In-Service Evaluation of Bridges with Epoxy-Coated Reinforcing Steel, 4 p.
216	5-13	Illumination Guidelines for Nighttime Highway Work, 8 p.
217	8-33	Relationships Between Implemented Transportation Control Measures and Measured Pollutant Levels, 12 p.
218	20-27(2)	A Generic Data Model for Linear Referencing System, 28 p.
219 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 9 p.
220	17-13	Strategies for Improving Roadside Safety, 8 p.
221	20-27(2)	Development of System and Application Architectures for Geographic Information Systems in Transportation, 34 p.
222	4-22	Pavement Marking Assessment System (PAMAS), 11 p.
223	8-33	Development of an Improved Framework for the Analysis of Air Quality and Other Benefits and Costs of Transportation Control Measures, 15 p.
224 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 9 p.
225	20-33(2)	Putting Research into Practice: A Synopsis of Successful Strategies and Case Histories, 16 p.
226	8-32(2)	Multimodal Transportation: Development of a Performance-Based Planning Process, 16 p.
227	1-32	Systems for Design of Highway Pavements, 4 p.
228	20-25(3)	Development of Training Material for Highway Construction Personnel, 4 p.
229	20-34	Developing Measures of Effectiveness for Truck Weight Enforcement Activities, 14 p.
230	8-33	Review of Travel Assumptions Employed in Emission Factor Models, 23 p.
231	25-4	Economic Effects of Restricting Left Turns, 14 p.
232	20-36	Report on the 1997 Review of Asian Bridge Structures, 45 p.
233	NA	Summary of Economic Development Research Projects, 13 p.
234	12-28 (13)A	Manual for Bridge Rating Through Load Testing, 146 p.
235	25-13	Assessment of Impacts of Bridge Deck Runoff Contaminants on Receiving Waters, 32 p.
236	20-36	Emerging Models for Delivering Transportation Programs and Services: A Report of the Transportation Agency Organization and Management Scan Tour, 49 p.
237	9-9	Superpave Gyrotory Compaction Guidelines, 5 p.
238	20-36	Report on the 1998 Scanning Review of European Winter Service Technology, 33 p.
239	17-12	Improved Safety Information for Highway Design, 9 p.
240	20-40	Conversion of AASHTO Documents to Metric Units, 24 p.
241	20-36	1998 Scanning Review of European Practice for Bridge Scour and Stream Instability Countermeasures, 36 p.
242	7-12(2)	Metrication and Enhancement of MicroBENCOST Software Package, 5 p.
243	1-29	Proposed Design Guidelines for Reducing Hydroplaning on New and Rehabilitated Pavements, 25 p.

TABLE 3 RESEARCH RESULTS DIGESTS<sup>a</sup>

NO.	PROJECT	TITLE, PAGES
244	10-47	Operational Guidelines for Longitudinal Pavement Profile Measurement, 14 p.
245 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 10 p.
246	1-33	Methodology for Pavement-Investment Decisions, 6 p.
247	3-52A	The Relationship Between Access Density and Accident Rates: Comparisons of <i>NCHRP Report 420</i> and Minnesota Data, 11 p.
248	2-17(3)A	Updated and Enhanced Database for Macroeconomic Analysis of Transportation Investments and Economic Performance, 5 p.
249 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 10 p.
250	6-12	Improved Visibility for Snowplowing Operations, 4 p.
251	25-16	Guidance for Selecting Compensatory Wetland Mitigation Options, 16 p.
252	2-18(4)	Development and Demonstration of StratBENCOST Procedure, 6 p.
253	9-12	Recommended Use of Reclaimed Asphalt Pavement in the Superpave Mix Design Method: Guidelines, 17 p.
254	10-48	Assessing Pavement Layer Condition Using Deflection Data, 3 p.
255	17-9(2)	Impacts of Resurfacing Projects With and Without Additional Safety Improvements, 15 p.
256	17-13	Strategic Plan for Improving Roadside Safety, 3 p.
257	14-11(2)	Effective Motivation of Highway Maintenance Personnel: Tools for Peak Performance, 3 p.
258	20-29(2)	Development of a Computer Model for Multimodal, Multicriteria Transportation Investment Analysis, 4 p.
259	5-14	Guidelines for the Effective Use and Procurement of Advanced Warning Arrow Panels, 25 p.
260 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 10 p.
261	8-37	The Case for Standardizing Household Travel Surveys, 13 p.
262	9-18	Field Shear Test for Hot Mix Asphalt, 14 p.
264	20-50 (8/13)	LTTP Data Analysis: Factors Affecting Pavement Smoothness, 5 p.
265	17-18(6)	AASHTO Strategic Highway Safety Plan Case Studies, 18 p.
266	20-24(11)	Asset Management Guidance for Transportation Agencies, 3 p.
267	20-48	Utility of Machine Translation Software, 11 p.
268	1-34	Performance of Pavement Subsurface Drainage, 15 p.
269	20-50(14)	Significance of "As-Constructed" HMA Air Voids to Pavement Performance from an Analysis of LTTP Data, 21 p.
270	18-5	Relationship of Portland Cement Characteristics to Concrete Durability, 4 p.
271	10-44A	A Process for Selecting Strategies for Rehabilitation of Rigid Pavements, 4 p.
272	10-50A	A Process for Selecting Strategies for Rehabilitation of Rigid Pavements, 4 p.
273	22-16	Development of an Improved Roadside Barrier System Phase I, 23 p.
274	20-5, Topic 30-09	Quality Assurance of Structural Materials, 32 p.
275	20-7(139)	Application of European 2+1 Roadway Designs, 31 p.
277	8-40	Review and Improvement of Existing Processes and Procedures for Evaluating Cultural Resource Significance, 10 p.
278	3-62	Accessible Pedestrian Signals: Synthesis and Guide to Best Practice, 22 p.
279	20-48(1)	Making the Business Case for Translating Non-English Transportation Information, 40 p.
280 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 12 p.
281	4-20C	Aggregate Tests for Portland Cement Concrete Pavements: Review and Recommendations, 28 p.
282	10-55	Fiber Reinforced Polymer Composites for Concrete Bridge Deck Reinforcement, 4 p.
283	9-30	Jackknife Testing An Experimental Approach to Refine Model Calibration and Validation, 12 p.
284	9-30	Refining the Calibration and Validation of Hot Mix Asphalt Performance Models: An Experimental Plan and Database, 20 p.
285	1-28A	Laboratory Determination of Resilient Modulus for Flexible Pavement Design, 52 p.
286	17-18(4)	Development of a Highway Safety Manual, 9 p.
287	3-64	Highway Capacity Manual Applications Guidebook, 4 p.
288	8-45 and H-29	A New Vision of Mobility: Guidance to Foster Collaborative Multimodal Decision Making (joint digest with TCRP RRD 65), 10 p.
289	20-7(173)	Measuring and Communicating the Effects of Traffic Incident Management Improvements, 40 p.
290	1-37A	Recommended Mechanistic-Empirical Pavement Design Guide and Software: Available for Evaluation, 4 p.
291	9-15	Quality Characteristics & Test Methods for Use in Performance-Related Specifications of HMA Pavements, 8 p.
292 <sup>b</sup>	20-5	Continuing Projects to Synthesize Information on Highway Problems, 18 p.
293	17-17(2)	Training Program for Night Road Work to Improve Safety and Operations, 4 p.

TABLE 3 RESEARCH RESULTS DIGESTS<sup>a</sup>

NO.	PROJECT	TITLE, PAGES
294	20-65(5)	Transit-Oriented Development: Developing a Strategy to Measure Success, 32 p.
295	20-65(3)	Availability and Accessibility of Liability and Excess Insurance for Public Transit and Private Coach Operators, 36 p.
296	17-18(8)	Comprehensive Human Factors Guidelines for Road Systems, 8 p.
297	5-16	New Facility for Calibrating Retroreflectometers, 4 p.
298	17-24	Use of Event Data Recorder (EDR) Technology for Highway Crash Data Analysis, 4 p.
299	17-25	Crash Reduction Factors for Traffic Engineering and Intelligent Transportation Systems (ITS) Improvements: State-of-Knowledge Report, 32 p.
300	25-24	Outcomes of the Environmental Streamlining Pilot Projects, 12 p.
301 <sup>h</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 17 p.
302	17-18	Core Competencies for Highway Safety Professionals, 24 p.
303	17-23	Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads, 11 p.
304	25-22(02)	Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions, 38 p.
305	17-28	Pavement Marking Materials and Markers: Testing the Relationship Between Retroreflectivity and Safety, 8 p.
306	8-54	Identification of Liability-Related Impediments to Sharing Section 409 Safety Data Among Transportation Agencies and a Synthesis of Best Practices, 16 p.
307	1-40	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software, 36 p.
308	1-40D	Changes to the Mechanistic-Empirical Pavement Design Guide, 24 p.
309 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 18 p.
310	8-55	Integrating Geospatial Technologies into the Right-of-Way Data-Management Process, 13 p.
311	20-65(10)	FMCSA Regulations as They Apply to FTA Section 5310/5311 Providers: A Handbook, 32 p.
312	3-68	Guide to Effective Freeway Performance Measurement (+ WOD 97), 41 p.
313	20-65(12)	Cost-Allocation Methods for Commuter, Intercity, and Freight Rail Operations on Shared-Use Rail Systems and Corridors, 30 p.
314	20-65(7)	State DOT Staff Resources for Administering Federal Public Transportation Programs (+WOD 99), 24 p.
315	20-65(9)	Centralized Versus Decentralized State Procurement of Paratransit Vehicles for the Federal Section 5310 Program, 48 p.
316	9-37	Using Surface Energy Measurements to Select Materials for HMA Pavements (+ WOD 104), 17 p.
317	25-23(2)	Prototype Software for an Environmental Information Management and Decision Support System, 24 p.
318	3-67	An Expert System for Recommending Speed Limits in Speed Zones, 24 p.
319	20-65(8A)	Buy America Issues Associated with State DOT Procurement of Paratransit Vehicles Using FTA Funds, 48 p.
320	20-65(11)	Current State Issues with Implementing FTA Section 5310 and Section 5311 Programs, 20 p.
321	1-43	Guide for Pavement Friction, pending
322	17-33	Public Information and Education in the Promotion of Highway Safety, 13 p.
323	10-58(2)	Using the Results of Contractor-Performed Tests in Quality Assurance (+ WOD 115), 17 p.
324	9-23	Simulating the Effects of Hot Mix Asphalt Aging for Performance Testing and Pavement Structural Design (+ WOD 113), 8 p.
325 <sup>b</sup>	20-5	Continuing Project to Synthesize Information on Highway Problems, 20 p.
326	20-65	State Public Transportation Division Involvement in State Emergency Planning, Response, and Recovery, 18 p.
327	20-5, Topic 30-05	Transportation Implications of Emerging Economic Development Trends, 33 p.
328	5-18	Color Effectiveness of Yellow Pavement Marking Materials, 12 p.
329	17-36	Highway Safety Manual Data Needs Guide, 11 p.
330	25-30	Temporary Bridging to Avoid or Minimize Impacts to Waters and Wetlands During Highway Construction, 28 p.

<sup>a</sup> See Table 7 for project titles. All items listed are final publications except where noted. Numbers missing from the series have been superseded by a later publication. See final page of this document for ordering information.

<sup>b</sup> Progress reports are superseded annually.

NA: Not applicable

TABLE 4 LEGAL RESEARCH DIGESTS

NO.	PROJECT	TITLE, PAGES
2	20-6	Supplement to Liability of State Highway Departments for Design, Construction, and Maintenance Defects, 20 p.
3	20-6	Supplement to Liability of State and Local Governments for Negligence Arising Out of the Installation and Maintenance of Warning Signs, Traffic Lights, and Pavement Markings, 10 p.
4	20-6	Supplement to Personal Liability of State Highway Department Officers and Employees, 9 p.
5	20-6	Supplement to Labor Standards in Federal-Aid Highway Construction Contracts, 20 p.
6	20-6	Impact of the Discretionary Function Exception on Tort Liability of State Highway Departments, 25 p.
7	20-6	Liability of Public Agencies Arising Out of Rejection of Bids and Misaward of Contracts, 17 p.
8	20-6	Continuing Project on Legal Problems Arising Out of Highway Programs, 11 p.
9	20-6	Supplement to Liability of State and Local Governments for Snow and Ice Control, 11 p.
10	20-6	Supplement to Liability of the State for Injury-Producing Defects in Highway Surface, 10 p.
11	20-6	Impact of 42 U.S.C. Section 1983 (Civil Rights Act) on Highway Departments, Personnel, and Officials, 21 p.
12	20-6	Suspension, Debarment, and Disqualification of Highway Construction Contractors, 27 p.
13	20-6	Civil RICO (Racketeer Influenced and Corrupt Organizations Act) Applications in the Highway Construction Industry, 28 p.
14	20-6	Supplement to Liability of State Highway Departments for Defects in Design, Construction, and Maintenance of Bridges, 12 p.
15	20-6	The Application of NEPA (National Environmental Policy Act) to Federal Highway Projects, 22 p.
16	20-6	Supplement to Payment of Attorney Fees in Eminent Domain and Environmental Litigation, 17 p.
17	20-6	Public Duty Defense to Tort Liability, 20 p.
18	20-6	Supplement to Planning and Precondemnation Activities as Constituting a Taking Under Inverse Law 10 p.
19	20-6	Continuing Project on Legal Problems Arising Out of Highway Programs, 11 p.
20	20-6	Supplement to Legal Aspects of Historic Preservation in Highway and Transportation Programs, 39 p.
21	20-6	Supplement to Liability of the State for Highway Traffic Noise, 8 p.
22	20-6	Authority of State Departments of Transportation to Mitigate the Environmental Impact of Transportation Projects, 12 p.
23	20-6	Supplement to Valuation Changes Resulting from Influence of Public Improvements, 24 p.
24	20-6	Continuing Project on Legal Problems Arising Out of Highway Programs, 8 p.
25	20-6	Minority and Disadvantaged Business Enterprise Requirements in Public Contracting, 28 p.
26	20-6	Legal Implications of Highway Department's Failure to Comply with Design, Safety, or Maintenance Guidelines, 12 p.
27	20-6	Liability of the State for Injury or Damage Occurring in Motor Vehicle Accident Caused by Trees, Shrubbery, or Other Vegetative Obstruction Located in Right-of-Way or Growing on Adjacent Private Property, 12 p.
28	20-6	Preventing and Defending Against Highway Construction Claims: The Use of Changed or Differing Site Condition Clauses and New York State's Use of Exculpatory Contract Provisions and No Claims Clauses, 52 p.
29	20-6	Highways and the Environment: Resource Protection and the Federal Highway Program, 46 p.
30	20-6	Legal Issues Relating to the Acquisition of Right of Way and the Construction and Operation of Highways over Indian Lands, 26 p.
31	20-6	Federal Air Quality Laws Governing State and Regional Transportation Planning, 32 p.
32	20-6	Federalism and the Intermodal Surface Transportation Efficiency Act of 1991, 24 p.
33	20-6	Freedom of Information Acts Federal Data Collections, and Disclosure Statutes Applicable to Highway Projects and the Discovery Process, 28 p.
34	20-6	Transportation Agencies as Potentially Responsible Parties at Hazardous Waste Sites, 32 p.
35	20-6	Continuing Project on Legal Problems Arising Out of Highway Programs, 8 p.
36	20-6	Photographic Traffic Law Enforcement, 43 p.
37	20-6	Indemnification and Insurance Requirements for Design Consultants and Contractors on Highway Projects, 25 p.
38	20-6	Risk Management for Transportation Programs Employing Written Guidelines as Design and Performance Standards, 21 p.
39	20-6	Liability of Contractors to State Transportation Departments for Latent Defects in Construction after Project Acceptance, 14 p.
40	20-6	Liability of Highway Departments for Damages Caused by Stormwater Runoff, 22 p.
41	20-6	Application of Outdoor Advertising Controls on Indian Land, 30 p.
42	20-6	Enforcement of Environmental Mitigation Commitments in Transportation Projects: A Survey of Federal and State Practice, 18 p.

TABLE 4 LEGAL RESEARCH DIGESTS

NO.	PROJECT	TITLE, PAGES
43	20-6	Application of the Fourth Amendment to the Inspection of Commercial Motor Vehicles and Drivers, 32 p.
44	20-6	Reexamination of the Line Between Governmental Exercise of the Police Power and Eminent Domain, 63 p.
45	20-6	The State's Immunity from Suit in Federal and State Court, 24 p.
46	20-6	Drug and Alcohol Testing—A Survey of Labor-Management Relations, 61 p.
47	20-6	Judicial Enforcement of Variable Speed Limits, 25 p.
48	20-6	Civil Rights in Transportation Projects, 24 p.
49	20-6	Emergency Contracting: Flexibilities in Contracting Procedures During an Emergency, 28 p.
50	20-6	Current Practices in the Use of Alternative Dispute Resolution, 46 p.



TABLE 5 WEB-ONLY DOCUMENTS

NO.	PROJECT	TITLE, PAGES
1	1-31	Smoothness Specifications for Pavements—Contractor's Final Report, 540 p.
2	3-51	Communications Mediums for Intelligent Transportation Systems—Contractor's Appendix A, 540 p.
3	8-32(5)	Multimodal Transportation Planning Data—Contractor's Final Report, 192 p.
4	8-32(5)	Multimodal Transportation Planning Data—Compendium to Contractor's Final Report, 236 p.
5	3-46	Capacity and Level of Service at Unsignalized Intersections. Volume 1, Two-Way Stop-Controlled Intersections—Contractor's Final Report, 134 p.
6	3-46	Capacity and Level of Service at Unsignalized Intersections. Volume 2, All-Way, Stop-Controlled Intersections—Contractor's Final Report, 72 p.
7		Summary of Progress Through 1998, 244 p.
8	14-12	Highway Maintenance Quality Assurance—Contractor's Final Report, 222 p.
9	8-32(1)	Innovative Practices for Multimodal Planning for Freight and Passengers—Project Bibliography, 166 p.
10	3-48	Capacity Analysis for Actuated Intersections—Contractor's Final Report, 208 p.
11	20-5	NCHRP Synthesis 257—Appendix C, 78 p.
12	3-47	Capacity Analysis of Interchange Ramp Terminals—Contractor's Final Report, 356 p.
13	20-34	Developing Measures of Effectiveness for Truck Weight Enforcement Activities—Contractor's Final Report, 278 p.
14	1-28	Laboratory Determination of Resilient Modulus for Flexible Pavement Design—Contractor's Final Report, 463 p.
15	20-7(92)	Durability of Precast Segmental Bridges—Contractor's Final Report, 45 p.
16	1-29	Improved Surface Drainage of Pavements—Contractor's Final Report, 225 p.
17	20-24(7)A	Alternative Approaches to the Taxation of Heavy Vehicles—Contractor's Applications Manual, 85 p.
18	2-17(6)	Tourism Travel Contributions to Economic Development—Volume II of Contractor's Final Report (Supporting Materials and References), 108 p.
19	4-24	HDPE Pipe: Recommended Material Specifications and Design Requirements—Contractor's Final Report, 272 p.
20	20-7(100)	Safety Appraisal of Suspension Bridge Main Cables—Workshop Final Report, 37 p.
21	8-32(4)	Volume II: Case Studies of Multimodal Partnerships—Contractor's Final Report, 200 p.
22	8-32(4)	Volume III: Research Report: Developing and Maintaining Partnerships for Multimodal Transportation Planning—Contractor's Final Report, 88 p.
23	10-53	Nondestructive Methods for Condition Evaluation of Prestressing Steel Strands in Concrete Bridges, 81 p.
24	20-7(99)	LRFD Design Criteria for Cotton Duck Pad Bridge Bearing, 43 p.
25	20-7(90)	TRAC PAC: The Next Generation, 249 p.
26	8-32(2)A	Multimodal Transportation: Development of a Performance-Based Planning Process, 320 p.
27	24-13	Evaluation of Metal-Tensioned Systems in Geotechnical Applications. Phase I, 215 p.
28	12-46	Manual for Condition Evaluation and Load Rating of Highway Bridges Using Load and Resistance Factor Philosophy, 65 p.
29	10-45	Procedures for Evaluating Corrosion-Inhibiting Admixtures for Structural Concrete, 216 p.
30	9-12	Recommended Use of Reclaimed Asphalt Pavement in the Superpave Mix Design Method, 461 p.
31	25-19	Assessing the Social and Economic Effects of Transportation Projects, 109 p.
32	20-50(2)	LTPP Data Analysis: Relative Performance of Jointed Plain Concrete Pavements with Sealed and Unsealed Joints, 103 p.
33	17-33	Strategic Plan for Improving Roadside Safety, 113 p.
34	9-09(1)	Literature Review: Verification of Gyration Levels in the Superpave $N_{design}$ Table, 83 p.
35	1-38	Rehabilitation Strategies for Highway Pavements, 310 p.
36	10-37A(1)	Extended Exposure and Monitoring of Epoxy-Coated Reinforced Concrete Test Slabs, 49 p.
37	25-20	Management of Runoff from Surface Transportation Facilities—Synthesis and Research Plan, 65 p.
38	10-54	Quality-Based Performance Rating of Contractors for Prequalification and Bidding Purposes, 220 p.
39	20-24(14)	Managing Change in State Departments of Transportation: Scans 1 through 8, 494 p.
40	20-50(8/13)	LTPP Data Analysis: Factors Affecting Pavement Smoothness, 299 p.
41	20-24(11)	Phase I Report: Task 1 of 3: Synthesis of Asset Management, 84 p.; Task 2 of 3: Asset Management Framework, 155 p.; Task 3 of 3: Recommended Research Program, 68 p.
42	20-51(1)	Issues in Pavement Smoothness: A Summary Report, 200 p.

TABLE 5 WEB-ONLY DOCUMENTS

NO.	PROJECT	TITLE, PAGES
43	25-10(2)	Guidance for Estimating the Indirect Effects of Proposed Transportation Projects: PowerPoint Presentation, 230 p.
44	12-45	Design Examples for Large-Span Culverts: Supporting Material for <i>NCHRP Report 473</i> , 60 p.
45	10-50A	A Process for Selecting Strategies for Rehabilitation of Rigid Pavements, 129 p.
46	20-7(133)	Improved Live Load Deflection Criteria for Steel Bridges, 140 p.
47	20-50(3/4)	LTPP Data Analysis: Effectiveness of Maintenance and Rehabilitation Options, 332 p.
48	20-50(5)	LTPP Data Analysis: Variations in Pavement Design Inputs, 265 p.
49	20-52	TRAC PAC 2—A Hands-On Educational Program, 69 p.
50	10-37C	Repair and Rehabilitation of Bridge Components Containing Epoxy-Coated Reinforcement, 192 p.
51	10-58	Construction Engineering and Management Research Program, 300 p.
52	20-50(9)	LTPP Data Analysis: Feasibility of Using FWD Deflection Data to Characterize Pavement Construction Quality, 78 p.
53	6-14	Feasibility of Using Friction Indicators to Improve Winter Maintenance Operations and Mobility, 180 p.
54	9-26	Precision Estimates of Selected Volumetric Properties of HMA Using Non-Absorptive Aggregate, 65 p.
55	25-23	Environmental Information Management and Decision Support System Implementation Handbook—Appendixes B through F, 79 p.
56	9-18	Sensitivity Evaluation of Field Shear Test Using Improved Protocol and Indirect Tension Strength Test, 33 p.
57	11-7	Development and Evaluation of a National Data-Management System for Highway Tort Claims, 103 p.
58	14-13	Research for Customer-Driven Benchmarking of Maintenance Activities, 99 p.
59	20-24(18)	Outsourcing of State DOT Capital Program Delivery Functions, 62 p.
60	20-50(7/12)	LTPP Data Analysis: Daily and Seasonal Variations in In Situ Material Properties, 707 p.
61	19-04	Improving the Compatibility of Vehicles and Roadside Safety Hardware, 270 p.
62	17-18(4)	Development of a Highway Safety Manual, 302 p.
63	19-4	A Review of DOT Compliance with GASB 34 Requirements—Final Report Appendixes A through G, 118 p.
64	20-7(173)	Appendixes to <i>NCHRP Research Results Digest 289: Measuring and Communicating the Effects of Traffic Incident Management Improvements</i> , 116 p.
65	24-11	Geofoam Applications in the Design and Construction of Highway Embankments, 792 p.
66	9-26	An Investigation of the Cause of Variation in HMA Bulk Specific Gravity Test Results Using Non-Absorptive Aggregates, 49 p.
67	24-16	Methodology for Predicting Channel Migration, 214 p.
68	9-27	Relationship of Air Voids, Lift Thickness, and Permeability in HMA Pavements, Vols 1 – 4, 607 p.
69	20-24(30)	Performance Measures for Context-Sensitive Solutions: A Guidebook for State DOTs, 95 p.
70	17-18(8)	Comprehensive Human Factors Guidelines for Road Systems, 133 p.
71	9-26	Precision Estimates for AASHTO Test Method T308 and the Test Methods for Performance-Graded Asphalt Binder in AASHTO Specification M320, 138 p.
72	5-16	National Calibration Facility for Retroreflective Traffic Control Materials, 154 p.
73	20-59(11)	Emergency Transportation Operations: Resources Guide for <i>NCHRP Report 525, Volume 6</i> , 70 p.
74	20-50 (10&16)	LTPP Data Analysis: Influence of Design and Construction Features on the Response and Performance of New Flexible and Rigid Pavements, 702 p.
75	17-24	Use of Event Data Recorder Technology for Highway Crash Data Analysis, 210 p.
76	18-04B	Final Report for Early-Opening-to-Traffic Portland Cement Concrete for Pavement Rehabilitation, 166 p.
77	8-38	Consideration of Environmental Factors in Transportation Skills Planning: Appendixes, 92 p.
78	12-61	Simplified Shear Design of Structural Concrete Members: Appendixes, 338 p.
79	25-24	Monitoring, Analyzing, and Reporting on the Environmental Streamlining Pilot Projects, 479 p.
80		Pending for 2007
81	12-59	Design and Construction Guidelines for Geosynthetic-Reinforced Soil Bridge Abutments with a Flexible Facing: Appendix C - Verification of the Analytical Model (Appendix C to <i>NCHRP Report 556</i> ), 53 p.
82	4-19(2)	Validation of Performance-Related Test of Aggregates for Use in Hot-Mix Asphalt Pavements: Appendixes A through F of the Contractor's Final Report, 117 p.
83	24-14	Scour at Contracted Bridge Sites, 299 p.
84	21-08	Innovative Load Testing Systems, 675 p.
85	3-77	Considerations for a Guide to Contracting ITS Projects, 249 p.
86	20-65[4]	Estimating the Impacts of the Aging Population on Transit Ridership, 53 p.

TABLE 5 WEB-ONLY DOCUMENTS

NO.	PROJECT	TITLE, PAGES
87	6-15	Test Methods for Evaluating Field Performance of RWIS Sensors, 331 p.
88	18-6A	Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements, 57 p.
89	8-54	Identification of Reliability-Related Impediments to Sharing \$409 Safety Data Among Transportation Agencies and a Synthesis of Best Practices, 38 p.
90	17-23	Safety Impacts and Other Implications of Raised Speed Limits on High-Speed Roads (Final Report for <i>NCHRP Research Results Digest 303</i> ), 197 p.
91	3-71	Improving Pedestrian Safety at Unsignalized Crossings, Appendices B to O (joint web-only document with <i>TCRP Web-Only Document 30</i> ), 270 p.
92	17-28	Pavement Marking Materials and Markers: Real-World Relationship Between Retroreflectivity and Safety Over Time, 206 p.
93	8-37	Technical Appendix to <i>NCHRP Report 571: Standardized Procedures for Personal Travel Surveys</i> , 239 p.
94	3-65	Appendixes to <i>NCHRP Report 572: Roundabouts in the United States</i> , 197 p.
95	8-55	Integrating Geospatial Technologies into the Right-of-Way Data Management Process: Appendixes A through F, 246 p.
96	9-9(1)	Appendixes to <i>NCHRP Report 573: Superpave Mix Design: Verifying Gyration Levels in the N<sub>design</sub> Table</i> , 195 p.
97	3-68	Guide to Effective Freeway Performance Measurement: Final Report and Guidebook, 482 p.
98	8-49	Final Report for <i>NCHRP Report 574: Guidance for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction</i> , 163 p.
99	20-65	Appendixes to <i>NCHRP Research Results Digest 314: State DOT Staff Resources for Administering Federal Public Transportation Programs</i> , 126 p.
100	2-22(2)	Examples of Best Practices for Communicating the Economic Benefits of Transportation, 140 p.
101	18-10	Procedures for Evaluating Air Entraining Admixtures for Highway Concrete, 100 p.
102	20-24(49)	Future Financing Options to Meet Highway and Transit Needs (+ Docutech version) 197 p.
103	25-23(2)	Final Report for <i>NCHRP Research Results Digest 317: Prototype Software for an Environmental Information Management and Decision Support System</i> , 108 p.
104	9-37	Final Report for <i>NCHRP RRD 316: Using Surface Energy Measurements to Select Materials for Asphalt Pavement</i> , 196 p.
105	3-69	Final Report for <i>NCHRP Report 581: Design of Construction Work Zones on High-Speed Highways</i> , 116 p.
106	24-24	Criteria for Selecting Hydraulic Models, 727 p.
107	24-25	Risk-Based Management Guidelines for Scour at Bridges with Unknown Foundations, 458 p.
108		Pending
109	9-26	Precision Estimates of Selected Volumetric Properties of HMA Using Absorptive Aggregate, 82 p.
110	18-08(A)	Supplementary Cementitious Materials to Enhance Durability of Concrete Bridge Decks, 95 p.
111	9-20	Technical Reports for Recommended Performance-Related Specification for Hot-Mix Asphalt Construction: Results of the WesTrack Project, 2,654 p.
112	8-53	Integrating Freight into Transportation Planning and Project Selection Processes, 94 p.
113	9-23	Environmental Effects in Pavement Mix and Structural Design Systems, 298 p.
114	9-26	Precision Estimates for AASHTO Test Method T 269 Determined Using AMRL Proficiency Sample Data, 40 p.
115	10-58(2)	Using the Results of Contractor-Performed Tests in Quality Assurance, 250 p.
116	24-12(01)	Corrosion Study and Implementation Plan for <i>NCHRP Report 597</i> , 56 p.
117A	3-62	Accessible Pedestrian Signals: A Guide to Best Practices, 428 p.
117B	3-62	Guidelines for Accessible Pedestrian Signals: Final Report, 139 p.
118	8-35	Incorporating ITS into the Transportation Planning Process: An Integrated Planning Framework (ITS, M&O, Infrastructure) <ul style="list-style-type: none"> <li>• Part I, Executive Guidebook, 84 p.</li> <li>• Part II, Practitioner's Guidebook, 240 p.</li> </ul>
119	4-31	Appendixes to <i>NCHRP Report 598</i> , 81 p.
120	20-06	A Survey of State Practices for Protecting Transportation Agencies Against Construction & DBE Topic 13-01
121	19-05	Fraud Including Use of Contractor Suspension and Debarment Procedures, 62 p.
122	25-11	Assessing and Mitigating Future Impacts to the Federal Highway Trust Fund Such as Alternative Fuel Consumption, 41 p.
123	20-07(222)	Development of a Modal Emissions Model, 435 p. (5/08)
124	3-74	Evaluation of the Flashing Yellow Arrow Permissive-Only Left-Turn Indication Field Implementation, 136 p.
124	3-74	Guidelines for Selection of Speed Reduction Treatments at High-Speed Intersections: Supplement to <i>NCHRP Report 613</i> , 268 p.

TABLE 5 WEB-ONLY DOCUMENTS

NO.	PROJECT	TITLE, PAGES
125	5-18	Color Effectiveness of Yellow Pavement Marking Materials, 158 p.
126	17-29	Methodology to Predict the Safety Performance of Rural Multilane Highways, 240 p.
127	20-63	Performance Measurement Tool Box and Reporting System for Research Programs and Projects, 214 p.
128	3-70	Multimodal Level of Service Analysis for Urban Streets: Users Guide, 60 p.
129	17-26	Methodology to Predict the Safety Performance of Urban and Suburban Arterials <ul style="list-style-type: none"> <li>• Phases I and II, 231 p.</li> <li>• Phase III, Pedestrian Safety Prediction Methodology, 76 p.</li> </ul>
130	20-59(22)	A Guide to Emergency Quarantine and Isolation Controls of Roads in Rural Areas, 113 p.

TABLE 6 CRP CD-ROMs

NO.	PROJECT	TITLE
<b>CRP-CD-1</b>	NCHRP 9-7, 9-8, 9-9	Bituminous Materials Research Series
<b>CRP-CD-2</b>	TCRP A-15	Transit Capacity and Quality of Service Manual: First Edition
<b>CRP-CD-3</b>	TCRP D-5	Performance of Direct-Fixation Track Software: Design Guidelines and Software
<b>CRP-CD-4</b>	TCRP C-11	Alternative-Fuel Transit Bus Hazard Assessment Model
<b>CRP-CD-5</b>	NCHRP 4-21	Appropriate Use of Waste and Recycled Materials in the Transportation Industry—An Information Database
<b>CRP-CD-6</b>	NCHRP 20-32(2)	Transportation Research Thesaurus
<b>CRP-CD-7</b>	NCHRP 25-9	Environmental Impact of Construction and Repair Materials
<b>CRP-CD-8</b>	NCHRP 9-11, 9-12, 9-13	Bituminous Materials Research Series II
<b>CRP-CD-9</b>	NCHRP 9-20	Recommended Performance-Related Specification for Hot-Mix Asphalt Construction: Results of the WesTrack Project (content released as NCHRP Web Doc 111 in 2007)
<b>CRP-CD-10</b>	NCHRP 9-10, 9-14, 9-19	Bituminous Materials Research Series III
<b>CRP-CD-11</b>	NCHRP I-32	Pavement Design Tools (Contractor's CD)
<b>CRP-CD-12</b>	NCHRP 14-11(2)	Tools for Peak Performance (Contractor's CD)
<b>CRP-CD-13</b>	TCRP G-03	Transit Risk Manager for Bus Services (Contractor's CD)
<b>CRP-CD-14</b>	NCHRP 25-22	Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions
<b>CRP-CD-15</b>	NCHRP 8-33	Supporting Materials for <i>NCHRP Report 462: Quantifying Air-Quality and Other Benefits and Costs of Transportation Control Measures</i>
<b>CRP-CD-16</b>	TCRP B-16	Multimedia Presentation: Role of Private-for-Hire Vehicle Industry in Public Transit (for <i>TCRP Report 75</i> )
<b>CRP-CD-17</b>	TCRP B-15	Supporting Material for <i>TCRP Report 73: Characteristics of Urban Travel Demand</i>
<b>CRP-CD-18</b>	TCRP H-19	Estimating and Presenting the Benefits and Costs of Public Transit Projects: Guidebook for Practitioners
<b>CRP-CD-19</b>	TCRP A-24	A Toolkit for Self-Service Barrier-Free Fare Collection (for <i>TCRP Report 80</i> )
<b>CRP-CD-20</b>	NCHRP 20-6 and TCRP J-5	Selected Studies in Transportation Law: Volumes 1–8: Vol. 1: Construction Contract Law (20-6) Vol. 2: Eminent Domain (pending) Vol. 3: Environmental Law and Transportation (20-6) Vol. 4: Tort Liability of Highway Agencies (20-6) Vol. 5: Transit Law (J-5) Vol. 6: Transit Labor 13[c] Decisions (J-5) Vol. 7: Transit Charter Bus Service Decisions and Documents (J-5) Vol. 8: Transportation Law and Government Relations (20-6)
<b>CRP-CD-21</b>	TCRP F-10	Toolbox for Transit Operator Fatigue (for <i>TCRP Report 81</i> )
<b>CRP-CD-22</b>	NCHRP 20-45	Scientific Approaches to Transportation Research
<b>CRP-CD-23</b>	NCHRP 15-19	A Guide to Best Practices for Achieving Context Sensitive Solutions (for <i>NCHRP Report 480</i> )
<b>CRP-CD-24</b>	NCHRP 3-52A	Impact Calculator: Impacts of Access Management Techniques
<b>CRP-CD-25</b>	TCRP G-6	<i>TCRP Report 88: A Guidebook for Developing a Transit Performance-Measurement System and Supplementary Material</i>
<b>CRP-CD-26</b>	NCHRP 12-43	BLCCA Software, Guidance Manual, User Manual, and Appendixes to <i>NCHRP Report 483</i>
<b>CRP-CD-27</b>	TCRP J-9(6)	<i>TCRP Report 84, Vol. 3: Using the Internet for Transit Training and Certification</i>
<b>CRP-CD-28</b>	NCHRP 3-56	RSRAP Software, <i>NCHRP Report 486</i> , and Supplementary Material
<b>CRP-CD-29 A&amp;B</b>	NCHRP 12-50	<i>NCHRP Report 485: Supporting Software—Subdomain Data, Common Tables, and Data Viewer; Volumes 1 &amp; 2</i>

TABLE 6 CRP CD-ROMs

NO.	PROJECT	TITLE
CRP-CD-30	NCHRP 12-48	Appendixes for <i>NCHRP Report 489: Design of Highway Bridges for Extreme Events</i>
CRP-CD-31	TCRP A-23	Bus Rapid Transit: Case Studies for <i>TCRP Report 90</i>
CRP-CD-32	NCHRP 25-6	Intersection Air Quality Model (Contractor's CD)
CRP-CD-33	NCHRP 22-9(2)	<i>NCHRP Report 492</i> Supplementary Material: RSAP Program and User's Manual
CRP-CD-34	TCRP J-9(4)	<i>TCRP Report 84, Vol. 4: Advanced Features of Transit Websites</i>
CRP-CD-35	NCHRP 3-54(2)	<i>NCHRP Report 493</i> Supplementary Material: Working Papers
CRP-CD-36	NCHRP 3-50(2)	Driver Information Load (DIL) Program and User Manual (for <i>NCHRP Report 488</i> )
CRP-CD-37	NCHRP 12-51	CARRIS Software Module and User's Guide (for <i>NCHRP Report 495</i> )
CRP-CD-38	NCHRP 15-18	Appendix Material for <i>NCHRP Report 504</i>
CRP-CD-39	NCHRP 24-17	<i>NCHRP Report 507</i> Appendix Material
CRP-CD-40	TCRP B-23	Software for <i>TCRP Report 98</i> , Requirements for Demand Responsive Services
CRP-CD-41	NCHRP 20-47(1)	Software for <i>NCHRP Report 506</i> , Positional Data in Transportation
CRP-CD-42	TCRP A-15A	<i>TCRP Report 100</i> (TCQSM) + Supplemental Material
CRP-CD-43	TCRP J-10	<i>TCRP Report 86: Public Transportation Security, Vol. 5: Security-Related Customer Communications and Training for Public Transportation Providers</i>
CRP-CD-44	NCHRP 9-12	Recommended Use of Reclaimed Asphalt Pavement in the Superpave Mix Design Method
CRP-CD-45	TCRP F-11	Public Transportation Operating Agencies as Employers of Choice: Toolkit
CRP-CD-46	NCHRP 9-19	Appendixes to <i>NCHRP Report 547</i> : Simple Performance Tests and Advanced Materials Characterization Models
CRP-CD-47	NCHRP 12-54	<i>NCHRP Report 527</i> : Appendixes A through H
CRP-CD-48	NCHRP 24-16	<i>NCHRP Report 533</i> Supporting Software –ArcView-based Data Logger and Channel Migration Predictor
CRP-CD-49	NCHRP 24-16	Archive River Meander Bend Databases, 4-CD set from <i>NCHRP Web-Only Document 67</i>
CRP-CD-50	NCHRP 17-17(2)	Training Program for Night Road Work to Improve Safety and Operations, 4-CD set for NCHRP Project 17-17(2) and <i>NCHRP Research Results Digest 293</i>
CRP-CD-51	TCRP H-30	Appendix Material for <i>TCRP Report 105</i>
CRP-CD-52	TCRP H-29, NCHRP 8-45	A Research Results Compendium to <i>TCRP Report 106/NCHRP Report 536</i>
CRP-CD-53	NCHRP 8-40(2)	Evaluating Cultural Resource Significance: Volume 1, Electronic Cultural Resource Evaluation Library (ECREL), and Volume 2, Historic Property Screening Tool (HPST)
CRP-CD-54	NCHRP 10-57	Structural Safety Evaluation of Suspension Bridge Parallel-Wire Cables; Supporting Material for <i>NCHRP Report 534</i>
CRP-CD-55	NCHRP 20-59(2)	Contents for <i>NCHRP Report 525, Vol. 4</i>
CRP-CD-56	NCHRP 12-58	Appendixes for <i>NCHRP Report 543</i>
CRP-CD-57	NCHRP 20-57	Supporting Material for <i>NCHRP Report 545</i>
CRP-CD-58	NCHRP 24-19	Supplemental Material and Software for <i>NCHRP Report 544</i>
CRP-CD-59	NCHRP 20-59(6AB)	System Security Awareness for Transportation Employees
CRP-CD-60	TCRP H-25A	Appendices to <i>TCRP Report 108</i>
CRP-CD-61	TCRP D-7 (Task 11)	<i>TCRP Report 71, Vol. 6: Direct-Fixation Track Design Specifications, Research, and Related Material</i>
CRP-CD-62	NCHRP 8-44	<i>NCHRP Report 546: Incorporating Safety into Long-Range Transportation Planning</i>
CRP-CD-63	NCHRP 25-20(1)	<i>NCHRP Report 565: Evaluation of Best Management Practices for Highway Runoff Control</i>
CRP-CD-64	TCRP J-10D	<i>TCRP Report 86: Public Transportation Security, Vol. 10—Hazard and Security Plan Workshop: Instructor Guide</i>

TABLE 6 CRP CD-ROMs

NO.	PROJECT	TITLE
<b>CRP-CD-65</b>	TCRP J-5(8-4)	Americans with Disabilities Act: The Federal Transit Administration's Letters of Findings and Compliance Assessments
<b>CRP-CD-66</b>	TCRP H-32	Building and Retaining Transit Ridership: The Keys to Success—An Interactive CD
<b>CRP-CD-67</b>	NCHRP 12-67	Users Manual and Software for <i>NCHRP Report 590: Multi-Objective Optimization for Bridge Management Systems</i>
<b>CRP-CD-68</b>	ACRP 1-01	<i>ACRP Legal Research Digest 4: Compilation of DOT and FAA Airport Legal Determinations and Opinion Letters Through December 31, 2007</i>
<b>CRP-CD-69</b>	NCHRP 15-28	CANDE-2007 Installation Software for <i>NCIIRP Report 619</i>

TABLE 7  
SUMMARY OF STATUS THROUGH DECEMBER 31, 2008, FOR FY 1963 THROUGH FY 2009 PROJECTS

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
<b>AREA ONE : DESIGN--PAVEMENTS</b>						
01-01(01)	Development of Procedures for Comparing the AASHO Road Test Findings with Performance of (1) Existing Pavements and (2) Newly Constructed Experimental Pavements	University of Alabama	42,800 *	3/1/1963	2/29/1964	Completed---Published as NCHRP Reports 2 and 2A
01-01(02)	Guidelines for Extending the Findings of the AASHO Road Test---Implementation Phase	Highway Research Board	11,356 *	3/1/1964	8/31/1965	Contract cancelled---No report
01-02	Comparison of Different Methods for Evaluating Pavement Conditions	Purdue University	29,957 *	2/15/1963	2/28/1965	Completed---Phase I report published as NCHRP Report 7; final report not published; for avail. see Summary of Progress Through 1988
01-03(01)	Factors Influencing Pavement Performance---Regional	Purdue University	45,982 *	2/15/1963	9/30/1967	Completed---Published as NCHRP Report 132
01-03(02)	Factors Influencing Pavement Performance---Local	Northwestern University	19,850 *	9/1/1963	9/30/1964	Completed---Published as NCHRP Report 22
01-03(03)	Factors Influencing Pavement Performance	University of California	19,800 *	4/1/1964	10/31/1965	Completed---Published as NCHRP Report 35
01-04(01)	Extension of Road Test Performance Concepts	Georgia Institute of Technology	10,000 *	10/1/1963	9/30/1964	Completed---Published as NCHRP Report 10
01-04(01)A	Extension of Road Test Performance Concepts	Duke University	19,924 *	2/1/1965	9/30/1966	Completed---Published as NCHRP Report 97
01-04(02)	Extension of Road Test Performance Concepts	Purdue University	12,243 *	2/1/1964	1/31/1966	Completed---Published as NCHRP Report 30
01-05	Detecting Variations in Load-Carrying Capacity of Flexible Pavements	Cornell Aero Lab	49,011 *	1/15/1964	7/15/1965	Completed---Published as NCHRP Report 21
01-05(02)	Detecting Seasonal Changes in Load-Carrying Capabilities of Flexible Pavements	Texas A&M University	49,428 *	9/1/1966	6/30/1968	Completed---Published as NCHRP Report 76
01-06	Standard Measurements for Satellite Program---Measurement Team	Texas A&M University	61,353 *	3/31/1964	1/31/1967	Completed---Published as NCHRP Report 59
01-07	Development of Interim Skid-Resistance Requirements for Highway Pavement Surfaces	Pennsylvania State University	24,815 *	6/15/1965	12/15/1966	Completed---Published as NCHRP Report 37
01-08	Factors Involved in the Design of Asphalt Pavement Surfaces	Materials R&D	23,255 *	1/1/1965	2/28/1966	Completed---Published as NCHRP Report 39
01-09	Evaluation of Studded Tires	Cornell Aero Lab	24,998 *	10/1/1966	6/30/1967	Completed---Published as NCHRP Report 61
01-10	Translating AASHO Road Test Findings---Basic Properties of Pavement Components	Materials R&D	203,094 *	9/12/1966	12/31/1970	Completed---Published as NCHRP Reports 139 and 140
01-10A	Systems Approach to Pavement Design---Implementation Phase	Texas A&M University	100,000 *	3/1/1972	12/31/1973	Completed---Published as NCHRP Report 160
01-10B	Development of Pavement Structural Subsystems	Woodward-Clyde	447,941 *	2/1/1974	7/31/1986	Completed---Published as NCHRP Report 291



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
01-11	Evaluation of AASHTO Interim Guides for Design of Pavement Structures	Materials R&D	83,925 *	10/23/1967	4/30/1971	Completed---Published as NCHRP Report 128; Guidelines published by AASHTO
01-12	Determination of Pavement Friction Coefficients Required for Driving Tasks	Franklin Institute	309,244 *	8/25/1969	6/8/1973	Completed---Published as NCHRP Report 154
01-12(02)	Locked-Wheel Pavement Skid Tester Correlation and Calibration Techniques	Pennsylvania State University	319,000 *	9/16/1970	5/15/1973	Completed---Published as NCHRP Report 151
01-12(03)	Requirements for Wear-Resistant and Skid-Resistant Highway Pavement Surfaces	Materials R&D	261,955 *	11/1/1971	9/30/1975	Completed---Report not published; summarized in NCHRP Research Results Digest 89; for avail. see Summary of Progress Through 1988
01-12A	Wet-Weather Skidding Accident Reduction at Intersections	Ohio DOT	199,955 *	7/1/1975	7/1/1978	Completed---Report not published; for avail. see Summary of Progress Through 1988
01-13	Effects of Studded Tires on Highway Safety	Calspan Corporation	208,898 *	4/19/1971	8/20/1974	Completed---Published as NCHRP Report 183
01-13(02)	Effects of Studded Tires on Highway Safety---Non-Winter Driving Conditions	University of Michigan	39,450 *	2/15/1972	5/31/1973	Completed---Published as NCHRP Report 176
01-14	Influence of Combined Highway Grade and Horizontal Alignment on Skidding	University of Michigan	69,968 *	10/15/1972	1/14/1974	Completed---Published as NCHRP Report 184
01-15	Design of Continuously Reinforced Concrete Pavements for Highways	University of Texas	151,870 *	8/1/1972	8/31/1975	Completed---Report not published; summarized in NCHRP Research Results Digest 82; for avail. see Summary of Progress Through 1988
01-16	Evaluation of Winter-Driving Traction Aids	Pennsylvania State University	304,400 *	6/3/1974	10/31/1981	Completed---Report not published; summarized in NCHRP Research Results Digest 133; for avail. see Summary of Progress Through 1988
01-17	Guidelines for Recycling Pavement Materials	Texas A&M University	199,470 *	11/1/1976	9/30/1979	Completed---Published as NCHRP Report 224
01-18	Calibration and Correlation of Response-Type Road Roughness Measuring Systems	University of Michigan	250,000 *	10/1/1977	9/30/1980	Completed---Published as NCHRP Report 228
01-19	Development of a System for Nationwide Evaluation of PCC Pavements	University of Illinois	225,000 *	1/23/1978	3/15/1985	Completed---Published as NCHRP Report 277
01-20	Influence of Asphalt Temperature Susceptibility on Pavement Construction and Performance	Texas A&M University	200,000 *	5/1/1979	7/16/1984	Completed---Published as NCHRP Reports 268 and 269

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
01-21	Repair of Joint-Related Distress in Portland Cement Concrete Pavements	University of Illinois	300,000 *	5/15/1980	6/28/1985	Completed---Published as NCHRP Report 281
01-22	Shoulder Geometrics and Use Guidelines	Hugh Downs/RK&K	100,000 *	9/8/1981	4/7/1983	Completed---Published as NCHRP Report 254
01-23	Pavement Roughness and Rideability	KETRON, Inc.	249,990 *	1/4/1982	11/30/1984	Completed---Published as NCHRP Report 275
01-23(02)	Pavement Roughness and Rideability---Field Evaluation	JMJ Research	199,983 *	1/6/1986	12/31/1987	Completed---Published as NCHRP Report 308
01-24	Revision of AASHTO Interim Guide for Design of Pavement Structures	Frank McCullough/Fred Finn				Conducted under Project 20-07, Task 24
01-25	Effects of Heavy Vehicle Characteristics on Pavement Response and Performance	Transportation Research Board	100,000 *	6/12/1986	11/30/1987	Completed---Report not published; for avail. see Summary of Progress Through 1988
01-25(01)	Effects of Heavy Vehicle Characteristics on Pavement Response and Performance---Phase II	University of Michigan	400,000 *	9/1/1988	12/31/1991	Completed---Published as NCHRP Report 353
01-26	Calibrated Mechanistic Structural Analysis Procedures for Pavements	University of Illinois	499,942	2/6/1987	12/31/1992	Completed---Report not published
01-27	Video Image Processing for Evaluating Pavement Surface Distress	Triple Vision	350,000 *	3/1/1989	8/31/1991	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 181
01-28	Laboratory Determination of Resilient Modulus for Flexible Pavement Design	Georgia Institute of Technology	443,433	4/15/1990	7/31/1997	Completed---Agency report available as NCHRP Web-Only Document 14
01-28A	Harmonized Test Methods for Laboratory Determination of Resilient Modulus for Flexible Pavement Design	University of Maryland	101,325	2/1/1998	3/31/2000	Completed---Summarized in NCHRP Research Results Digest 285; agency report available for loan
01-29	Improved Surface Drainage of Pavements	Pennsylvania State University	400,000	1/4/1993	4/30/1997	Completed---Summarized in NCHRP Research Results Digest 243; agency report available as NCHRP Web-Only Document 16
01-30	Support Under Portland Cement Concrete Pavements	University of Illinois	150,000	1/1/1993	9/30/1994	Completed---Published as NCHRP Report 372
01-31	Smoothness Specifications for Pavements	ERES Consultants	399,980	2/1/1994	12/31/1996	Completed---Agency report available as NCHRP Web-Only Document 1
01-32	Systems for Design of Highway Pavements	ERES Consultants	500,000	2/1/1994	5/30/1997	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 227; available on CRP-CD-11
01-33	Methodology to Improve Pavement-Investment Decisions	Washington State University	499,800	7/1/1995	4/30/1999	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 246

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
01-34	Performance of Subsurface Pavement Drainage	ERES Consultants	505,070	5/15/1995	4/30/1998	Completed---Summarized in NCHRP Research Results Digest 268
01-34A	Contributions of Pavement Structural Layers to Rutting of Flexible Pavements	Purdue University	149,923	6/18/1999	7/31/2001	Completed---Published as NCHRP Report 468
01-34B	Effectiveness of Subsurface Drainage for HMA and PCC Pavements	Kathleen T. Hall	49,965	4/1/1999	12/31/1999	Completed---Agency report available for loan
01-34C	Effects of Subsurface Drainage on Performance of Asphalt and Concrete Pavements	Kathleen T. Hall	116,924	4/6/2000	3/31/2003	Completed---Published as NCHRP Report 499
01-34D	Effects of Subsurface Drainage on Performance of Asphalt and Concrete Pavements: Further Evaluation and Analysis of LTPP SPS-1 and SPS-2 Field Sections	Kathleen T. Hall, Ph.D., P.E.	230,000	11/18/2002	4/30/2007	Completed---Published as NCHRP Report 583
01-35	Guidelines for Developing Pavement Performance Trends	Cancelled				Project cancelled
01-35A	Guide for Pavement Management	Texas A&M University	197,225	12/1/1997	6/30/2000	Completed---Published by AASHTO
01-36	Determination of Pavement Damage from Super-Single and Singled-Out Dual Truck Tires	University of Nevada - Reno	99,027	11/1/1996	2/23/1998	Contract cancelled
01-37	Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures	Nichols Consulting Engineers	325,489	12/20/1996	7/31/1997	Contract cancelled
01-37A	Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures: Phase II	ERES Consultants	6,579,080	2/1/1998	2/28/2004	Completed---Available online at <a href="http://www.trb.org/mcpdg">http://www.trb.org/mcpdg</a>
01-37A(01)	Distribution Plan for the Recommended Mechanistic-Empirical Pavement Guide and Software	ERES Consultants	53,126	5/14/2004	12/13/2004	Completed
01-37A(01)B	Distribution Plan for the Recommended Mechanistic-Empirical Pavement Guide and Software	Cancelled				Contract cancelled, amended 01-40D(02) instead
01-38	Guide on Pavement Rehabilitation Strategies	Kathleen T. Hall	100,000	3/1/1999	3/31/2001	Completed---Agency report available as NCHRP Web-Only Document 35
01-39	Traffic Data Collection, Analysis, and Forecasting for Mechanistic Pavement Design	Cambridge Systematics	500,000	8/30/2000	7/30/2004	Completed---Published as NCHRP Reports 509 and 538
01-40	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software	----	55,000			Conducted as NCHRP Projects 1-40A to 1-40S
01-40A(01)A	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Flexible Pavement Design	Consultant: Robert P. Elliott	35,000	8/20/2004	9/30/2005	Completed---Summarized in NCHRP Research Results Digest 307

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
01-40A(01)B	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Senior Technical Reviewer for Flexible Pavement Design	Consultant: Dr. Marshall R. Thompson	90,000	9/1/2004	12/31/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(01)C	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Flexible Pavement Design	Consultant: Dr. Barry J. Dempsey	25,000	9/3/2004	12/31/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(01)D	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Flexible Pavement Design	Consultant: Samuel H. Carpenter	25,000	9/23/2004	10/12/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)A	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Senior Technical Reviewer for Rigid Pavement Design	Consultant: Ernest J. Barenberg	75,000	8/20/2004	8/15/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)B	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Rigid Pavement Design	Construction Technology Laboratories	35,400	9/14/2004	9/14/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)C	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Rigid Pavement Design	Consultant: Dr. Jeffrey R. Roesler	4,415	9/1/2004	8/30/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)D	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Rigid Pavement Design	Consultant: Dr. Jamshid M. Armaghani	27,000	9/3/2004	12/31/2005	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)E	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Rigid Pavement Design	----	18,000			Completed---Summarized in NCHRP Research Results Digest 307
01-40A(02)F	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Technical Reviewer for Rigid Pavement Design	Consultant: Moon Won	25,000	4/14/2005	4/14/2006	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(03)	Independent Review of the Recommended Mechanistic-Empirical Design Guide and Software: Reliability, Composite Pavement Design, and Summary Report	Scott Wilson Pavement Engineering, Ltd.	238,285	11/16/2004	6/30/2006	Completed---Summarized in NCHRP Research Results Digest 307
01-40A(04)A	Independent Review of the Mechanistic-Empirical Pavement Design Guide: Senior Technical Reviewer for Low Volume Road Design	----	25,000			Completed
01-40A(04)B	Independent Review of the Mechanistic-Empirical Pavement Design Guide: Technical Reviewer for Low Volume Road Design	Consultant: David P. Orr	25,000	11/17/2004	3/31/2006	Completed

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
01-40B	Local Calibration Guidance for the Recommended Guide for Mechanistic-Empirical Design of New and Rehabilitated Pavement Structures	Applied Research Associates	415,696	1/28/2005	12/31/2008	Awaiting contractor's revised final report
01-40D(01)	Technical Assistance to NCHRP: Version 0.9 of the Mechanistic-Empirical Pavement Design Software	Arizona State University	642,819	7/18/2005	12/31/2008	Research in progress
01-40D(02)	Technical Assistance to NCHRP: Version 0.9 of the Mechanistic-Empirical Pavement Design Software	Applied Research Associates	848,595	10/25/2005	12/31/2008	Research in progress
01-40D(03)	MEPDG Software Version 0.9-- Verification and Recalibration of the Thermal Cracking Model	Consultant: William G. Buttlar	7,920	1/11/2006	9/30/2006	Completed
01-40D(04)	MEPDG Software Version 0.9-- Technical Assistance to NCHRP and the NCHRP 1-40D(01) Contractor	Consultant: Charles W. Schwartz	16,800	5/15/2006	9/30/2006	Completed
01-40E(01)	Error Patch 2004-01 for the Mechanistic-Empirical Pavement Design Software	ERES Consultants	8,500	11/5/2004	8/31/2005	Completed
01-40S	Roadmap for Future MEPDG Research	Consultant: Stephen F. Brown	16,000	8/1/2007	10/31/2007	Completed
01-41	Models for Predicting Reflection Cracking of Hot-Mix Asphalt Overlays	Texas A&M University	500,000	2/3/2005	6/30/2009	Research in progress
01-42	Top-Down Fatigue Cracking of Hot-Mix Asphalt Layers - Phase I	Advanced Asphalt Technologies, LLC	39,556	8/22/2003	2/28/2005	Completed---Phase I only; continued under Project 01-42A
01-42A	Models for Predicting Top-Down Cracking of Hot-Mix Asphalt Layers	University of Florida	360,000	5/1/2006	3/31/2009	Research in progress
01-43	Guide for Pavement Friction	Applied Research Associates	349,805	6/30/2003	6/30/2006	Completed---Available from AASHTO; to be summarized in an NCHRP Research Results Digest
01-44	Measuring Tire-Pavement Noise at the Source	Hillingworth & Rodkin, Inc.	249,676	9/2/2005	5/16/2008	Completed---To be published as NCHRP Report 630
01-45	Models for Estimating the Effects of Pavement Condition on Vehicle Operating Costs	Michigan State University	500,000	10/4/2006	10/3/2009	Research in progress
01-46	Handbook for Pavement Design, Construction, and Management	----	450,000			In development
01-47	Sensitivity Evaluation of MEPDG Performance Prediction	----	250,000			In development

### AREA TWO : ADMINISTRATION--ECONOMICS

02-01	Criteria for Highway Benefit Analysis	University of Washington	101,948 *	6/1/1963	11/30/1967	Completed---Report not published; for avail. see Summary of Progress Through 1988
02-02	Guidelines for the Determination of Community Consequences	University of Washington	48,873 *	7/1/1963	8/31/1964	Completed---Published as NCHRP Report 18

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
02-03	Analysis of Motor Vehicle Accident Data as Related to Highway Classes and Design Elements	Cornell Aero Lab	155,972 *	6/1/1963	8/31/1966	Completed---Published as NCHRP Report 47
02-04	The Value of Highway Travel Time, Comfort, Convenience, and Uniform Driving Speed	Texas A&M University	77,100 *	6/1/1963	8/31/1966	Completed---Published as NCHRP Report 33
02-05	Running Cost of Motor Vehicles as Affected by Highway Design and Traffic	Catholic University	101,263 *	6/1/1963	12/31/1966	Completed---Published as NCHRP Report 13; Phase II report included in NCHRP Report 111
02-05A	Running Cost of Motor Vehicles as Affected by Highway Design and Traffic	Paul J. Claffey	65,665 *	7/1/1967	8/10/1970	Completed---Report included in NCHRP Report 111
02-06	Warranted Levels of Improvement for Local Rural Roads	Stanford University	40,000 *	6/1/1963	9/30/1966	Completed---Published as NCHRP Report 63
02-07	Road User Costs in Urban Areas	Catholic University	99,376 *	2/1/1964	5/31/1966	Completed---Report included in NCHRP Report 111
02-08	Estimation and Evaluation of Diverted and Generated (Induced) Traffic	Northwestern University	40,000 *	5/1/1964	8/31/1966	Completed---Report not published; for avail. see Summary of Progress Through 1988
02-09	Effect of Highway Landscape Development on Nearby Property	Franklin Institute	149,103 *	11/8/1965	1/31/1968	Completed---Published as NCHRP Report 75
02-10	Future Needs for Oversize-Overweight Permit Operation on State Highways	Jorgensen & Associates	99,655 *	11/1/1966	4/30/1968	Completed---Published as NCHRP Report 80
02-11	Summary and Evaluation of Economic Consequences of Highway Improvements	Highway Research Board	110,000 *	1/1/1967	7/31/1970	Completed---Published as NCHRP Report 122
02-12	Highway User Economic Analysis	Stanford University	100,069 *	4/1/1974	5/31/1977	Completed---Report published by AASHTO
02-13	Multilane Design Alternatives for Improving Suburban Highways	Midwest Research Institute	100,000 *	7/18/1983	3/31/1985	Completed---Published as NCHRP Report 282
02-14	Public/Private Partnerships for Financing Highway Improvements	Kimley-Horn & Associates	175,000 *	1/1/1986	1/31/1990	Completed---Ph. I report summarized in NCHRP RRD 161 and publ. as NCHRP Report 307; Ph. II report summarized in NCHRP Research Results Digest 179
02-15	Identifying, Measuring, and Evaluating the Benefits of Safety Roadside Rest Areas	KLD Associates	236,560 *	1/13/1986	4/30/1989	Completed---Published as NCHRP Report 324
02-16	Relationships Between Vehicle Configurations and Highway Design	TRB Division B & EO	912,000 *	3/2/1987	6/30/1990	Completed---Published as TRB Special Report 227
02-17(01)	Methodologies for Evaluating the Effects of Transportation Policies on the Economy	Hickling Corporation	99,145 *	9/1/1989	1/31/1991	Completed---Summarized in NCHRP Research Results Digest 200; published as NCHRP Report 342
02-17(02)	Workshop on Research Needs in Transportation and Economic Development	Greenhorn & O'Mara	52,000 *	9/1/1989	7/31/1990	Completed---Report not published

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
02-17(03)	Macroeconomic Analysis of the Linkages Between Transportation Investments and Economic Performance	Johns Hopkins University	250,000	11/1/1991	5/31/1997	Completed---Published as NCHRP Report 389
02-17(03)A	Update and Enhancement of Dataset for Macroeconomic Analysis of Transportation Investments and Economic Performance	Johns Hopkins University	42,701	11/1/1995	12/31/1997	Completed---Summarized in NCHRP Research Results Digest 248
02-17(04)	Measuring the Relationship Between Freight Transportation Services and Industry Productivity	Hickling Lewis Brod	250,000	10/14/1991	5/15/1995	Completed---Report not published
02-17(05)	Impact of Urban Congestion on Business	Cambridge Systematics	170,000	9/15/1991	3/15/1993	Completed---Summarized in NCHRP Research Results Digest 202
02-17(06)	Tourism Travel Contributions to Economic Development	Greenhorne & O'Mara	299,448	2/1/1993	2/28/1997	Completed---Published as NCHRP Report 419; Phase I summarized in NCHRP Research Results Digest 211
02-18	Research Strategies for Improving Highway User Cost-Estimating Methodologies	Hickling Corporation	200,000	1/2/1991	4/30/1994	Completed---Report not published
02-18(02)	Valuation of Travel-Time Savings and Predictability in Congested Conditions for Highway User-Cost Estimation	Hickling Lewis Brod	149,809	2/20/1995	7/31/1997	Completed---Published as NCHRP Report 431
02-18(03)	Development of an Innovative Highway User-Cost Estimation Procedure	Hickling Lewis Brod	100,000	11/15/1994	3/30/1997	Completed---Report not published; to be included in Project 02-18(04)
02-18(04)	Development and Demonstration of StratBENCOST Procedure	Hickling Lewis Brod	164,930	12/1/1997	9/30/1999	Completed---Summarized in NCHRP Research Results Digest 252
02-19	Research on the Relationship Between Economic Development and Transportation Development	Hagler Bailly, Inc.	100,000	4/17/1995	4/15/1997	Completed---Published as NCHRP Report 418
02-19(02)	Guidance on Using Existing Analytical Tools for Evaluating Transportation Investments	Hagler Bailly, Inc.	99,990	6/22/1998	8/31/1999	Completed---Draft agency report available on request
02-20	Economic Trends and Multimodal Transportation Requirements	Louis Berger Group	249,999	2/15/1995	4/30/1998	Completed---Published as NCHRP Report 421
02-21	Economic Implications of Congestion	Cambridge Systematics	300,000	4/1/1997	3/30/2001	Completed---Published as NCHRP Report 463
02-22	Needs in Communicating the Economic Impacts of Transportation Investment	Hagler Bailly, Inc.	200,000	2/3/1997	3/15/1999	Completed---Published as NCHRP Report 436
02-22(02)	Case Studies on Communicating the Economic Benefits of Transportation Investments	Hagler Bailly, Inc.	100,000	8/18/1999	9/30/2000	Completed---To be published as an NCHRP Web-Only Document; agency final report available by request
02-23	Development of an Update to the 1977 AASHTO Redbook	ECONorthwest	340,000	5/17/2000	8/31/2003	Completed---Published by AASHTO

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
02-23(02)	User Benefit Analysis for Highways Manual - Phase 2	ECONorthwest	100,000	12/8/2004	6/1/2007	Completed---Final report in review
<b>AREA THREE : TRAFFIC--OPERATIONS AND CONTROL</b>						
03-01	Development of Criteria for Evaluating Traffic Operations	Cornell Aero Lab	158,878 *	2/15/1963	2/28/1966	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-02	Surveillance Methods and Ways and Means of Communicating with Drivers	Cornell Aero Lab	246,756 *	2/15/1963	4/30/1966	Completed---Published as NCHRP Reports 9, 28, and 29
03-03	Sensing and Communication Between Vehicles	Ohio State University	163,190 *	2/15/1963	11/30/1965	Completed---Published as NCHRP Report 51
03-04	Means of Locating Disabled or Stopped Vehicles and Methods of Communication with a Central Location	Airborne Instruments	127,991 *	3/1/1963	12/15/1966	Completed---Published as NCHRP Report 6; Phase II published as NCHRP Report 40
03-05	Improved Criteria for Designing and Timing Traffic Signal Systems	Planning Research Corporation	264,902 *	3/1/1963	12/31/1969	Completed---Published as NCHRP Reports 3 and 32; Phase II published as NCHRP Report 73; Phase III published as NCHRP Report 124
03-06	Effect of Regulatory Devices on Intersection Capacity and Operation	De Leuw, Cather	153,175 *	4/1/1963	8/15/1966	Completed---Published as NCHRP Reports 11 and 41
03-07	Establishment of Standards for Highway Noise Levels	Bolt, Beranek	572,263 *	2/1/1964	11/30/1974	Completed---Published as NCHRP Report 78; Phase II publ. as NCHRP Rpt. 117; Phase III publ. as NCHRP Rpt. 144; Phase IV publ. as NCHRP Rpts. 173 & 174
03-08	Factors Influencing Safety at Highway-Rail Grade Crossings	Voorhees & Associates	91,421 *	12/1/1963	1/6/1967	Completed---Published as NCHRP Report 50
03-09	Analysis and Projection of Research on Traffic Surveillance, Communication, and Control	Jorgensen & Associates	23,760 *	10/15/1966	1/14/1968	Completed---Published as NCHRP Report 84
03-10	Application of Vehicle Operating Characteristics to Geometric Design and Traffic Operations	Cornell Aero Lab	41,520 *	1/1/1966	3/10/1967	Completed---Published as NCHRP Report 68
03-11	Optimizing Street Operations Through Traffic Regulations and Control	Peat, Marwick, et al.	258,331 *	9/1/1966	9/30/1968	Completed---Published as NCHRP Report 110
03-12	Development of Information Requirements and Transmission Techniques for Highway Users	Airborne Instruments	398,976 *	10/1/1966	12/11/1972	Completed---Phase I and II reports included in NCHRP Report 123; Phase III report not published; for avail. see Summary of Progress Through 1988
03-13	Guidelines for Medial and Marginal Access Control of Major Roadways	Texas A&M University	149,293 *	9/1/1967	11/30/1969	Completed---Published as NCHRP Report 93
03-14	Optimizing Flow on Existing Street Networks	Edwards & Kelcey, Inc.	990,000 *	10/1/1967	1/10/1970	Completed---Published as NCHRP Report 113



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-15	Weaving Area Operations Study	Polytechnic Institute of New York	300,000 *	10/1/1969	12/31/1973	Completed---Published as NCHRP Report 159
03-16	Freeway Lane Drops	System Development Corporation	176,604 *	11/1/1969	10/31/1973	Completed---Report not published; for avail. see Summary of Progress Through 1988; last phase published as NCHRP Report 175
03-17	Improving Traffic Operations and Safety at Exit Gore Areas	Pennsylvania State University	79,983 *	1/1/1971	11/30/1972	Completed---Published as NCHRP Report 145
03-18(01)	Improved Control Logic for Use with Computer-Controlled Traffic	Stanford University	381,660 *	7/15/1971	6/30/1977	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-18(02)	Traffic Control in Oversaturated Street Networks	Polytechnic Institute of New York	200,000 *	9/1/1971	6/30/1975	Completed---Published as NCHRP Report 194
03-18(03)	Cost-Effectiveness Methodology for Evaluation of Signalized Street Network Surveillance and Control Systems	JHK & Associates	123,267 *	5/1/1975	4/15/1977	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-18(04)	Methodology for Performance Evaluation of Signalized Network Control Strategies	Computran	148,705 *	7/21/1977	11/20/1980	Completed---Report not published; summarized in NCHRP Research Results Digest 126; for avail. see Summary of Progress Through 1988
03-19	Grade Effects on Traffic Flow Stability and Capacity	Midwest Research Institute	220,443 *	9/1/1971	8/31/1974	Completed---Published as NCHRP Report 185
03-20	Traffic Signal Warrants	KLD Associates	201,935 *	9/1/1972	12/31/1976	Completed---Report not published; summarized in NCHRP Research Results Digest 78; for avail. see Summary of Progress Through 1988
03-20A	Peak-Hour Traffic Signal Warrants	JHK & Associates	150,000 *	6/23/1980	7/31/1982	Completed---Published as NCHRP Report 249
03-21	Motorist Response to Highway Guide Signing	BioTechnology	272,071 *	4/1/1974	1/31/1976	Completed---Report not published; summarized in NCHRP Research Results Digest 91; for avail. see Summary of Progress Through 1988
03-21(02)	Effectiveness of Changeable-Message Displays in Advance of High-Speed Freeway Lane Closures	BioTechnology	170,993 *	12/1/1979	8/31/1981	Completed---Published as NCHRP Report 235
03-22	Guidelines for Design and Operation of Ramp Control Systems	Stanford University	199,030 *	4/15/1974	12/31/1975	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-22A	Guidelines for Design and Operation of Ramp Control Systems	Texas A&M University	249,538 *	2/1/1977	3/31/1981	Completed---Published as NCHRP Report 232

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-23	Guidelines for Uniformity in Traffic Control Signal Design Configurations	KLD Associates	308,779 *	4/8/1974	7/28/1977	Completed---Report not published; summarized in NCHRP Research Results Digest 97; for avail. see Summary of Progress Through 1988
03-24	Determine the Luminous Requirements for Retroreflective Highway Signing	University of Michigan	100,000 *	9/1/1974	4/30/1977	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-25	Cost and Safety Effectiveness of Highway Design Elements	Jorgensen & Associates	260,576 *	7/15/1975	4/16/1978	Completed---Published as NCHRP Report 197
03-26	Investigation of Selected Noise Barrier Acoustical Parameters	Pennsylvania State University	224,494 *	12/1/1976	2/28/1980	Completed---Report not published; summarized in NCHRP Research Results Digests 105 and 122; for avail. see Summary of Progress Through 1988
03-27	Guidelines for Selecting Traffic Signal Control at Individual Intersections	Voorhees & Associates	150,000 *	11/15/1976	7/31/1979	Completed---Published as NCHRP Report 233
03-28	Development of an Improved Highway Capacity Manual	JHK & Associates	161,000 *	12/15/1977	8/15/1979	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-28(02)	Urban Signalized Intersection Capacity	JHK & Associates	331,000 *	10/1/1979	8/31/1982	Completed---Results included in Highway Capacity Manual (TRB Special Report 209)
03-28A	Two-Lane, Two-Way Rural Highway Capacity	Texas A&M University	157,492 *	5/1/1980	2/28/1983	Completed---Results included in Highway Capacity Manual (TRB Special Report 209)
03-28B	New Highway Capacity Manual	Polytechnic Institute of New York	283,440 *	7/1/1982	3/31/1985	Completed---Results included in Highway Capacity Manual (TRB Special Report 209)
03-28C	Effects of Quality of Traffic Signal Progression on Delay	Texas A&M University	164,546 *	8/1/1986	7/31/1988	Completed---Published as NCHRP Report 339
03-29	Traffic Signal Display Complexity	Systems Technologies	196,284 *	7/1/1983	3/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
03-30	Intersection Channelization	Jack Leisch Associates	130,000 *	7/1/1983	5/15/1985	Completed---Published as NCHRP Report 279
03-31	Guidelines for Evaluating Alternatives for Replacing a Grade-Separated Rail/Highway Crossing	Ernst & Whinney	200,000 *	9/4/1984	2/28/1987	Completed---Published as NCHRP Report 288
03-32	Temporary Pavement Markings for Work Zones	Texas A&M University	164,990 *	5/1/1985	2/28/1987	Completed---Summary published in Transportation Research Record 1160
03-33	Capacity and Level-of-Service Procedures for Multilane Rural and Suburban Highways	JHK & Associates	475,132 *	6/1/1985	4/30/1990	Completed---Results included in Highway Capacity Manual (TRB Special Report 209)

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-34	The Feasibility of a National Heavy-Vehicle Monitoring System	Arthur D. Little	499,791 *	11/1/1985	9/30/1988	Completed---Published as NCHRP Report 303
03-35	Speed-Change Lanes	JHK & Associates	250,000 *	6/1/1986	5/31/1989	Completed---Report not published
03-36	Development of a Low-Cost Bridge Weigh-In-Motion System	Bridge Weighing Systems	400,000 *	2/16/1987	2/28/1990	Completed---Report not published
03-37	Capacity and Level of Service at Ramp-Freeway Junctions	Polytechnic University	400,000	7/1/1990	12/31/1993	Completed---Results included in Highway Capacity Manual (TRB Special Report 209)
03-37(02)	Capacity and Level of Service at Ramp-Freeway Junctions (Phase II)	Polytechnic University	150,000	9/1/1994	4/30/1996	Completed---Published as NCHRP Report 385
03-38(01)	Assessment of Advanced Technologies for Relieving Urban Traffic Congestion	Castle Rock Consultants	202,666 *	7/1/1987	6/30/1991	Completed---Published as NCHRP Report 340
03-38(01)A	A Study to Assess Advanced Vehicle and Highway Technologies	TRB EO	345,000	7/1/1989	3/31/1991	Completed---Published as TRB Special Report 232
03-38(02)	Travel Characteristics of Large-Scale Suburban Activity Centers	JHK & Associates	300,000 *	6/1/1987	2/28/1989	Completed---Published as NCHRP Report 323
03-38(03)	Traffic Adaptive Control (Phase 1)---Critical Intersection Control Strategies; (Phase 2)---OPAC Control Strategies	Farradyne Systems	374,829	9/1/1987	3/31/1993	Completed---Report not published
03-38(04)	Traffic Signal Control for Saturated Conditions	KLD Associates	270,000 *	10/1/1987	6/4/1992	Completed---Report not published
03-38(05)	Effective Utilization of Street Width	Midwest Research Institute	159,941 *	4/1/1988	6/30/1990	Completed---Published as NCHRP Report 330
03-38(06)	Cost Sharing for Transportation Improvements Near Major Suburban Employment Centers	Indiana University	125,000	5/15/1988	2/28/1991	Completed---Report not published
03-38(07)	Access Management Policies and Guidelines for Activity Centers	Metro Transportation Group	224,759	5/15/1989	9/30/1993	Completed---Published as NCHRP Report 348
03-39	Evaluation and Calibration Procedures for Weigh-In-Motion Systems	Texas A&M University	398,500	3/1/1988	12/31/1993	Completed---Report not published
03-39(02)	On-Site Evaluation and Calibration Procedures for Weigh-In-Motion Systems	Washington State University	247,846	3/10/1994	12/9/1995	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 214
03-40	Single Point Urban Interchange Design and Operations Analysis	Texas A&M University	241,037 *	5/1/1989	11/30/1991	Completed---Published as NCHRP Report 345
03-41	Procedure for Determining Work Zone Speed Limits	Graham-Migletz	200,000	11/15/1989	5/31/1993	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 192
03-41(02)	Effectiveness and Implementability of Procedures for Work Zone Speed Limits	Graham-Migletz	200,000	1/1/1994	3/31/1997	Completed---Report not published
03-42	Determination of Stopping Sight Distances	Texas A&M University	500,000	5/1/1991	11/1/1994	Completed---Published as NCHRP Report 400

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-43	Use of Shoulders and Narrow Lanes to Increase Freeway Capacity	JHK & Associates	300,000	1/15/1991	4/15/1994	Completed---Published as NCHRP Report 369
03-44	Improved Traffic Control Device Design and Placement to Aid the Older Driver	Michigan State University	400,000	4/15/1992	12/31/1996	Completed---Results included in FHWA's Older Driver Handbook
03-45	Speed-Flow Relationships for Basic Freeway Segments	JHK & Associates	350,000	11/1/1992	6/30/1995	Completed---Results included in 1997 Highway Capacity Manual update
03-46	Capacity and Level of Service at Unsignalized Intersections	University of Idaho	412,436	1/1/1993	12/31/1995	Completed---Results included in 1997 Highway Capacity Manual update; agency report available as NCHRP Web-Only Documents 5 and 6
03-47	Capacity Analysis of Interchange Ramp Terminals	Texas A&M University	400,000	1/1/1994	4/30/1997	Completed---Some results included in 2000 Highway Capacity Manual update; agency report available as NCHRP Web-Only Document 12
03-48	Capacity Analysis for Actuated Intersections	University of Florida	250,000	12/15/1993	9/30/1996	Completed---Some results included in 1997 Highway Capacity Manual update; agency report available as NCHRP Web-Only Document 10
03-49	Capacity and Operational Effects of Midblock Left-Turn Lanes	University of Nebraska - Lincoln	300,000	1/1/1994	11/30/1996	Completed---Published as NCHRP Report 395
03-50	Driver Information Overload	Westat, Inc.	299,833	1/3/1994	9/30/1998	Completed---Report not published; to be included in Project 03-50(02)
03-50(02)	Additional Investigations on Driver Information Overload	Westat, Inc.	220,204	10/13/1999	11/15/2002	Completed---Published as NCHRP Report 488 and available on CRP-CD-36
03-51	Communications Mediums for Signal, IVHS, and Freeway Surveillance Systems	Kimley-Horn & Associates	380,000	12/15/1993	4/30/1996	Completed---Agency report available as NCHRP Web-Only Document 2
03-52	Impacts of Access-Management Techniques	Urbitran Associates	399,982	2/27/1995	3/31/1998	Completed---Published as NCHRP Report 420
03-52A	Impacts of Access-Management Techniques	Urbitran Associates	99,232	12/1/1998	3/31/2000	Completed---Summarized in NCHRP Research Results Digest 247; software available on CRP-CD-24
03-53	Development of a HOV Systems Manual	Texas A&M University	250,000	2/20/1995	2/28/1998	Completed---Published as NCHRP Reports 413 and 414
03-54	Uniform Traffic Signal Displays for Protected/Permissive Left-Turn Control	Kittelson & Associates	100,000	1/9/1995	12/31/1996	Completed---Report to be included with Project 03-54(02)
03-54(02)	Evaluation of Traffic Signal Displays for Protected/Permissive Left-Turn Control	Kittelson & Associates	732,618	12/22/1997	7/31/2004	Completed---Published as NCHRP Report 493 and CRP-CD-35; interim MUTCD approval granted

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-55	A Highway Capacity Manual for the Year 2000	Catalina Engineering	300,000	1/1/1995	10/31/1996	Completed---Report not published
03-55(02)	Techniques to Estimate Speeds and Service Volumes for Planning Applications	Dowling Associates	200,000	7/1/1995	9/30/1996	Completed---Published as NCHRP Report 387
03-55(02)A	Planning Applications for the Year 2000 Highway Capacity Manual	Dowling Associates	200,000	7/18/1997	6/17/1999	Completed---Results included in 2000 Highway Capacity Manual; report available on the CRP website
03-55(03)	Capacity and Quality of Service for Two-Lane Highways	Midwest Research Institute	599,829	9/15/1995	11/30/1999	Completed---Results included in 2000 Highway Capacity Manual; report available on the CRP website
03-55(04)	Performance Measures and Levels of Service in the Year 2000 Highway Capacity Manual	JHK & Associates/TransCore	159,250	1/8/1996	10/31/1997	Completed---Report not published
03-55(05)	Capacity and Quality of Service of Weaving Areas	Viggen Corporation	299,829	12/1/1996	1/31/1999	Completed as Project 03-55(05)B
03-55(05)B	Capacity and Quality of Service of Weaving Areas	Iteris, Inc.	18,866	6/11/2004	12/10/2004	Completed---Report available on the CRP website
03-55(06)	Production of the Year 2000 Highway Capacity Manual	Catalina Engineering	1,152,750	10/15/1996	1/31/2001	Completed---Published as 2000 Highway Capacity Manual
03-56	Systemwide Impact of Safety and Traffic Operation Design Decisions for Resurfacing, Restoration, or Rehabilitation (RRR)	Midwest Research Institute	434,874	5/15/1996	9/30/2002	Completed---Published as NCHRP Report 486 and available on CRP-CD-28
03-56(02)	Implementation of the Resurfacing Safety Resource Allocation Program	Midwest Research Institute	140,000	1/31/2003	6/30/2008	Completed---Assisted state DOTs
03-57	Recommended Traffic Control Devices for Railroad-Highway Grade Crossings	Westat, Inc.	269,837	6/1/1999	12/31/2001	Completed---Published as NCHRP Report 470; results included in the MUTCD
03-58	Assessing Traffic Control Signal Installations Using Capacity Analysis and Simulation	Texas A&M University	175,000	8/4/1999	6/30/2001	Completed---Published as NCHRP Report 457
03-59	Assessment of Variable Speed Limit Implementation Issues	Northwestern University	549,860	11/9/2000	11/9/2005	Completed---Publication decision pending
03-60	Capacity and Quality of Service of Interchange Ramp Terminals	Pennsylvania State University	299,904	5/30/2001	3/31/2005	Completed---Results added to the Highway Capacity Manual
03-60A	Validation and Enhancement of the Highway Capacity Manual's Interchange Ramp Terminal Methodology	University of Florida	200,000	2/15/2008	6/14/2009	Research in progress
03-61	Communicating Changes in Horizontal Alignment	Michigan State University	410,629	5/7/2001	8/31/2005	Completed---Published as NCHRP Report 559
03-62	Guidelines for Accessible Pedestrian Signals (APS)	University of North Carolina - Chapel Hill	900,000	10/4/2001	4/30/2010	Research in progress; interim materials summarized in NCHRP Research Results Digest 278. Workshops scheduled.

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-63	Assessment of Sharing Information Between Public Safety and Transportation Agencies for Traffic-Incident Management	Mitretek Systems	199,807	11/12/2001	3/31/2004	Completed---Published as NCHRP Report 520
03-64	Highway Capacity Manual Applications Guide	Kittelson & Associates	273,301	2/13/2002	8/11/2006	Completed---Report available at <a href="http://hcmguide.com">http://hcmguide.com</a>
03-65	Applying Roundabouts in the United States	Kittelson & Associates	899,994	6/5/2002	3/31/2006	Completed---Published as NCHRP Report 572
03-65A	Update of Roundabouts: An Informational Guide	Kittelson & Associates	350,000	2/13/2007	8/12/2009	Research in progress
03-66	Traffic Signal State Transition Logic Using Enhanced Sensor Information	University of Tennessee	1,100,000	4/25/2003	5/31/2009	Research in progress
03-67	Expert System for Recommending Speed Limits in Speed Zones	University of North Carolina - Chapel Hill	300,000	9/17/2003	11/30/2006	Completed---Summarized in NCHRP Research Results Digest 318; agency report available on project web page
03-68	Guide to Effective Freeway Performance Measurement	Cambridge Systematics	299,624	10/13/2003	10/31/2006	Completed---Summarized in NCHRP Research Results Digest 312; agency report available as NCHRP Web-Only Document 97
03-69	Design of Construction Work Zones on High Speed Highways	Pennsylvania State University	499,999	8/6/2003	10/30/2006	Completed---Published as NCHRP Report 581
03-70	Multimodal Level of Service Analysis for Urban Streets	Dowling Associates	1,100,000	3/14/2003	9/30/2008	Completed---Published as NCHRP Report 616; agency report available as NCHRP Web-Only Document 128
03-71	Improving Pedestrian Safety at Unsignalized Roadway Crossings (TCRP Project D-08)	Texas A&M University	550,000	11/6/2002	3/6/2006	Completed---Published as NCHRP Report 562 and TCRP Report 112
03-72	Lane Widths, Channelized Right Turns, and Right-Turn Deceleration Lanes in Urban and Suburban Areas	Midwest Research Institute	450,000	5/20/2003	8/31/2006	Completed---Publication decision pending
03-73	Separation of Vehicles - CMV Only Lanes	Cambridge Systematics	149,922	12/27/2007	6/26/2009	Research in progress (includes \$50k from NCFRP)
03-74	Guidelines for Selection of Speed Reduction Treatments at High Speed Intersections	Kittelson & Associates	500,000	6/15/2004	12/31/2007	Completed---Published as NCHRP Report 613
03-75	Analysis of Freeway Weaving Sections	Polytechnic University	450,000	6/1/2004	1/1/2008	Completed---Results being incorporated into the Highway Capacity Manual
03-76A	Highway Traffic Signal Warrant For Intersections Near Highway-Rail Grade Crossings	Polytechnic University	199,137	3/31/2004	5/31/2006	Completed---Results incorporated into the MUTCD
03-76B	Low-Cost Active Warning Systems for Highway-Rail Grade Crossings	Texas A&M University	400,000	3/1/2004	12/31/2006	Completed---Agency report available for loan from NCHRP
03-77	Guide to Contracting Intelligent Transportation System Projects	Edwards & Kelcey, Inc.	437,874	3/4/2004	1/31/2008	Completed---Published as NCHRP Report 560 and NCHRP Web-Only Document 85

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-78	Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities	University of North Carolina - Chapel Hill	30,328	2/1/2005	7/31/2008	Contract transferred to North Carolina State University; see Project 03-78A
03-78A	Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities	North Carolina State University	730,000	1/4/2006	2/3/2009	Research in progress; contractor's draft final report pending.
03-79	Measuring and Predicting the Performance of Automobile Traffic on Urban Streets	Texas A&M University	625,000	10/1/2004	1/31/2008	Completed---Publication decision pending; results being incorporated into the Highway Capacity Manual
03-79A	Arterial Performance Measures	Purdue University	225,000	9/10/2008	3/10/2010	Research in progress
03-80	Traffic Enforcement Strategies for Work Zones	Texas A&M University	500,000	7/14/2005	4/30/2009	Research in progress
03-81	Strategies for Integrated Operation of Freeway and Arterial Corridors	Siemens Energy & Automation, Inc	175,000	10/7/2005	10/7/2007	Research on hold pending completion of FHWA research
03-82	Default Values for Capacity and Quality of Service Analysis	Kittelson & Associates	400,000	9/2/2005	9/1/2007	Completed---Published as NCHRP Report 599
03-83	Low-Cost Improvements for Recurring Freeway Bottlenecks	Dowling Associates	300,000	8/10/2005	6/9/2009	Research in progress
03-84	Guide for Multistate Transportation Operations Programs	E-Squared Engineering	265,000	8/23/2006	1/22/2008	Completed---Agency report provided to AASHTO for publication
03-85	Guidance for the Use of Alternative Traffic Analysis Tools in Highway Capacity Analyses	University of Florida	399,926	7/28/2006	3/31/2009	Research in progress---results being incorporated into the Highway Capacity Manual
03-86	Traffic Operations Management and Planning Process	----	500,000			In development
03-87	Proactive Ramp Management Under the Threat of Freeway-Flow Breakdown	University of Florida	400,000	10/19/2006	4/18/2009	Research in progress
03-88	Ramp and Interchange Spacing	Kittelson & Associates	499,998	6/23/2008	12/22/2010	Research in progress
03-89	Design Guidance for Channelized Right-Turn Lanes	Midwest Research Institute	400,000	4/23/2008	10/23/2009	Research in progress
03-90	Operation of Traffic Signal Systems in Oversaturated Conditions	Kimley-Horn & Associates	600,000	3/14/2008	6/14/2010	Research in progress
03-91	Left-Turn Accommodations at Unsignalized Intersections	Texas A&M University	350,000	4/24/2008	10/23/2009	Research in progress
03-92	Production of the Year 2010 Highway Capacity Manual	Kittelson & Associates	1,000,000	9/24/2007	9/23/2011	Research in progress
03-93	Automated Enforcement for Speeding and Red Light Running	Vanasse Hangen Brustlin, Inc.	150,000	8/1/2009	11/30/2009	Research in progress
03-94	Transportation Systems Management and Operations Guide	----	450,000			In development
03-95	Guidelines for Timing Yellow and All-Red Intervals at Signalized Intersections	----	300,000			In development

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
03-96	Analysis of Managed Lanes on Freeway Facilities	----	350,000			In development
03-97	Traffic Signal Analysis with Varying Demands and Capacities	----	850,000			In development
03-98	Assessment of Auxiliary through Lanes at Signalized Intersections	----	400,000			Contract pending
03-99	Development and Application of Access Management Guidelines	----	400,000			In development
<b>AREA FOUR : MATERIALS AND CONSTRUCTION—GENERAL MATERIALS</b>						
04-01	Development of Appropriate Methods for Evaluating the Effectiveness of Stabilizing Agents	University of Illinois	114,991 *	6/1/1963	10/31/1966	Completed---Report not published; for avail. see Summary of Progress Through 1988
04-02	A Study of Degrading Aggregates in Bases and Subbases with Production of Excessive Amounts of and/or Harmful Types of Fines	Purdue University	63,990 *	2/15/1963	11/30/1966	Completed---Published as NCHRP Report 98
04-03(01)	Development of Methods to Identify Aggregate Particles Which Undergo Destructive Volume Changes When Frozen in Concrete	Virginia Polytechnic Institute	43,337 *	3/1/1963	3/31/1967	Completed---Published as NCHRP Report 12; Phase II published as NCHRP Report 65
04-03(02)	Development of Methods to Identify Aggregate Particles Which Undergo Destructive Volume Changes When Frozen in Concrete	Pennsylvania State University	106,213 *	3/25/1963	8/3/1967	Completed---Published as HRB Special Report 80 and NCHRP Report 15; Phase II published as NCHRP Report 66
04-04	Synthetic Aggregates for Highway Uses	Battelle Memorial Institute	14,790 *	3/1/1963	4/15/1964	Completed---Published as NCHRP Report 8
04-05	A Study of the Mechanism Whereby the Strength of Bases and Subbases Is Affected by Frost and Moisture	Michigan Tech University	64,105 *	2/15/1963	8/31/1965	Completed---Report not published; for avail. see Summary of Progress Through 1988
04-06	Protective Coatings for Highway Structural Steel	Steel Structures Painting Council	25,000 *	3/1/1965	11/30/1966	Completed---Published as NCHRP Reports 74, 74A, and 74B
04-07	Fatigue Strength of High-Yield Reinforcing Bars	Portland Cement Association	150,000 *	10/1/1967	8/31/1973	Completed---Report included in NCHRP Report 164
04-08	Research Needs Relating to Performance of Aggregates in Highway Construction	Virginia Polytechnic Institute	55,254 *	1/1/1968	4/30/1969	Completed---Published as NCHRP Report 100
04-08(02)	Density Standards for Field Compaction of Granular Bases and Subbases	Clemson University	95,248 *	4/1/1971	6/30/1973	Completed---Published as NCHRP Report 172
04-08(03)	Predicting Moisture-Induced Damage to Asphaltic Concrete	University of Idaho	261,037 *	9/1/1971	1/31/1982	Completed---Published as NCHRP Report 192; Phase II published as NCHRP Report 246



TABLE 7 (continued)

Project							
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **	
04-08(04)	Predicting Moisture-Induced Damage to Asphaltic Concrete---10-Year Field Evaluation	University of Idaho	24,402 *	6/1/1985	1/31/1987	Completed---Report not published; for avail. see Summary of Progress Through 1988	
04-09	Evaluation of Preformed Elastomeric Pavement Joint Sealing Systems and Practices	Utah DOT	93,494 *	10/1/1968	6/30/1971	Completed---Report included in Phase II report; summarized in NCHRP Research Results Digest 123	
04-09(01)	Preformed Elastomeric Pavement Joint Sealing Systems---Field Evaluation Phase	Utah DOT	144,837 *	10/1/1972	12/31/1979	Completed---Report not published; for avail. see Summary of Progress Through 1988	
04-10	Promising Replacements for Conventional Aggregates for Highway Use	University of Illinois	50,000 *	10/15/1969	3/31/1971	Completed---Published as NCHRP Report 135	
04-10A	Waste Materials as Potential Replacements for Highway Aggregates	Valley Forge Laboratories	53,663 *	9/1/1972	11/30/1973	Completed---Published as NCHRP Report 166	
04-11	Buried Plastic Pipe for Drainage of Transportation Facilities	Simpson Gumpertz & Heger, Inc.	200,000 *	9/16/1974	1/26/1979	Completed---Published as NCHRP Report 225	
04-12	Upgrading of Poor or Marginal Aggregates for PCC and Bituminous Pavements	Pennsylvania State University	149,941 *	12/1/1976	5/31/1979	Completed---Published as NCHRP Report 207	
04-13	Temporary Pavement Marking Systems	Southwest Research Institute	49,500 *	11/1/1976	2/28/1978	Completed---Report not published; for avail. see Summary of Progress Through 1988	
04-13A	Temporary Pavement Marking Paint Systems	Georgia Institute of Technology	69,971 *	4/1/1978	9/30/1979	Completed---Report not published; for avail. see Summary of Progress Through 1988	
04-14	Coating Systems for Painting Old and New Structural Steel	Georgia Institute of Technology	199,302 *	1/1/1978	12/31/1981	Completed---Report not published; for avail. see Summary of Progress Through 1988	
04-15	Corrosion Protection of Prestressing Systems in Concrete Bridges	Wiss, Janney, Elstner & Associates	249,973 *	7/1/1982	11/30/1985	Completed---Published as NCHRP Report 313	
04-16	Cost and Service Life of Pavement Markings	Pennsylvania State University	340,327 *	10/1/1984	8/30/1990	Completed---Report not published	
04-17	Environmental Monitoring and Evaluation of Calcium Magnesium Acetate (CMA)	University of Washington	199,943 *	1/7/1985	10/31/1987	Completed---Published as NCHRP Report 305	
04-18	Design and Evaluation of Large Stone Mixtures	Texas A&M University	299,440	6/1/1992	7/31/1996	Completed---Published as NCHRP Report 386	
04-19	Aggregate Tests Related to Asphalt Concrete Performance in Pavements	Auburn University	499,194	2/1/1994	5/31/1997	Completed---Published as NCHRP Report 405	
04-19(02)	Validation of Performance-Related Tests of Aggregates for Use in Hot-Mix Asphalt Pavements	Purdue University	399,975	3/16/2000	1/31/2005	Completed---Published as NCHRP Report 557	

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
04-20	Aggregate Tests Related to Performance of Portland Cement Concrete	Texas A&M University	132,890	3/15/1995	12/31/1996	Contract cancelled
04-20A	State-of-the-Art Report and Plan for Research on Aggregate Tests Related to Performance of Portland Cement Concrete	Consultant: Richard C. Meininger	30,300	5/27/1997	1/31/1998	Completed---Agency report available for loan
04-20B	Aggregate Tests Related to Performance of Portland Cement Concrete Pavements (Phase I)	University of Delaware	19,995	5/3/1999	11/1/1999	Completed---Results incorporated into Project 04-20C
04-20C	Aggregate Tests Related to Performance of Portland Cement Concrete Pavements: State of the Knowledge	Consultant: Dr. Kevin J. Folliard	36,000	4/1/2001	7/31/2002	Completed---Summarized in NCHRP Research Results Digest 281
04-21	Appropriate Use of Waste and Recycled Materials in the Transportation Industry	Chesner Engineering	499,974	6/1/1995	7/15/2000	Completed---Information database available on CRP-CD-5
04-22	Pavement-Marking Materials: Health, Environmental, and Performance Assessment	Research Triangle Institute	199,996	2/1/1995	1/30/1997	Completed---Published as NCHRP Report 392; summarized in NCHRP Research Results Digest 222
04-23	Performance-Related Tests of Aggregates for Use in Unbound Pavement Layers	Applied Research Associates	499,938	5/1/1996	12/31/1999	Completed---Published as NCHRP Report 453
04-24	HDPE Pipe Material Specifications and Design Requirements	Drexel University	130,000	1/1/1997	8/31/1998	Completed---Published as NCHRP Report 429
04-25	Implementation Plan for Automating Highway-Materials Testing	Braun Intertec Corporation	154,960	2/10/1997	2/26/1999	Completed---Published as NCHRP Report 427
04-26	Thermoplastic Drainage Pipe, Design and Testing	Simpson Gumpertz & Heger, Inc.	500,000	6/18/1999	8/22/2008	Completed---To be published in early 2009
04-27	Application of Fiber-Reinforced Polymer Composites to the Highway Infrastructure	University of Delaware	224,907	9/12/2000	11/30/2002	Completed---Published as NCHRP Report 503
04-28	Feasibility Study for an All-White Pavement Marking System	Texas A&M University	250,000	5/25/2000	7/15/2002	Completed---Published as NCHRP Report 484
04-29	Selection of Sign Materials to Optimize Performance	University of Iowa	300,000	5/2/2001	9/1/2006	Terminated
04-30	Test Methods for Characterizing Aggregate Shape, Texture, and Angularity (Phase I)	Washington State University	49,960	7/2/2002	3/31/2003	Completed---Phase I only; continued under Project 04-30A
04-30A	Test Methods for Characterizing Aggregate Shape, Texture, and Angularity	Texas A&M University	450,000	8/28/2003	5/31/2005	Completed---Published as NCHRP Report 555
04-31	Tests of Recycled Aggregates for Use in Unbound Pavement Layers	Applied Research Associates	299,999	7/2/2003	10/31/2006	Completed---Published as NCHRP Report 598
04-32	Performance and Quality Control of Corrugated Polyethylene Pipe Manufactured from Recycled Polyethylene Material	TRI/Environmental, Inc.	349,819	2/28/2006	12/31/2008	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
04-33	Procedures for Testing and Evaluating Detectable Warning Systems	Wiss, Janney, Elstner & Associates	349,557	11/28/2006	5/27/2009	Research in progress
04-34	Application of LADAR in the Analysis of Aggregate Characteristics	Virginia Polytechnic Institute	500,000	6/20/2006	6/19/2009	Research in progress
04-35	Enhanced Test Method for Specific Gravity and Absorption of Coarse and Fine Aggregate	Auburn University	350,000	4/3/2008	4/2/2010	Research in progress
04-36	Characterization of Cementitious Stabilized Layers for Use in Pavement Design and Analysis	----	500,000			In development
04-37	Long-Term Performance of Epoxy Adhesive Anchors	----	500,000			In development
04-38	Developing a Laboratory Test for Determining the Initial Retroreflectivity Level of Glass Beads in Pavement Markings	----	350,000			In development
<b>AREA FIVE : TRAFFIC--ILLUMINATION AND VISIBILITY</b>						
05-02(01)	Effects of Illumination on Operating Characteristics of Freeways--Traffic Flow, Driver Behavior, and Accidents	Yale University	145,849 *	2/15/1963	7/31/1967	Completed---Report included in NCHRP Report 60
05-02(02)	Effects of Illumination on Operating Characteristics of Freeways---Driver Response, Visibility, and Visual Discomfort	Ohio State University	81,187 *	2/15/1963	8/31/1965	Completed---Report included in NCHRP Report 60
05-02(03)	Effects of Illumination on Operating Characteristics of Freeways---Driver Discomfort	Institute for Research	37,460 *	2/20/1963	2/28/1966	Completed---Report included in NCHRP Report 60
05-03	Visual Information Needed by the Driver at Night	Ohio State University	100,940 *	9/1/1964	3/31/1967	Completed---Published as NCHRP Report 99
05-04	Economic Study of Roadway Lighting	Franklin Institute	19,412 *	7/20/1964	8/31/1965	Completed---Published as NCHRP Report 20
05-05	Nighttime Use of Highway Pavement Delineation Materials	Southwest Research Institute	150,000 *	3/1/1965	9/15/1969	Completed---Published as NCHRP Report 45; Phase II published as NCHRP Report 85
05-05A	Development of Optimum Specifications for Glass Beads in Pavement Markings	Pennsylvania State University	99,350 *	5/1/1971	6/30/1973	Completed---Report not published; for avail. see Summary of Progress Through 1988
05-05B	Pavement Marking Systems for Improved Wet-Night Visibility Where Snowplowing Is Prevalent	Texas A&M University	200,000 *	9/1/1971	12/31/1974	Completed---Report not published; for avail. see Summary of Progress Through 1988
05-06	Highway Fog	Cornell Aero Lab	99,955 *	10/2/1967	4/30/1969	Completed---Published as NCHRP Report 95
05-06A	Highway Fog	Sperry Rand	93,540 *	9/1/1970	5/31/1973	Completed---Published as NCHRP Report 171

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
05-07	Roadway Delineation Systems	Pennsylvania State University	469,526 *	10/1/1968	6/30/1971	Completed---Published as NCHRP Report 130
05-08	Warrants for Highway Lighting	Texas A&M University	198,875 *	3/16/1970	2/15/1973	Completed---Published as NCHRP Report 152
05-09	Partial Lighting of Interchanges	KETRON, Inc.	199,999 *	12/1/1980	1/31/1983	Completed---Published as NCHRP Report 256
05-10	A Mobile System for Measuring Retroreflectance of Traffic Signs	EKTRON Appl Image	480,795 *	9/7/1987	12/31/1990	Completed---Report not published
05-11	Implementation Strategies for Sign Retroreflectivity Standards	Bellomo-McGee, Inc.	203,544 *	2/15/1989	8/31/1991	Completed---Published as NCHRP Report 346
05-12	Requirements for Application of Light Emitting Diodes (LEDs) to Traffic Control Signals	Lighting Sciences	249,973	2/15/1992	8/15/1994	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 205
05-13	Illumination Guidelines for Nighttime Highway Work	University of Florida	173,979	2/1/1993	6/30/1995	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 216
05-13(02)	Illumination Guidelines for Nighttime Highway Work	University of Florida	199,243	2/1/1996	10/31/1999	Completed---Published as NCHRP Report 498
05-14	Advance Warning Arrow Panel Visibility	Last Resource	275,000	3/1/1993	12/31/1996	Completed---Summarized in NCHRP Research Results Digest 259
05-15	Visibility Performance Requirements for Vehicular Traffic Signals	Westat, Inc.	350,000	3/18/1996	12/31/1999	Completed---Results provided to ITE
05-16	National Calibration Facility for Retroreflective Traffic Control Materials	National Institute of Standards & Technology	534,400	12/12/2001	12/30/2004	Completed---Summarized in NCHRP Research Results Digest 297; agency report available as NCHRP Web-Only Document 72
05-17	Safety Evaluation of Permanent Raised Pavement Markers	iTRANS Consulting, Inc.	392,349	12/3/2001	12/31/2003	Completed---Published as NCHRP Report 518
05-18	Color Effectiveness of Yellow Pavement Marking Materials	University of Iowa	400,000	11/6/2002	6/30/2007	Completed---Summarized in NCHRP Research Results Digest 328; agency report available as NCHRP Web-Only Document 125
05-19	Guidelines for Roadway Lighting Based on Safety Benefits and Costs	Rensselaer Polytechnic Institute	800,000	7/14/2005	11/13/2008	Research in progress

**AREA SIX : MAINTENANCE--SNOW AND ICE CONTROL**

06-01	Development of Economical and Effective Chemical Deicing Agents to Minimize Injury to Highway Structures and Vehicles	IIT Research Institute	40,000 *	2/15/1963	9/30/1964	Completed---Published as NCHRP Report 19
06-02	Nonchemical Methods for Preventing or Removing Snow and Ice Accumulations on Highway Structures	Jorgensen & Associates	25,000 *	2/15/1963	2/29/1964	Completed---Published as NCHRP Report 4

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
06-03	Development and Evaluation of Protective Coatings to Prevent Deterioration of Concrete Structures by Deicing Agents	Battelle Memorial Institute	58,557 *	3/1/1963	2/28/1965	Completed---Published as NCHRP Report 16
06-04	Evaluation and Development of Methods for Reducing Corrosion of Reinforcing Steel	Battelle Memorial Institute	39,330 *	3/1/1963	4/30/1965	Completed---Published as NCHRP Report 23
06-05	Study of Physical Factors Influencing Resistance of Concrete to Deicing Agents	University of Illinois	72,500 *	3/1/1963	8/31/1965	Completed---Published as NCHRP Report 27
06-06	To Evaluate Existing Methods and/or Develop Improved Methods for the Measurement of Certain Properties of Concrete	Ohio State University	69,393 *	3/1/1963	2/28/1966	Completed---Report not published; for avail. see Summary of Progress Through 1988
06-07	Estimation of Disintegration in Concrete Structures	Geotechnics	8,547 *	3/1/1963	8/31/1964	Contract cancelled---No report; continued under Project 06-07A
06-07A	Estimation of Disintegration in Concrete Structures	IIT Research Institute	44,614 *	2/1/1965	7/31/1966	Completed---Report not published; for avail. see Summary of Progress Through 1988
06-08	Evaluation of Methods of Replacement of Deteriorated Concrete in Structures	Tallamy Associates	25,000 *	2/15/1963	2/29/1964	Completed---Published as NCHRP Report 1
06-09	Potential Accelerating Effects of Chemical Deicing Damage by Traffic and Other Environmental-Induced Stresses in Concrete Bridge Decks	University of Illinois	200,000 *	1/1/1965	6/15/1968	Completed---Published as NCHRP Report 101
06-10	Develop Improved Snow Removal and Ice Control Techniques at Interchanges	Tallamy Associates	95,000 *	9/1/1967	9/30/1970	Completed---Published as NCHRP Report 127
06-11	Economic Evaluation of the Effects of Ice and Frost on Bridge Decks	Midwest Research Institute	100,000 *	9/1/1970	9/11/1974	Completed---Published as NCHRP Report 182
06-12	Improved Visibility for Snow Plowing Operations	Rensselaer Polytechnic Institute	299,581	1/1/1996	12/31/1999	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 250
06-13	Guidelines for Snow and Ice Control Materials and Methods	Midwest Research Institute	748,252	3/2/1998	5/15/2003	Completed---Guidelines published as NCHRP Report 526
06-14	Feasibility of Using Friction Indicators to Improve Winter Maintenance Operations and Mobility	Virginia Polytechnic Institute	150,000	5/17/2000	8/31/2002	Completed---Agency report available as NCHRP Web-Only Document 53
06-15	Testing and Calibration Methods for RWIS Sensors	SRF Consulting Group, Inc.	299,990	6/20/2003	12/31/2005	Completed---Agency report available as NCHRP Web-Only Document 87
06-16	Guidelines for the Selection of Snow and Ice Control Materials To Mitigate Environmental Impacts	Levelton Engineering, Ltd.	252,968	6/2/2003	1/1/2007	Completed---Published as NCHRP Report 577
06-16A	Guidelines for the Selection of Snow and Ice Control Materials To Mitigate Environmental Impacts-Continuation of Concrete Corrosion Testing	Levelton Engineering, Ltd.	25,000	11/29/2007	5/28/2009	Research in progress

TABLE 7 (continued)

<b>Project</b>						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
06-17	Performance Measures for Snow and Ice Control Operations	Iowa State University	150,000	5/24/2005	3/31/2008	Completed---To be summarized in an NCHRP Research Results Digest
<b>AREA SEVEN : TRAFFIC--TRAFFIC PLANNING</b>						
07-01	The Influence of Land Use on Urban Travel Patterns	Louis E. Keefer	129,568 *	2/1/1964	9/30/1967	Completed---Published as NCHRP Reports 24 and 62
07-02	Traffic Attraction of Rural Outdoor Recreational Areas	IIT Research Institute	49,496 *	2/1/1964	5/31/1966	Completed---Published as NCHRP Report 44
07-03	Weighing Vehicles in Motion	Franklin Institute	73,391 *	2/1/1964	8/31/1967	Completed---Published as NCHRP Report 71
07-04	Factors and Trends in Trip Lengths	Voorhees & Associates	150,980 *	2/1/1964	1/10/1969	Completed---Published as NCHRP Report 48; Phase II published as NCHRP Report 89
07-05	Predicted Traffic Usage of a Major Highway Facility Versus Actual Usage	Yale University	99,675 *	2/1/1964	11/30/1966	Completed---Published as NCHRP Report 58
07-06	Multiple Use of Lands Within Highway Rights-of-Way	Barton-Aschman Associates	24,220 *	2/1/1966	2/28/1967	Completed---Published as NCHRP Report 53
07-07	Motorists' Needs and Services on Interstate Highways	Airborne Instruments	99,267 *	1/1/1966	12/31/1967	Completed---Published as NCHRP Report 64
07-08	User Cost and Related Consequences of Alternative Levels of Highway Service	Stanford University	99,070 *	9/1/1970	4/15/1972	Completed---Published as NCHRP Report 133
07-09	Development of Models for Predicting Weekend Recreational Traffic	Midwest Research Institute	74,983 *	9/1/1972	5/15/1974	Completed---Report not published; for avail. see Summary of Progress Through 1988
07-10	Peak-Period Traffic Congestion	Remak/Rosenbloom	49,624 *	4/1/1974	3/31/1975	Completed---Published as NCHRP Report 169
07-10(02)	The Institutional Aspects of Implementing Congestion-Reducing Techniques	Remak/Rosenbloom	74,703 *	4/1/1975	11/30/1978	Completed---Published as NCHRP Report 205
07-11	Low-Cost TSM Projects---Simplified Procedures for Evaluation and Setting Priorities	Multiplications, Inc.	199,988 *	4/6/1981	11/30/1983	Completed---Published as NCHRP Report 263
07-11A	Low-Cost TSM Projects---Simplified Procedures for Evaluation, Phase II	Texas A&M University	150,000 *	3/4/1985	8/3/1986	Completed---Published as NCHRP Report 283
07-12	Microcomputer Evaluation of Highway User Benefits	Texas A&M University	200,000	2/1/1989	9/30/1995	Completed---Report released with software through McTrans Center at University of Florida
07-12(02)	Metrication and Enhancement of MicroBENCOST Software Package	Texas A&M University	170,000	12/15/1995	6/30/1997	Completed---Summarized in NCHRP Research Results Digest 242
07-13	Quantifying Congestion	Texas A&M University	375,000	3/1/1992	2/28/1997	Completed---Published as NCHRP Report 398

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
07-14	Guidelines for Analysis of Investments in Bicycle Facilities	University of Minnesota	300,000	10/17/2003	8/21/2005	Completed---Published as NCHRP Report 552
07-15	Cost Effective Measures and Planning Procedures for Travel Time Variation, Delay and Reliability	Cambridge Systematics	299,489	2/1/2004	5/15/2007	Completed---Published as NCHRP Report 618
07-16	Recommended Revisions to the AASHTO Guidelines for Traffic Data Programs	Cambridge Systematics	349,902	3/29/2005	4/30/2007	Completed---Final Report transmitted to AASHTO
<b>AREA EIGHT : TRANSPORTATION PLANNING--FORECASTING</b>						
08-01	Social and Economic Factors Affecting Travel	----	94,558 *	2/1/1964	9/23/1966	Completed---Published as NCHRP Report 70
08-02	Factors Influencing Modal Trip Assignment	IIT Research Institute	298,033 *	2/1/1964	8/31/1966	Completed---Published as NCHRP Report 57
08-03	Individual Preferences for Various Means of Transportation	University of Pennsylvania	63,282 *	2/1/1964	3/31/1965	Completed---Report not published; for avail. see Summary of Progress Through 1988
08-04	Criteria for Evaluating Alternative Transportation Plans	Northwestern University	89,900 *	2/1/1965	8/1/1967	Completed---Published as NCHRP Report 96
08-04A	Criteria for Evaluating Alternative Transportation Plans	University of Illinois	5,000 *	10/14/1968	1/10/1969	Completed---Published as NCHRP Report 96
08-05	Transportation Aspects of Land-Use Controls	Victor Gruen	125,538 *	4/1/1965	1/15/1970	Completed---Published as NCHRP Report 31; Phase II published as NCHRP Report 121
08-06	Individual Preferences for Alternative Dwelling Types and Environments	University of North Carolina	99,897 *	2/14/1966	3/13/1968	Completed---Published as NCHRP Report 81
08-07	Evaluation of Data Requirements and Collection Techniques for Transportation Planning	Creighton-Hamburg	190,000 *	9/13/1968	8/28/1970	Completed---Published as NCHRP Report 120
08-07A	Data Requirements and Transportation Planning Procedures in Small Urban Areas	University of Tennessee	98,005 *	6/1/1973	6/14/1975	Completed---Published as NCHRP Report 167
08-08(01)	The Impact of Highways upon Environmental Values (Study Design)	Massachusetts Institute of Technology	29,654 *	9/16/1968	3/14/1969	Completed---Study design, not published
08-08(02)	The Impact of Highways upon Environmental Values (Study Design)	Daniel, Mann, Johnson, Mendenhall	28,950 *	9/9/1968	3/7/1969	Completed---Study design, not published
08-08(03)	The Impact of Highways upon Environmental Values	Massachusetts Institute of Technology	470,000 *	9/15/1969	7/31/1974	Completed---Published as NCHRP Report 156
08-09	Comparative Economic Analysis of Alternative Multimodal Passenger Transportation Systems	Creighton-Hamburg	100,000 *	9/1/1971	1/31/1973	Completed---Published as NCHRP Report 146
08-10	Planning and Design Guidelines for Efficient Bus Utilization of Highway Facilities	Wilbur Smith Associates	149,907 *	9/1/1971	7/31/1973	Completed---Published as NCHRP Reports 143 and 155

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
08-11	Social, Economic, Environmental Consequences of Not Constructing a Transportation Facility	David A. Crane & Partners, Inc.	364,363 *	9/16/1974	11/30/1979	Completed---Phase I report not published; for avail. see Summary of Progress Through 1988; Phase II report published as NCHRP Reports 216 and 217
08-12	Travel Estimation Procedures for Quick Response to Urban Policy Issues	Metropolitan Washington Council of Governments	39,895 *	9/3/1974	12/31/1975	Completed---Published as NCHRP Reports 186 and 187
08-12A	Travel Estimation Procedures for Quick Response to Urban Policy Issues	COMSIS Corporation	239,331 *	11/1/1975	10/31/1978	Completed---Published as NCHRP Reports 186 and 187
08-13	Disaggregate Travel Demand Models	Charles River Associates	100,000 *	9/15/1974	1/31/1976	Completed---Phase I report not published; for avail. see Summary of Progress Through 1988
08-13(02)	Disaggregate Travel Demand Models	Charles River Associates	200,000 *	5/1/1976	12/31/1980	Completed---Published as NCHRP Report 253
08-14	New Approaches to Understanding Travel Behavior	Boston College	144,135 *	1/1/1975	4/30/1977	Completed---Report not published; for avail. see Summary of Progress Through 1988
08-14A	New Approaches to Understanding Travel Behavior: Phase II	Charles River Associates	221,250 *	1/1/1978	6/30/1982	Completed---Published as NCHRP Report 250
08-15	State and Regional Transportation Impact Identification and Measurement	Bigelow-Crain	80,000 *	9/1/1974	5/31/1976	Completed---Report not published; for avail. see Summary of Progress Through 1988
08-15A	Economic Impacts of State Transportation Policies and Programs	Reg Sci Research Inst	117,852 *	10/1/1977	3/31/1980	Completed---Report not published; for avail. see Summary of Progress Through 1988
08-16	Guidelines for Public Transportation Levels of Service and Evaluation	University of Tennessee	489,952 *	1/1/1976	12/31/1980	Completed---Published as NCHRP Reports 208, 209, 210, 211, and 212
08-17	Freight Data Requirements for Statewide Transportation Systems Planning	R. Creighton Associates	231,147 *	7/15/1975	2/15/1977	Completed---Published as NCHRP Reports 177 and 178
08-18	Techniques for Evaluating Options in Statewide Transportation Planning/Programming	Planning Envr Intl/AMV	300,393 *	9/1/1975	6/30/1978	Completed---Published as NCHRP Reports 179 and 199
08-19	The Relationship of Changes in Urban Highway Supply to Vehicle-Miles of Travel	Cambridge Systematics	199,954 *	12/1/1976	11/30/1978	Completed---Report not published; summarized in NCHRP Research Results Digest 127; for avail. see Summary of Progress Through 1988
08-20	Improved Methods for Vehicle Counting and Determining Vehicle-Miles of Travel	Hamhurg & Associates	200,000 *	1/2/1978	7/31/1980	Completed---Report not published; for avail. see Summary of Progress Through 1988



TABLE 7 (continued)

Project							
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **	
08-21	Guidelines for Use of Vanpools and Carpools as a Transportation System Management Technique	George Washington University	265,486 *	3/1/1979	6/30/1981	Completed---Guidelines published as NCHRP Report 241; report not published; for avail. see Summary of Progress Through 1988	
08-22	Transportation Financing Within the Context of Energy Constraints	System Design Concepts	100,000 *	3/26/1979	2/27/1981	Completed---Published as NCHRP Report 231	
08-23	Fuel Supply Limitations and Passenger Travel	Charles River Associates	110,000 *	4/2/1979	9/1/1980	Completed---Published as NCHRP Report 229	
08-24	Forecasting the Basic Inputs to Transportation Planning	Hamburg & Associates	81,000 *	1/21/1980	4/30/1982	Completed---Published as NCHRP Report 266	
08-24A	Forecasting the Basic Inputs to Transportation Planning at the Zonal Level	COMSIS Corporation	192,444 *	4/1/1987	2/28/1990	Completed---Published as NCHRP Report 328	
08-25	Intercity Bus Transportation Planning	Peat, Marwick, et al.	200,000 *	4/1/1980	1/31/1982	Completed---Report not published; for avail. see Summary of Progress Through 1988	
08-26	Development of Highway Traffic Data for Project Planning and Design in Urbanized Areas	JHK & Associates	100,000 *	5/15/1981	12/31/1982	Completed---Published as NCHRP Report 255	
08-27	Cost-Effectiveness of Transportation Services for Handicapped Persons	University of Tennessee	199,543 *	9/1/1981	4/30/1983	Completed---Published as NCHRP Reports 261 and 262	
08-28	Strategic Planning and Management for Transportation Agencies	Ernst & Young	180,020 *	6/1/1987	6/25/1990	Completed---Published as NCHRP Report 331	
08-29	Travel Estimation Techniques for Urban Planning	Barton-Aschman Associates	300,000	2/15/1991	4/29/1994	Completed---Published as NCHRP Report 365	
08-29(02)	Travel Estimation Techniques for Urban Planning	Barton-Aschman Associates	47,398	4/1/1995	1/31/1996	Completed---Published as NCHRP Report 365	
08-30	Characteristics and Changes in Freight Transportation Demand	Cambridge Systematics	550,000	12/15/1992	2/29/1996	Completed---Published as NCHRP Report 388	
08-30A	Freight Capacity	TRB Division B	100,000	11/1/1997	12/31/2001	Completed---Published as TRB Special Report 271	
08-31	Long-Term Availability of Multimodal Corridor Capacity	Urban Institute	285,000	1/4/1993	1/1/1996	Completed---Continued as Project 08-31A	
08-31A	Long-Term Availability of Multimodal Corridor Capacity	Cambridge Systematics	65,920	7/1/1995	3/31/1996	Completed---Published as NCHRP Report 399	
08-32	Workshop on Multimodal Transportation Planning Research Needs	TRB Division D	70,000	3/15/1993	3/14/1994	Completed---Problem statements developed	
08-32(01)	Innovative Practices for Multimodal Transportation Planning for Freight and Passengers	Transmanagement, Inc.	140,658	12/1/1994	6/30/1996	Completed---Published as NCHRP Report 404	
08-32(02)	Multimodal Transportation: Development of a Performance-Based Planning Process	Cambridge Systematics	250,000	1/1/1995	7/31/1996	Completed---Phase I summarized in NCHRP Research Results Digest 226	

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
08-32(02)A	Multimodal Transportation: Development of a Performance-Based Planning Process	Cambridge Systematics	299,990	4/1/1997	4/30/1999	Completed---Published as NCHRP Report 446
08-32(03)	Integration of Land-Use Planning with Multimodal Transportation Planning	Parsons Brinckerhoff Quade & Douglas	400,000	10/1/1995	12/31/1998	Completed---Published as NCHRP Report 423A
08-32(04)	Developing and Maintaining Partnerships for Multimodal Transportation Planning	Kimley-Horn & Associates	199,950	3/31/1995	6/30/1997	Completed---Published as NCHRP Report 433
08-32(05)	Multimodal Transportation Planning Data	Jack Faucett Associates	350,000	2/1/1995	12/31/1996	Completed---Published as NCHRP Report 401
08-33	Quantifying Air-Quality and Other Benefits and Costs of Transportation Control Measures	Cambridge Systematics	1,014,964	7/1/1995	12/31/1999	Completed---Summarized in NCHRP Research Results Digests 217, 223, and 230; published as NCHRP Report 462 and available on CRP-CD-15
08-34	Major Investment Studies: Development of a Practitioner's Guidebook for Effective Study Design, Management, and Implementation	Science Applications International Corporation	195,553	3/1/1997	2/28/1999	Completed---Published as NCHRP Report 435
08-35	Incorporating ITS into the Transportation Planning Process	Mitretek Systems	449,999	4/13/1998	6/30/2002	Completed---Published as NCHRP Web-Only Document 118
08-36	Research for the AASHTO Standing Committee on Planning	Cambridge Systematics	600,000	c 8/3/2006	6/2/2007	Research in progress---Refer to project writeup on CRP website
08-37	Standardized Procedures for Personal Travel Surveys	Louisiana Transportation Research Council	370,000	3/7/2000	3/31/2005	Completed---Summarized in NCHRP Research Results Digest 261; published as NCHRP Report 571
08-38	Consideration of Environmental Factors in Transportation Systems Planning	Georgia Institute of Technology	250,000	3/19/2001	6/19/2003	Completed---Published as NCHRP Report 541; appendixes available as NCHRP Web-Only Document 77
08-39	Financing and Improving Land Access to U.S. Intermodal Cargo Hubs	Louis Berger Group	250,000	11/15/2000	2/28/2003	Completed---Published as NCHRP Report 497
08-40	Evaluating Cultural Resource Significance Using Information Technology	URS Corporation	173,997	11/1/2000	1/31/2002	Completed---Report not published; summarized in NCHRP Research Results Digest 277; to be included in Project 08-40(02)
08-40(02)	Evaluating Cultural Resource Significance - Implementation Tools	URS Group, Inc.	225,219	1/15/2003	9/1/2004	Completed---Published as NCHRP Report 542
08-41	Effective Methods for Environmental-Justice Analyses	URS Corporation	499,182	4/24/2001	1/31/2004	Completed---Published as NCHRP Report 532
08-42	Rail Freight Solutions to Roadway Congestion	Global Insight	449,990	7/11/2002	3/1/2007	Completed---Published as NCHRP Report 586
08-43	Methods for Forecasting Statewide Freight Movements and Related Performance Measures	Cambridge Systematics	499,885	2/7/2002	1/17/2005	Completed---Published as NCHRP Report 606

TABLE 7 (continued)

Project							
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **	
08-44	Incorporating Safety into Long-Range Transportation Planning	University of Arizona	500,000	8/8/2002	4/8/2005	Completed---Published as NCHRP Report 546 and CRP-CD-62	
08-44(02)	Transportation Safety Planning: Predicting Safety Characteristics and Countermeasures	Arizona State University	400,000	10/27/2006	4/28/2009	Research in progress	
08-45	A Collaborative Vision of Mobility: Updating the Toolbox (TCRP Project H-29)	Transmanagement, Inc.	150,000	4/28/2003	7/28/2004	Completed---Published as NCHRP Report 536 and TCRP Report 106	
08-46	A Guide for Including Access Management in Transportation Plans	Dye Management Group	225,000	3/31/2003	5/30/2005	Completed---Published as NCHRP Report 548	
08-47	Guidebook for Freight Policy, Planning, and Programming in Small and Mid-Sized Metropolitan Areas	Cambridge Systematics	275,000	8/6/2003	12/31/2005	Completed---Published as NCHRP Report 570	
08-48	Using American Community Survey Data for Transportation Planning	Cambridge Systematics	299,999	8/7/2003	9/15/2006	Completed---Published as NCHRP Report 588	
08-49	Procedures for Cost Estimation and Management for Highway Projects During Planning, Programming, and Preconstruction	Texas A&M University	400,000	3/15/2004	6/15/2008	Completed---Published as NCHRP Report 574; agency final report published as NCHRP Web-Only Document 98. Additional work continues as 08-49(02).	
08-49(02)	Right of Way Methods and Tools to Control Project Cost Escalation	----				Completed---Publication decision pending	
08-50	Factors that Support the Planning-Programming Linkage	Cambridge Systematics	249,677	3/24/2004	1/30/2007	Completed---Published as NCHRP Report 591	
08-51	Enhancing Internal Trip Capture Estimation for Mixed-Use Developments	Texas A&M University	250,000	7/5/2005	3/1/2009	Research in progress	
08-52	Best Practices to Enhance the Transportation/Land-Use Connection in Rural America	Renaissance Planning Group	100,000	5/12/2005	3/1/2007	Completed---Published as NCHRP Report 582	
08-53	Integrating Freight into Transportation Planning and Project Selection Processes	Cambridge Systematics	300,000	1/24/2005	3/31/2007	Completed---Published as NCHRP Report 594	
08-54	Identification of Liability-Related Impediments to Sharing 409 Safety Data among Transportation Agencies, and Synthesis of Best Practices	Cambridge Systematics	50,000	12/28/2004	6/30/2006	Completed---Summarized in NCHRP Research Results Digest 306	
08-55	Integrating Geo-Spatial Technologies into the Right-of-Way Data-Management Process	Virginia Polytechnic Institute	100,000	5/13/2005	10/31/2006	Completed---Summarized in NCHRP Research Results Digest 310	
08-55A	Developing a Logical Model for a Geo-Spatial Right-of-Way Land Management System	Virginia Polytechnic Institute	350,000	10/3/2007	4/2/2010	Research in progress	
08-56	Truck Noise-Source Mapping	Wyle Laboratories, Inc.	496,889	8/25/2005	3/1/2009	Research in progress	
08-57	Improved Framework and Tools for Highway Pricing Decisions	PB Consult, Inc.	750,000	7/7/2006	3/31/2009	Research in progress---Interim report under review	

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
08-58	Development of a Statewide Corridor Planning Guidebook	Wilbur Smith Associates	400,000	2/7/2006	12/31/2008	Completed---Publication decision pending
08-59	Cost Implications of New Development	Rutgers, The State University of New Jersey	400,000	6/1/2006	5/31/2009	Research in progress
08-60	Guidebook on Risk Analysis Tools and Management Practices to Control Transportation Project Cost	University of Colorado - Boulder	200,000	6/1/2007	4/1/2009	Research in progress---Interim report under review
08-61	Travel Demand Forecasting: Parameters and Techniques	Cambridge Systematics	550,000	3/19/2007	3/18/2009	Research in progress---Interim report under review
08-62	Transportation Performance Management Programs--Insight from Practitioners	Cambridge Systematics	200,000	4/5/2007	2/4/2009	Research in progress---Interim report under review
08-63	Review of Canadian and Mexican Experience with Large Commercial Motor Vehicles	University of Michigan	99,998	3/28/2007	1/1/2009	Research in progress
08-64	A Guidebook on Improved Principles, Processes, and Methods for Shared-Use Passenger and Freight Rail Corridors	ICF Consulting, Inc.	500,000	4/6/2007	8/5/2009	Research in progress
08-65	Identification of Results-oriented Public Involvement Strategies Between Transportation Agencies and Native American Tribal Communities	University of New Mexico	199,970	4/17/2008	10/16/2009	Research in progress
08-66	Trip-Generation Rates for Transportation Impact Analyses of Infill Developments	Kimley-Horn & Associates	299,488	4/4/2008	4/3/2010	Research in progress
08-67	Integrating Individual Transportation System-Level Performance Programs to Determine Network Performance	Cambridge Systematics	300,000	4/8/2008	10/8/2009	Research in progress---Interim report under review
08-68	Citizen's Guide and Discipline-Specific Professionals' Guide for Context-Sensitive Solutions in Transportation	ICF Incorporated	400,000	4/21/2008	4/21/2010	Research in progress
08-69	Supplement to the AASHTO Transportation Asset Management Guide: Volume 2 - A Focus on Implementation	AECOM Consulting Transportation Group	750,000	3/13/2008	5/12/2010	Research in progress
08-70	Target-Setting Methods and Data Management To Support Performance-Based Resource Allocation by Transportation Agencies	Cambridge Systematics	700,000	1/24/2008	1/23/2010	Research in progress
08-71	Methodology for Estimating Life Expectancies of Highway Assets	----	500,000			Contract pending
08-72	Case Studies of Best Practices, Model Initiatives, and Mitigation Strategies that Incorporate the Principles of Title VI and Environmental Justice in Transportation Decisions	----	400,000			In development
08-73	Road Pricing: Educating and Informing Stakeholders and the Public	----	100,000			In development

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
08-74	Sustainability Performance Measures for State Departments of Transportation and Other Transportation Agencies	----	500,000			Contract pending
08-75	Performance Measurement and Evaluation of Tolling and Congestion Pricing Project Benefits and System Impacts	----	200,000			In development
08-76	Institutionalizing Safety in Transportation Planning Processes: Techniques, Tactics and Strategies	----	400,000			In development
<b>AREA NINE : MATERIALS AND CONSTRUCTION--BITUMINOUS MATERIALS</b>						
09-01	Asphalt Durability and Its Relation to Pavement Performance	American Oil	100,000 *	2/1/1964	4/30/1967	Completed---Published as NCHRP Report 67
09-02	Asphalt Durability and Its Relation to Pavement Performance---Adhesion	Montana College	101,903 *	1/1/1965	10/31/1967	Completed---Report not published; for avail. see Summary of Progress Through 1988
09-03	Evaluation of Pavement Joint and Crack Sealing Materials and Practices	Rensselaer Polytechnic Institute	24,996 *	6/1/1965	6/30/1966	Completed---Published as NCHRP Report 38
09-04	Minimizing Premature Cracking of Asphaltic Concrete Pavements	Materials R&D	99,560 *	11/1/1971	6/30/1973	Completed---Published as NCHRP Report 195
09-04A	Bayesian Analysis Methodology for Verifying Recommendations to Minimize Asphalt Pavement Distress	Woodward-Clyde	204,194 *	9/15/1975	11/1/1978	Completed---Published as NCHRP Report 213
09-05	Design of Emulsified Asphalt Paving Mixtures	Asphalt Institute	150,172 *	4/1/1980	6/30/1984	Completed---Published as NCHRP Report 259
09-06(01)	Asphalt Aggregate Mixture Analysis System (AAMAS)	Brent Rauhut Engineering	660,017 *	1/5/1987	6/4/1990	Completed---Published as NCHRP Report 338
09-06A	Development of Asphalt Aggregate Mixture Analysis System: Phase I	ARE, Inc.	25,000 *	6/2/1986	10/2/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
09-06B	Development of Asphalt Aggregate Mixture Analysis System: Phase I	Brent Rauhut Engineering	25,000 *	6/2/1986	10/2/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
09-06C	Development of Asphalt Aggregate Mixture Analysis System: Phase I	University of Maryland	24,879 *	6/2/1986	10/2/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
09-07	Field Procedures and Equipment to Implement SHRP Asphalt Specifications	Brent Rauhut Engineering	1,150,784	4/1/1993	7/15/1997	Completed---Published as NCHRP Report 409 and available on CRP-CD-1
09-08	Designing Stone Matrix Asphalt Mixtures	Auburn University	995,720	4/1/1994	6/30/1998	Completed---Published as NCHRP Report 425 and available on CRP-CD-1

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
09-09	Refinement of the Superpave Gyratory Compaction Procedure	Auburn University	499,850	6/1/1996	7/31/1998	Completed---Summarized in NCHRP Research Results Digest 237 and available on CRP-CD-1
09-09(01)	Verification of Gyration Levels in the Ndesign Table	Auburn University	625,447	2/3/2000	9/30/2006	Completed---Published as NCHRP Report 573
09-10	Superpave Protocols for Modified Asphalt Binders	Asphalt Institute	995,139	4/15/1996	2/15/2001	Completed---Published as NCHRP Report 459 and available on CRP-CD-10
09-10A	Superpave Protocols for Modified Asphalt Binders Implementation	University of Wisconsin - Madison	19,344	6/20/2001	12/31/2002	Completed---Agency report available for loan
09-11	Segregation in Hot-Mix Asphalt Pavements	Auburn University	300,000	6/15/1997	1/14/2000	Completed---Published as NCHRP Report 441 and available on CRP-CD-8
09-12	Incorporation of Reclaimed Asphalt Pavement in the Superpave System	Purdue University	463,514	4/1/1997	9/30/2000	Completed---Published as NCHRP Report 452; summarized in NCHRP Research Results Digest 253; available on CRP-CD-8
09-12(01)	Marketing the Use of Reclaimed Asphalt Pavements in the Superpave Mix Design Method	Fugro-BRE, Inc.	57,250	1/8/2001	12/31/2002	Completed---Video presentation available on CRP-CD-44
09-13	Evaluation of Water Sensitivity Tests	University of Nevada - Reno	150,000	11/1/1997	8/31/1999	Completed---Published as NCHRP Report 444 and available on CRP-CD-8
09-14	Investigation of the Restricted Zone in the Superpave Aggregate Gradation Specification	Auburn University	501,678	5/1/1998	7/15/2001	Completed---Published as NCHRP Report 464 and available on CRP-CD-10
09-15	Quality Characteristics and Test Methods for Use in Performance-Related Specifications of Hot-Mix Asphalt Pavements	Fugro Consultants	449,995	1/1/1999	6/30/2004	Completed---Published as NCHRP RRD 291
09-16	Relationship Between Superpave Gyratory Compaction Properties and Permanent Deformation In Service	Asphalt Institute	249,809	5/10/1999	5/15/2002	Completed---Published as NCHRP Report 478
09-16(01)	Validation of NCHRP 09-16 Findings for HMA Quality Control Operations	Asphalt Institute	79,885	11/30/2002	3/15/2005	Completed---Report available for loan
09-17	Accelerated Laboratory Rutting Tests: Asphalt Pavement Analyzer	Auburn University	369,744	5/19/1999	4/15/2003	Completed---Published as NCHRP Report 508
09-18	Field Shear Test for Hot Mix Asphalt	Pennsylvania State University	200,000	6/30/1999	10/31/2001	Completed---Summarized in NCHRP Research Results Digest 262
09-18(01)	Validation of Field Shear Test and Indirect Tension Strength Test	Advanced Asphalt Technologies, LLC	18,983	8/8/2002	12/8/2002	Completed---Agency report available as NCHRP Web-Only Document 56
09-19	Superpave Support and Performance Models Management	University of Maryland	2,628,282	5/10/1999	7/31/2006	Completed---Published as NCHRP Reports 465, 547, and 580, and available on CRP-CD-10 and CRP-CD-46

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
09-19(01)	Spreadsheet Solutions for E* as an SPT for Permanent Deformation	Arizona State University	41,380	7/12/2004	2/28/2005	Completed---Products transferred to Projects 09-22 and 09-33
09-19(02)	Spreadsheet Solutions for E* as an SPT for Permanent Deformation and Fatigue Cracking	Arizona State University	44,205	7/18/2005	3/31/2007	Completed---Products transferred to Projects 09-22 and 09-33
09-20	Performance-Related Specifications for Hot-Mix Asphalt Construction	Nevada Automotive Test Center	1,500,000	12/31/1998	11/30/2000	Completed---Published as NCHRP Report 455; to be available on CRP-CD-9
09-20A	Follow-up to Performance-Related Specifications for Hot-Mix Asphalt Construction	Applied Pavement Technologies	12,225	7/1/2001	12/31/2001	Completed---Software deliverable used in 09-22
09-21	Superpave Advisory Structure	TRB Division E	400,000	3/9/1998	3/8/2003	Completed---No report
09-22	Beta Testing and Validation of HMA PRS	Fugro Consultants	1,500,000	10/3/2000	3/31/2009	Research in progress
09-23	Environmental Effects in Pavement Mix and Structural Design Systems	Arizona State University	487,234	2/27/2001	12/31/2007	Completed---Published as NCHRP Report 602 and summarized in NCHRP Research Results Digest 324
09-23A	Implementing a National Catalog of Subgrade Soil-Water Characteristic Curve (SWCC) Default Inputs for Use with the MEPDG	Arizona State University	59,800	7/24/2008	7/23/2009	Research in progress
09-24	Validation of a Simple Performance Test Device	Combined				Combined with Project 09-19
09-25	Requirements for Voids in Mineral Aggregate for Superpave Mixtures	Advanced Asphalt Technologies, LLC	399,896	4/2/2001	7/31/2006	Completed---Published as NCHRP Report 567
09-26	Precision Statements for AASHTO Standard Methods of Test	NIST/AASHTO Materials Reference Lab.	1,260,253	1/23/2001	7/31/2009	Research in progress; interim results in NCHRP Web-Only Documents 54, 66, 71, 109, and 114
09-26A	Data Mining and Interlaboratory Studies to Prepare Precision Statements for AASHTO Standards	----	325,000			Research in progress
09-27	Relationships of HMA In-Place Air Voids, Lift Thickness, and Permeability	Auburn University	350,000	4/19/2001	5/31/2004	Completed---Published as NCHRP Report 531
09-29	Simple Performance Tester for Superpave Mix Design	Advanced Asphalt Technologies, LLC	1,399,980	4/2/2001	9/30/2009	Research in progress; interim results published as NCHRP Reports 513, 530, 614, and 629
09-30	Experimental Plan for Calibration and Validation of HMA Performance Models for Mix and Structural Design	Fugro South LLP	200,000	10/15/2001	2/28/2004	Completed---Summarized in NCHRP Research Results Digests 283 and 284
09-30(01)	Expand Population of M_E Database and Conduct Two Pre-Implementation Studies	Fugro Consultants	42,086	6/24/2004	1/31/2005	Completed---Results used in NCHRP Project 09-30A
09-30A	Rutting Performance Models for HMA Mix and Structural Design	Applied Research Associates	1,000,000	8/29/2005	6/30/2009	Research in progress
09-31	Air Void Requirements for Superpave Mix Design	Advanced Asphalt Technologies, LLC	249,993	10/15/2001	7/31/2006	Completed---Published as NCHRP Report 567

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
09-32	Evaluation of SST and IDT Testing and Identification of Future Activities	----	100,000			Combined with Project 09-29
09-33	A Mix Design Manual for Hot Mix Asphalt	Advanced Asphalt Technologies, LLC	500,000	8/13/2004	12/31/2008	Research in progress
09-33A	Adapting SPT Specification Criteria to HMA Mix Design	Arizona State University	59,450	1/8/2008	1/7/2009	Research in progress
09-34	Improved Test Procedure for Determining the Moisture Damage Susceptibility of Bituminous Pavements	Pennsylvania State University	400,000	3/26/2002	4/15/2007	Completed---Published as NCHRP Report 589
09-35	Critical Review of Research on Aggregate Properties and Effects on Superpave Designed Mixes	Auburn University	75,000	9/16/2002	10/31/2004	Completed---Published as NCHRP Report 539
09-36	Improved Procedure for Laboratory Aging of Asphalt Binders in Pavements	Advanced Asphalt Technologies, LLC	499,921	2/17/2003	12/31/2008	Research in progress
09-37	Using Surface Energy Measurements To Select Materials for Asphalt Pavements	Texas A&M University	450,000	6/16/2003	12/31/2006	Completed---Summarized in NCHRP Research Results Digest 316
09-38	Endurance Limit of Hot Mix Asphalt Mixtures to Prevent Fatigue Cracking in Flexible Pavements	Auburn University	750,000	1/23/2004	3/31/2009	Awaiting contractor's final report
09-39	Procedure for Determining Mixing and Compaction Temperatures of Asphalt Binders in Hot Mix Asphalt	Auburn University	400,000	7/1/2005	3/31/2009	Awaiting contractor's final report
09-40	Optimization of Tack Coat for HMA Placement	Louisiana Transportation Research Council	350,000	7/1/2005	3/31/2009	Research in progress
09-41	Performance and Maintenance of Permeable Friction Courses	Burns Cooley Dennis, Inc.	249,994	3/8/2005	12/31/2009	Awaiting contractor's revised final report
09-42	History of Superpave: Documenting the Research Program and Implementation Process	Purdue University	150,000	2/28/2006	11/27/2008	Awaiting contractor's final report
09-43	Mix Design Practices for Warm Mix Asphalt Technologies	Advanced Asphalt Technologies, LLC	500,000	3/22/2007	3/21/2010	Research in Progress
09-44	Developing a Plan for Validating an Endurance Limit for HMA Pavements	Advanced Asphalt Technologies, LLC	250,000	4/17/2007	12/31/2008	Awaiting contractor's final report
09-44A	Validating an Endurance Limit for HMA Pavements	----	500,000			In development
09-45	Test Methods and Specification Criteria for Mineral Filler Used in HMA	University of Wisconsin - Madison	500,000	6/5/2007	7/31/2010	Research in progress
09-46	Mix Design and Evaluation Procedure for High Reclaimed Asphalt Pavement Content in Hot Mix Asphalt	Auburn University	400,000	4/15/2008	4/14/2010	Research in progress
09-47	Engineering Properties/Field Performance of Warm Mix Asphalt Technologies	Asphalt Institute	897,837	3/31/2008	9/30/2011	Research in progress
09-48	Field versus Laboratory Volumetrics and Mechanical Properties	----	500,000			In development



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
<b>AREA TEN : MATERIALS AND CONSTRUCTION--SPECIFICATIONS, PROCEDURES, AND PRACTICES</b>						
10-01	Development of Guidelines for Practical and Realistic Construction Specifications	Miller-Warden	25,000 *	11/15/1963	11/14/1964	Completed---Published as NCHRP Report 17
10-02	Evaluation of Construction Control Procedures	Miller-Warden	59,750 *	11/4/1963	2/1/1966	Completed---Published as NCHRP Report 34
10-02A	Evaluation of Construction Control Procedures	Materials R&D	70,945 *	7/15/1966	11/14/1967	Completed---Published as NCHRP Report 69
10-03	Effects of Different Methods of Stockpiling and Handling Aggregates	Miller-Warden	55,000 *	10/22/1963	10/16/1965	Completed---Published as NCHRP Report 5; Phase II published as NCHRP Report 46
10-04	Rapid Test Methods for Field Control of Construction	Clemson University	99,320 *	2/1/1964	2/28/1967	Completed---Published as NCHRP Report 103
10-05	Density and Moisture Content Measurements by Nuclear Methods	Research Triangle Institute	88,636 *	1/15/1964	10/7/1966	Completed---Published as NCHRP Report 14; Phase II published as NCHRP Report 43
10-05A	Optimization of Nuclear Density and Moisture Content Measurement Methods	North Carolina State University	51,214 *	2/1/1968	1/31/1970	Completed---Published as NCHRP Report 125
10-06	Measurement of Pavement Thicknesses by Rapid and Nondestructive Methods	IIT Research Institute	108,821 *	2/1/1964	10/31/1966	Completed---Published as NCHRP Report 52
10-07	Potential Uses of Sonic and Ultrasonic Devices in Highway Construction	Ohio State University	24,310 *	2/1/1964	3/31/1965	Completed---Published as NCHRP Report 25
10-08	Evaluating Procedures for Determining Concrete Pavement Thickness and Reinforcement Position	Pennsylvania DOT	151,982 *	3/2/1970	7/31/1973	Completed---Published as NCHRP Report 168
10-09	Criteria for Need of Seal Coats for Bituminous Pavements	University of Minnesota	50,000 *	11/1/1969	2/28/1974	Completed---Report not published; summarized in NCHRP Research Results Digest 48; for avail. see Summary of Progress Through 1988
10-10	Acceptance Criteria for Electroslag Weldments in Bridges	US Steel	300,000 *	5/1/1974	9/30/1978	Completed---Published as NCHRP Report 201
10-11	Development of a Performance Specification for Bridge Deck Joint-Sealing Systems	Howard, Needles, et al.	29,996 *	12/1/1976	4/30/1978	Completed---Published as NCHRP Report 204
10-12	Acceptance of Aggregates Used in Bituminous Paving Mixtures	Texas A&M University	174,411 *	9/1/1977	6/30/1981	Completed---Report not published; for avail. see Summary of Progress Through 1988
10-13	Ultrasonic Measurement of Weld Flaw Size	Welding Institute	376,000 *	7/1/1979	8/31/1985	Completed---Published as NCHRP Report 242; Phase II report not published; for avail. see Summary of Progress Through 1988

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-14	Locating Voids Beneath Pavement Using Pulsed Electromagnetic Wave Techniques	Georgia Institute of Technology	99,850 *	4/2/1979	5/1/1981	Completed---Published as NCHRP Report 237
10-15	Structural Strength Evaluation of Existing Reinforced Concrete Bridges	Eng Computer Corp	225,000 *	4/1/1980	4/30/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988; Phase II published as NCHRP Report 292
10-16	Assessment of Deficiencies and Preservation of Bridge Substructures Below the Waterline	Byrd, Tallamy, MacDonald & Lewis	150,000 *	2/16/1981	12/1/1982	Completed---Published as NCHRP Report 251
10-17	Use of Antistripping Additives in Asphaltic Concrete Mixtures	David G. Tunnicliff	676,335 *	3/1/1981	11/30/1994	Completed---Phase I report published as NCHRP Report 274; Phase II report published as NCHRP Report 373
10-18	Specifying and Obtaining Entrained Air in Concrete	Construction Technology Laboratories/PCA	73,585 *	5/4/1981	6/1/1983	Completed---Published as NCHRP Report 258
10-19	Adding Dust Collector Fines to Asphalt Paving Mixtures	Pennsylvania State University	49,926 *	3/1/1981	11/30/1982	Completed---Published as NCHRP Report 252
10-20	Elastomeric Bearings Design, Construction, and Materials	University of Washington	374,715 *	2/1/1981	5/31/1989	Completed---Summarized in NCHRP RRD 171; publ. as NCHRP Report 248; Ph. II publ. as NCHRP Report 298; Ph. III publ. as NCHRP Report 325
10-20A	High-Load, Multi-Rotational Bridge Bearings: Design, Materials, and Construction	University of Washington	265,398	6/1/1986	12/31/1993	Completed---Published as NCHRP Report 432; supplement available for loan
10-21	Performance of Bridge Deck Concrete Subjected to Traffic-Induced Vibrations During Placement	Transportation Research Board	25,000 *	2/1/1980	9/30/1981	Completed---Published as NCHRP Synthesis 86
10-22	The Performance of Weathering Steel in Bridges	Sheladia Associates	195,550 *	4/1/1982	8/31/1987	Completed---Phase I published as NCHRP Report 272; Phase II published as NCHRP Report 314
10-23	Removal of Lead-Based Bridge Paints	Midwest Research Institute	81,118 *	7/1/1982	6/30/1983	Completed---Published as NCHRP Report 265
10-24	Rapid Replacement of PCC Pavement Segments	ARE, Inc.	240,000 *	3/15/1982	3/14/1988	Completed---Report not published; summarized in NCHRP Research Results Digest 169; for avail. see Summary of Progress Through 1988
10-25	Measurement of Cement and Water Content of Fresh Concrete	USACE Waterways Experiment Station	148,303 *	10/13/1983	9/5/1986	Completed---Published as NCHRP Report 284
10-25A	Instantaneous Determination of Water-Cement Ratio in Fresh Concrete	Wiss, Janney, Elstner & Associates	272,431 *	6/1/1985	2/15/1990	Completed---Summarized in NCHRP Research Results Digest 174

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-26	Data Bases for Performance-Related Specifications for Highway Construction	ARE, Inc.	60,000 *	6/15/1983	9/14/1984	Completed---Report not published, for avail. see Summary of Progress Through 1988
10-26A	Performance-Related Specifications for Hot-Mix Asphaltic Concrete	Pennsylvania State University	250,000 *	1/6/1986	9/30/1989	Completed---Published as NCHRP Report 332
10-27	Determination of Asphaltic Concrete Pavement Structural Properties by Nondestructive Testing	Texas A&M University	449,519 *	9/17/1984	8/31/1989	Completed---Published as NCHRP Report 327
10-28	A Method to Determine Deteriorated Areas in Portland Cement Concrete Pavements	Gulf Applied Research	199,784 *	11/1/1985	12/31/1987	Completed---Published as NCHRP Report 304
10-29	Anchorage Zone Reinforcement for Post-Tensioned Concrete Girders	University of Texas	489,223 *	10/1/1986	9/30/1992	Completed---Published as NCHRP Report 356
10-30(01)	Nondestructive Methods for Field Inspection of Embedded or Encased High Strength Steel Rods and Cables	University of Manchester	25,000 *	1/6/1986	9/29/1986	Completed---Report not published, for avail. see Summary of Progress Through 1988
10-30(02)	Nondestructive Methods for Field Inspection of Embedded or Encased High Strength Steel Rods and Cables	Southwest Research Institute	25,000 *	1/20/1986	10/3/1986	Completed---Report not published, for avail. see Summary of Progress Through 1988
10-30(03)	Nondestructive Methods for Field Inspection of Embedded or Encased High Strength Steel Rods and Cables	University of Manchester	400,000 *	7/1/1987	4/30/1991	Completed---Summarized in NCHRP Research Results Digest 188
10-31	Acceptance Criteria for Steel Bridge Welds	Materials Research Lab	348,350 *	1/1/1986	12/31/1989	Completed---Published as NCHRP Report 335
10-32	Durability of In-Place Concrete Containing High-Range Water-Reducing Admixtures	Construction Technology Laboratories/PCA	99,811	1/6/1986	7/5/1987	Completed---Published as NCHRP Report 296
10-32A	Durability Testing of High-Strength Concrete Containing High-Range Water-Reducing Admixtures	Utah State University	249,238	9/1/1987	4/30/1993	Completed---Summarized in NCHRP Research Results Digest 208
10-33	Potential Benefits of Geosynthetics in Flexible Pavement Systems	Georgia Institute of Technology	100,000 *	1/6/1986	12/15/1988	Completed---Published as NCHRP Report 315
10-34	Transient Protection, Grounding, and Shielding of Electronic Traffic Control Equipment	Georgia Institute of Technology	339,988	3/1/1986	9/30/1995	Completed---Phase I report published as NCHRP Report 317; Phase II agency report available for loan
10-35	Fatigue Behavior of Welded and Mechanical Splices in Reinforcing Steel	Wiss, Janney, Elstner & Associates	300,000 *	11/1/1987	4/30/1991	Completed---Summarized in NCHRP Research Results Digest 197
10-36	Evaluation of Weldments Incorporating Backing Materials	Arctec Cauada Ltd./Fleet Tech Ltd.	349,475	6/13/1988	9/30/1993	Completed---Agency report available on microfiche
10-37	Performance of Epoxy-Coated Reinforcing Steel in Highway Bridges	Kenneth C. Clear	350,000	5/1/1991	7/31/1994	Completed---Published as NCHRP Report 370
10-37A	Performance of Epoxy-Coated Reinforcing Steel---Laboratory Testing	Florida Atlantic University	66,121	8/1/1994	7/31/1998	Completed---Continued under Project 10-37A(01)

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-37A(01)	Extended Exposure and Monitoring of Epoxy-Coated Reinforced Concrete Test Slabs	Florida Atlantic University	30,000	8/3/1998	12/31/2000	Completed---Agency report available as NCHRP Web-Only Document 36
10-37B	A Protocol for the Evaluation of Existing Bridges Containing Epoxy-Coated Reinforcing Steel	Richard Weyers Consulting	10,000	9/1/1994	12/31/1995	Completed---Report not published; summarized in NCHRP Research Results Digest 215
10-37C	Repair and Rehabilitation of Bridge Components Containing Epoxy-Coated Reinforcement	Concorr, Inc.	354,876	1/1/1996	12/31/2001	Completed---Agency report available as NCHRP Web-Only Document 50
10-38	Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports	Lehigh University	300,000	9/1/1992	5/30/1996	Completed---Published as NCHRP Report 412
10-38(02)	Fatigue-Resistant Design of Cantilevered Signal, Sign, and Light Supports	University of Minnesota	266,358	6/1/1998	1/31/2001	Completed---Published as NCHRP Report 469
10-39	Construction Testing and Inspection Levels	Bergstrahl-Shaw-Newman	140,000	9/1/1992	6/1/1994	Completed---Report available only to sponsors
10-39A	Testing and Inspection Levels for Hot-Mix Asphaltic Concrete Overlays	University of Wisconsin - Madison	259,904	2/1/1996	11/15/1998	Completed---Published as NCHRP Report 447
10-40	Plasma Arc Cutting of Bridge Steels	Edison Welding Institute	268,688	1/18/1993	7/31/1995	Completed---Published as NCHRP Report 384
10-41	Evaluation of Unbonded Portland Cement Concrete Overlays	ERES Consultants	200,000	2/1/1994	8/29/1997	Completed---Published as NCHRP Report 415
10-42	Constructability Review Process for Transportation Facilities	Texas A&M University	300,000	2/15/1994	8/14/1996	Completed---Published as NCHRP Reports 390 and 391
10-43	Moveable Bridge Inspection, Evaluation, and Maintenance	A.G. Lichtenstein & Associates	284,000	2/1/1994	6/30/1997	Completed---Adopted as an AASHTO manual
10-44	Nondestructive Testing to Determine Insitu Material Properties of Pavement Layers	Brent Rauhut Engineering	160,000	4/3/1995	6/30/1997	Completed---Phase I only
10-44A	Determination of Insitu Material Properties of Asphalt Concrete Pavement Layers	Applied Research Associates	299,990	11/1/1997	10/31/2000	Completed---Summarized in NCHRP Research Results Digest 271
10-45	Procedures for Evaluating Corrosion-Inhibiting Admixtures for Structural Concrete	CC Technologies Laboratories, Inc.	274,848	12/1/1995	3/31/1999	Completed---Agency report available as NCHRP Web-Only Document 29
10-46	Corrosion of Steel Piling in Nonmarine Applications	CC Technologies Laboratories, Inc.	299,061	3/20/1995	5/31/1997	Completed---Published as NCHRP Report 408
10-47	Guidelines for Longitudinal Pavement Profile Measurement	University of Michigan	300,000	7/1/1996	2/28/1999	Completed---Published as NCHRP Report 434; summarized in NCHRP Research Results Digest 244
10-48	Assessing Pavement Layer Condition Using Deflection Data	North Carolina State University	360,437	2/1/1997	10/31/2000	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 254
10-49	Improved Contracting Methods for Highway Construction Projects	Texas A&M University	312,500	1/1/1997	3/31/2000	Completed---Guide published as NCHRP Report 451

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-50	Strategies for Rehabilitating Rigid Pavements Subjected to High-Traffic Volumes	Nichols Consulting Engineers	72,480	2/24/1997	6/23/1998	Completed---Phase I only; continued under Project 10-50A
10-50A	Guidelines for Selecting Strategies for Rehabilitating Rigid Pavements Subjected to High-Traffic Volumes	Texas A&M University	225,000	3/1/1999	2/28/2002	Completed---Agency report available as NCHRP Web-Only Document 45; summarized in NCHRP Research Results Digest 272
10-51	Performance-Related Specifications for Elastomeric Bridge Bearings	University of Texas - Austin	324,918	7/1/1997	6/30/2000	Completed---Published as NCHRP Report 449
10-52	Performance Tests for Modular Bridge Joints	University of Minnesota	362,734	6/1/1998	3/31/2001	Completed---Published as NCHRP Report 467
10-53	Condition Evaluation of Prestressed Steel Strands in Concrete Bridges	Construction Technology Laboratories	387,035	4/1/1997	9/30/1999	Completed---Phase I only; agency report available as NCHRP Web-Only Document 23
10-54	Quality-Based Performance Rating of Contractors for Prequalification and Bidding Purposes	Pennsylvania State University	199,829	3/1/1997	5/11/2001	Completed---Agency report available as NCHRP Web-Only Document 38
10-55	Fiber Reinforced Polymer Composites for Concrete Bridge Deck Reinforcement	Florida Atlantic University	299,994	4/1/1999	9/30/2002	Completed---To be summarized in NCHRP Research Results Digest 282
10-56	Accelerated Pavement Testing: Data Guidelines	ERES Consultants	175,000	3/7/2000	10/14/2002	Completed---Published as NCHRP Report 512
10-57	Structural Safety Evaluation Guidelines For Suspension Bridge Parallel-Wire Cables	Weidlinger Associates	448,752	3/10/2000	4/30/2004	Completed---Guidelines published as NCHRP Report 534; agency report available on CRP-CD-54
10-57A	Structural Safety Evaluation Guidelines For Suspension Bridge Parallel-Wire Cables	Consultant; Robert Easterling	25,000	10/16/2002	12/31/2003	Completed---Agency report available as appendix on CRP-CD-54
10-58	Construction Engineering and Management Research Program	University of Wisconsin	200,000	3/1/2000	10/31/2008	Completed---Agency report available as NCHRP Web-Only Document 51
10-58(01)	Time-Related Incentive and Disincentive Provisions in Highway Construction Contracts	Trinity Construction Management Services, Inc.	250,000	6/1/2006	10/31/2008	Research in progress---Contractor's draft final report under review
10-58(02)	Using Contractor-Performed Tests in Quality Assurance	Auburn University	298,802	10/24/2003	10/31/2006	Completed---Summarized in Research Results Digest 323; agency report available as NCHRP Web-Only Document 115
10-58(03)	Effects of Nighttime Construction Activities on Safety, Quality, and Productivity	----	70,000			Project cancelled; funds (\$70k) transferred to 10-58(01)
10-58A	Construction Engineering and Management Research Program (Brochure)	Bergstrahl-Shaw-Newman	12,722	6/20/2002	7/31/2002	Completed---Agency report available on the AASHTO Highway Subcommittee on Construction website

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-59	Construction Specifications for Bonded Repair and Retrofit of Concrete Structures Using FRP Composites	University of Cincinnati		5/29/2001	5/28/2003	Contract transferred to North Carolina State University
10-59A	Construction Specifications for Bonded Repair and Retrofit of Concrete Structures Using FRP Composites	North Carolina State University	193,246	10/19/2001	8/19/2004	Contract transferred to Florida International University; Phase I results published as NCHRP Report 514
10-59B	Construction Specifications for Bonded Repair and Retrofit of Concrete Structures Using FRP Composites	Florida International University	281,754	12/6/2004	8/31/2007	Completed---Published as NCHRP Report 609
10-60	Avoiding Delays in the Delivery of Highway Construction Projects	Cancelled				Project cancelled; funds (\$250k) transferred to 20-24(12)A and \$250k returned for reprogramming
10-61	Best-Value Procurement Methods for Highway Construction Projects	Trauner Consulting Services	334,704	4/1/2002	8/30/2005	Completed---Published as NCHRP Report 561
10-62	Acceptance Test for Surface Characteristics of Steel Strands Used in Pre-stressed Concrete	Wiss, Janney, Elstner & Associates	500,000	7/25/2003	7/31/2008	Completed---To be published as an NCHRP report
10-63	Heat-Straightening Repair of Damaged Steel Bridge Girders: Fatigue and Fracture Performance	Lehigh University	375,000	3/27/2003	12/31/2007	Completed---Published as NCHRP Report 604
10-64	Field Inspection of In-Service FRP Bridge Decks	Construction Technology Laboratories	299,311	4/16/2003	12/31/2005	Completed---Published as NCHRP Report 564
10-65	Nondestructive Testing Technology for Quality Control and Acceptance of Flexible Pavement Construction	Applied Research Associates	699,995	8/22/2003	10/31/2008	Completed---To be published as an NCHRP report
10-66	Predicting In-Service Performance of Flexible Pavements from Accelerated Pavement Testing	J.B. Metcalf	100,000	3/4/2004	10/31/2005	Completed---Phase I only
10-67	Texturing of Concrete Pavements	ERES Consultants	499,994	8/20/2004	11/30/2008	Completed---Publication decision pending
10-68	Guidelines for the Use of Highway Pavement Warranties	Trauner Consulting Services	400,000	7/7/2005	9/30/2008	Research in progress---Contractor's draft final report under review
10-69	Guidelines for Dowel Alignment in Concrete Pavements	University of Minnesota	499,983	9/29/2005	12/31/2008	Completed---Publication decision pending
10-70	Cost Effective Connection Details for Highway Sign, Luminaire, and Traffic Signal Structures	Lehigh University	891,086	3/15/2006	3/14/2009	Research in progress
10-71	Evaluation of CIP Reinforced Joints for Full-Depth Precast Concrete Bridge Decks	University of Minnesota	650,000	7/5/2006	11/4/2009	Research in progress
10-72	Bridge Deck Design Criteria and Testing Procedures	Purdue University	499,836	9/11/2006	9/10/2009	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
10-73	Guide Specification for the Design of Externally Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements	Georgia Institute of Technology	449,926	8/13/2007	11/12/2009	Research in progress
10-74	Development of Fatigue Loading and Design Methodology for High-Mast Lighting Poles	Purdue University	674,957	5/2/2008	5/1/2011	Research in progress
10-75	Guide for Pavement-Type Selection	Applied Research Associates	299,911	5/1/2008	4/30/2010	Research in progress
10-76	Methodologies for Evaluating Pavement Strategies and Barriers for Noise Mitigation	Illingworth & Rodkin, Inc.	299,665	6/13/2008	6/14/2010	Research in progress
10-77	Developing Guidelines for GPS (Geographical Positioning System) Controlled Construction Machine Guidance and Required CADD Software	----	500,000			In development
10-78	Analysis of Nighttime Construction Activities and Impacts to Safety, Quality, and Productivity	----	250,000			In development
10-79	Guidelines for Pavement-Related Pay Adjustment Factors	----	250,000			In development
<b>AREA ELEVEN : ADMINISTRATION--LAW</b>						
11-01	Rules of Compensability and Valuation in Highway Land Acquisition	University of Wisconsin	84,840 *	1/1/1965	4/30/1967	Completed---Published as NCHRP Report 104
11-01(01)	Eliminating Enhancement or Diminution Effects on Right-of-Way Valuation	Real Estate Research	5,000 *	9/2/1968	2/28/1969	Completed---Published as NCHRP Report 114
11-01(02)	Recognition of Benefits to Remainder Property in Highway Valuation	Montano & Associates	5,000 *	10/1/1968	3/31/1969	Completed---Published as NCHRP Report 88
11-01(03)	Taxation Aspects of Right-of-Way Acquisition	University of Tulsa	2,250 *	9/16/1968	4/30/1969	Project cancelled---No final report
11-01(04)	Compensation in the Nature of Additives to Market Value	University of Oklahoma	2,500 *	12/1/1968	5/31/1969	Completed---Report not published; for avail. see Summary of Progress Through 1988
11-01(05)	Rules of Discovery and Disclosure in Highway Condemnation Proceedings	Long, Mikkelsen	2,500 *	9/15/1968	4/14/1969	Completed---Published as NCHRP Report 87
11-01(06)	Valuation and Condemnation Problems of Selected Special Purpose Properties	Edward E. Level	7,500 *	9/2/1968	11/28/1969	Completed---Published as NCHRP Report 92
11-01(07)	Valuation and Compensability of Noise, Pollution, and Other Environmental Factors	University of Oklahoma	2,500 *	10/1/1968	3/31/1969	Completed---Report not published; for avail. see Summary of Progress Through 1988
11-01(08)	Remainder Damages Caused by Drainage, Runoff, Blasting, and Slides	Harrison Lewis	7,500 *	10/15/1968	1/15/1970	Completed---Published as NCHRP Report 134

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
11-01(09)	Valuation and Condemnation Problems Involving Trade Fixtures	Edward L. Snitzer	5,000 *	3/15/1969	12/1/1969	Completed---Published as NCHRP Report 94
11-01(10)	Compensability and Valuation Aspects of Residential Displacement in Highway Programs	Ross, Hardies, et al.	5,000 *	3/15/1969	9/15/1969	Completed---Published as NCHRP Report 107
11-01(11)	Valuation Elements of Joint Development Projects, Including Air Rights	Real Estate Research	5,000 *	2/24/1969	8/25/1969	Completed---Report not published; for avail. see Summary of Progress Through 1988
11-02	Theory and Practice in Inverse Condemnation	Reg & Urban Planning	15,000 *	2/1/1965	6/30/1966	Completed---Published as NCHRP Report 72
11-03	Valuation and Legal Implications of Scenic, Conservation, and Roadside Easements	Sutte, Jr. & Associates	25,000 *	11/1/1966	12/15/1967	Completed---Published as NCHRP Report 56
11-03(01)	Public Control of Roadside Advertising Signs for Highway Beautification	Sutte, Jr. & Associates	20,000 *	10/1/1968	12/31/1969	Completed---Published as NCHRP Report 119
11-03(02)	Public Control of Junkyards for Highway Beautification	Real Estate Research	13,300 *	9/2/1968	2/28/1970	Completed---Published as NCHRP Report 112
11-04	Elimination of Wide Divergence in Right-of-Way Valuation	Am Inst RI Est App	24,959 *	7/1/1969	2/28/1971	Completed---Published as NCHRP Report 126
11-05	Valuation of Air Space	Daniel, Mann, Johnson, Mendenhall	49,800 *	10/1/1970	5/31/1972	Completed---Published as NCHRP Report 142
11-06	Valuation and Compensability of Noise Pollution	Jack Faucett Associates	94,744 *	4/1/1974	7/31/1975	Completed---Report not published; for avail. see Summary of Progress Through 1988
11-07	National Data-Management System for Highway Tort Claims	Pennsylvania State University	290,495	5/1/1997	8/30/2002	Completed---Agency report available as NCHRP Web-Only Document 57

**AREA TWELVE : DESIGN--BRIDGES**

12-01	Deformation of Steel Beams Related to Permitted Highway Bridge Overloads	University of Missouri	50,000 *	2/1/1965	6/30/1967	Completed---Report included in Project 12-06 report
12-02	Distribution of Wheel Loads on Highway Bridges	Iowa State University	79,512 *	6/1/1966	12/31/1968	Completed---Published as NCHRP Report 83
12-03	Development of Waterproof Roadway Joints for Bridges	Southwest Research Institute	149,895 *	12/15/1965	3/14/1969	Completed---Report available only to sponsors; summarized in NCHRP Research Results Digest 14
12-04	Thermal Characteristics of Highway Bridges	Southwest Research Institute	102,400 *	12/15/1965	3/31/1968	Completed---Report not published; for avail. see Summary of Progress Through 1988
12-05	Protection of Steel in Prestressed Concrete Bridges	University of Denver	173,255 *	9/15/1966	11/15/1968	Completed---Published as NCHRP Report 90



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-06	Prediction of Permanent Camber of Bridges	University of Missouri	82,253 *	2/1/1967	4/30/1972	Completed---Report not published; for avail. see Summary of Progress Through 1988
12-07	Effects of Weldments on Fatigue Strength of Steel Beams	Lehigh University	399,023 *	10/1/1966	12/31/1972	Completed---Published as NCHRP Report 102; Phase II published as NCHRP Report 147
12-08	Bridge Rail Service Requirements as a Basis for Design Criteria	Texas A&M University	98,546 *	3/1/1968	6/30/1971	Completed---Published as NCHRP Report 86; Phase II published as NCHRP Report 149
12-09	Elastomeric Bearing Research	Battelle Memorial Institute	84,800 *	9/1/1967	1/31/1970	Completed---Published as NCHRP Report 109
12-10	Analysis and Design of Bridge Bents	Portland Cement Association	297,900 *	1/1/1970	12/31/1973	Completed---Published as NCHRP Report 163
12-11	Waterproof Membranes for Protection of Concrete Bridge Decks	Materials R&D	303,004 *	8/1/1970	9/30/1978	Completed---Published as NCHRP Report 165; Phase II report not published; for avail. see Summary of Progress Through 1988
12-12	Welded Steel Bridge Members Under Variable-Cycle Fatigue Loadings	US Steel	310,000 *	10/1/1970	10/31/1975	Completed---Published as NCHRP Report 188
12-13	Cathodic Protection for Reinforced Concrete Bridge Decks	USS Engineering & Consulting	174,601 *	10/1/1972	7/31/1974	Completed---Published as NCHRP Report 180
12-13A	Field Evaluation of Galvanic Cathodic Protection for Reinforced Concrete Bridge Decks	Portland Cement Association	74,405 *	8/1/1975	5/15/1981	Completed---Published as NCHRP Report 234
12-14	Subcritical Crack Growth in Steel Bridge Members	US Steel	99,923 *	10/1/1972	6/30/1974	Completed---Published as NCHRP Report 181
12-15	Detection and Repair of Fatigue Cracking in Highway Bridges	Lehigh University	100,000 *	10/1/1972	4/30/1975	Completed---Published as NCHRP Report 206
12-15(02)	Retrofitting Procedures for Fatigue-Damaged Full-Scale Welded Bridge Beams	Lehigh University	150,000 *	6/1/1976	11/30/1978	Completed---Published as NCHRP Report 206
12-15(03)	Fatigue Behavior of Full-Scale Welded Bridge Attachments	Lehigh University	125,000 *	2/1/1978	7/31/1980	Completed---Published as NCHRP Report 227
12-15(04)	Steel Bridge Members Under Variable-Amplitude, Long-Life Fatigue Loading	Lehigh University	150,000 *	4/1/1980	9/30/1983	Completed---Published as NCHRP Report 267
12-15(05)	Fatigue Behavior of Variable-Loaded Bridge Details Near the Fatigue Limit	Lehigh University	399,999 *	9/1/1983	12/31/1990	Completed---Interim report published as NCHRP Report 286; final report published as NCHRP Report 354
12-16	Influence of Bridge Deck Repairs on Corrosion of Reinforcing Steel	Battelle Columbus	214,912 *	9/1/1974	11/30/1977	Completed---Report not published; summarized in NCHRP Research Results Digest 85; for avail. see Summary of Progress Through 1988

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-17	Evaluation of Repair Techniques for Damaged Steel Bridge Members	Battelle Columbus	49,974 *	11/15/1976	4/30/1978	Completed---Report not published; for avail. see Summary of Progress Through 1988
12-17A	Guidelines for Evaluation and Repair of Damaged Steel Bridge Members	Shanafelt/Horn	99,950 *	10/1/1981	5/31/1984	Completed---Published as NCHRP Report 271
12-18	Development of an Integrated Bridge Design System	Multiplications, Inc.	224,985 *	9/6/1977	12/31/1982	Completed---Report not published; for avail. see Summary of Progress Through 1988
12-18A	Assessment of an Integrated Bridge Design System	Eng Computer Corp	15,000 *	2/1/1984	1/3/1986	Completed---Report available only to sponsors
12-19	Cathodic Protection of Concrete Bridge Structures	Corrosion Engineering & Research	250,000 *	1/1/1978	12/31/1980	Completed---Report not published; for avail. see Summary of Progress Through 1988
12-19A	Concrete Sealers for Protection of Bridge Structures	Wiss, Janney, Elstner & Associates	99,190 *	8/1/1979	12/1/1981	Completed---Published as NCHRP Report 244
12-19B	Cathodic Protection of Concrete Bridge Structures	Wiss, Janney, Elstner & Associates	138,900 *	11/1/1982	4/30/1985	Completed---Published as NCHRP Report 278
12-20	Bridges on Secondary Highways and Local Roads: Rehabilitation and Replacement	University of Virginia	169,878 *	3/1/1978	11/30/1981	Completed---Published as NCHRP Report 222; Phase II published as NCHRP Report 243
12-21	Evaluation of Damage and Methods of Repair for Prestressed Concrete Bridge Members	G. O. Shanafelt	188,454 *	4/15/1979	7/8/1985	Completed---Published as NCHRP Report 226; Phase II published as NCHRP Report 280
12-22	Thermal Effects in Concrete Bridge Superstructures	Eng Computer Corp	100,000 *	10/1/1981	1/31/1984	Completed---Published as NCHRP Report 276
12-23	Recommended Revisions to the AASHTO Manual for Maintenance Inspection of Bridges	A.G. Lichtenstein & Associates	233,800 *	1/3/1989	8/3/1992	Completed---Report distributed to sponsors
12-24	Design of Multi-Beam Precast Bridge Superstructures	University of Washington	149,879 *	8/1/1983	5/31/1986	Completed---Published as NCHRP Report 287
12-25	Fatigue and Fracture Evaluation for Rating Riveted Steel Bridges	Lehigh University	199,957 *	9/1/1984	9/30/1987	Completed---Published as NCHRP Report 302
12-26	Distribution of Wheel Loads on Highway Bridges	Imbsen & Associates	500,000 *	4/15/1985	10/31/1990	Completed---Phase I and II summarized in NCHRP Research Results Digest 187
12-26(02)	Distribution of Wheel Loads on Highway Bridges	Imbsen & Associates	100,000	9/28/1992	12/31/1993	Completed---Agency report available on microfiche
12-27	Welded Repair of Cracks in Steel Bridge Members	Welding Institute	374,575 *	10/15/1984	2/28/1989	Completed---Published as NCHRP Report 321
12-28(01)	Load Capacity Evaluation of Existing Bridges	Case Western Reserve University	302,000 *	9/1/1985	8/31/1989	Completed---Published as NCHRP Report 301
12-28(02)	Bridge Management Systems	ARE, Inc.	495,000 *	6/24/1985	4/30/1990	Completed---Published as NCHRP Report 300; Phase II has no final report

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-28(02)A	Bridge Management Systems Software	National Engineering Technology Corporation	585,000	1/10/1992	12/31/1994	Completed---No report
12-28(02)B	Bridge Management Systems Software	National Engineering Technology Corporation	140,000	8/14/1995	12/31/1996	Completed---No report; software and documentation available
12-28(02)C	Conversion of BRIDGIT Bridge Management Software to Windows	National Engineering Technology Corporation	54,456	1/1/1998	6/30/1998	Completed---No report; software distributed
12-28(03)	Fatigue Evaluation Procedures for Steel Bridges	Case Western Reserve University	200,000 *	7/1/1985	9/30/1987	Completed---Published as NCHRP Report 299
12-28(04)	Methods of Strengthening Existing Highway Bridges	Iowa State University	164,985 *	7/1/1985	7/31/1987	Completed---Published as NCHRP Report 293
12-28(05)	Standard Methodology for Conducting Condition Surveys of Concrete Bridge Components	New Mexico State University	98,338 *	8/1/1985	8/31/1987	Completed---Published as NCHRP Report 312
12-28(06)	Distortion-Induced Fatigue Cracking in Steel Bridges	Lehigh University	250,000 *	10/1/1985	11/30/1989	Completed---Published as NCHRP Report 336
12-28(07)	Guidelines for Evaluating Corrosion Effects in Existing Steel Bridges	Modjeski & Masters	298,644 *	5/5/1986	11/30/1989	Completed---Published as NCHRP Report 333
12-28(08)	Improving Bridge Load Capacity Estimates by Correlation with Test Data	University of Tennessee	191,024 *	2/1/1986	2/19/1988	Completed---Published as NCHRP Report 306
12-28(09)	Methods of Flaw Detection in Concrete Bridge Components	Combined				Combined with Project 10-30(03)
12-28(10)	Guidelines for Determining Redundancy in Steel Bridges	Lehigh University	299,995 *	3/1/1986	5/31/1989	Completed---Published as NCHRP Report 319
12-28(11)	Development of Site-Specific Load Models for Bridge Rating	Imbsen & Associates	200,000 *	2/9/1987	3/30/1990	Completed---Report not published
12-28(12)	Inelastic Rating Procedures for Steel Beam and Girder Bridges	University of Minnesota	241,031 *	9/1/1987	5/30/1990	Completed---Published as NCHRP Report 352
12-28(13)	Nondestructive Load Testing for Bridge Evaluation and Rating	Raths Raths & Johnson	150,000 *	10/4/1987	9/30/1989	Completed---Report not published
12-28(13)A	Bridge Rating Through Nondestructive Load Testing	A.G. Lichtenstein & Associates	227,200 *	12/17/1990	2/28/1994	Completed---Summarized in NCHRP Research Results Digest 234
12-29	Design of Simple-Span Precast Prestressed Bridge Girders Made Continuous	Construction Technology Laboratories/PCA	241,993 *	8/26/1985	5/31/1988	Completed---Published as NCHRP Report 322
12-30	Fatigue of Cables in Cable-Stayed Bridges	Acer Freeman Fox Ltd.	124,975	1/13/1986	2/12/1989	Completed---Report not published
12-31	Notch Toughness Variability in Bridge Steel Plates	University of Texas	385,000 *	9/1/1987	9/1/1992	Completed---Published as NCHRP Report 355
12-32	Evaluation of Bridge Deck Protective Strategies	University of Washington	92,515 *	4/1/1986	5/15/1987	Completed---Published as NCHRP Report 297

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-33	Development of a Comprehensive Bridge Specification and Commentary	Modjeski & Masters	1,404,167	7/1/1988	12/31/1995	Completed---Specifications published by AASHTO; summarized in NCHRP Research Results Digest 198; report published as NCHRP Report 368
12-33A	Development of a Comprehensive Bridge Specification and Commentary---Timber Structures and Code Calibration	Sensei Engineers	60,000	9/19/1988	12/31/1991	Completed---No report; See Project 12-33
12-33B	Development of a Comprehensive Bridge Specification and Commentary---Concrete Structures	Imbsen & Associates	125,500 *	9/19/1988	3/31/1992	Completed---No report; See Project 12-33
12-33C	Development of a Comprehensive Bridge Specification and Commentary---Soil-Structure Interaction Systems	D'Appolonia	83,832 *	7/24/1989	3/31/1992	Completed---No report; See Project 12-33
12-34	Update of AASHTO Standard Specifications for Highway Bridges: Division II---Construction	Imbsen & Associates	200,000 *	10/19/1987	10/18/1989	Completed---Report provided to AASHTO
12-35	Recommended Specifications for the Design of Foundations, Retaining Walls, and Substructures	D'Appolonia	99,588 *	1/4/1988	7/3/1989	Completed---Report provided to AASHTO
12-36	Redundancy in Highway Bridge Superstructures	City College of New York	200,000	4/8/1991	11/16/1993	Completed---See Project 12-36(02)
12-36(02)	Redundancy in Highway Bridge Superstructures: Phase II	City College of New York	250,000	9/1/1994	5/31/1997	Completed---Published as NCHRP Report 406
12-37	Transverse Cracking in Newly Constructed Bridge Decks	Wiss, Janney, Elstner & Associates	350,000	1/27/1992	3/31/1995	Completed---Published as NCHRP Report 380
12-38	Improved Design Specifications for Horizontally Curved Steel Girder Highway Bridges	Auburn University	378,103	1/1/1993	6/30/1999	Completed---Published as NCHRP Report 424; specification adopted by AASHTO and Appendixes D-F published by AASHTO as G1C-4
12-39	Design Specifications for Debris Forces on Highway Bridges	University of Louisville	474,735	3/1/1993	4/30/2000	Completed---Published as NCHRP Report 445; Task 7 report published as NCHRP Report 417
12-40	Fatigue Criteria for Modular Bridge Expansion Joints	Lehigh University	335,000	1/18/1994	4/30/1997	Completed---Published as NCHRP Report 402
12-41	Rapid Replacement of Bridge Decks	University of Nebraska - Lincoln	499,921	1/1/1994	8/31/1997	Completed---Published as NCHRP Report 407
12-42	LRFD Bridge Design Specifications Support	Modjeski & Masters	922,630	2/1/1995	12/31/2003	Completed---Available on request
12-43	Life-Cycle Cost Analysis for Bridges	National Engineering Technology Corporation	439,691	5/28/1996	3/30/2002	Completed---Published as NCHRP Report 483 and CRP-CD-26
12-44	Recommended Specifications for the Design of Movable Highway Bridges	Modjeski & Masters	374,325	7/26/1996	9/30/1999	Completed---Specifications published by AASHTO

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-45	Recommended Specifications for Large-Span Culverts	Simpson Gumpertz & Heger, Inc.	475,000	4/26/1996	11/30/2001	Completed---Published as NCHRP Report 473
12-46	Manual for Condition Evaluation and Load Rating of Highway Bridges Using Load and Resistance Factor Philosophy	A.G. Lichtenstein & Associates	389,187	3/1/1997	9/30/2000	Completed---Report on calibration published as NCHRP Report 454; agency report available as NCHRP Web-Only Document 28
12-47	Redundancy in Highway Bridge Substructures	Imbsen & Associates	250,000	1/1/1998	8/31/2000	Completed---Published as NCHRP Report 458
12-48	Design of Highway Bridges for Extreme Events	City College of New York	350,000	7/15/1998	9/30/2002	Completed---Published as NCHRP Report 489 and CRP-CD-30
12-49	Comprehensive Specification for the Seismic Design of Bridges	ATC/MCEER Joint Venture	850,000	8/1/1998	11/30/2001	Completed---Specifications under review by AASHTO; published as NCHRP Report 472
12-50	Bridge Software Validation Guidelines and Examples	Michael Baker, Jr., Inc.	499,948	5/13/1998	6/30/2002	Completed---Published as NCHRP Report 485 and CRP-CD-29A&B
12-51	Effect of Truck Weight on Bridge Network Costs	Wayne State University	399,998	12/1/2000	12/31/2002	Completed---Published as NCHRP Report 495 and CRP-CD-37
12-52	LRFD Specifications for Horizontally Curved Steel Girder Highway Bridges	Modjeski & Masters	700,000	9/1/1999	10/31/2005	Completed---Published as NCHRP Report 563; recommended specifications adopted by AASHTO
12-53	Connection Between Simple-Span Precast Concrete Girders Made Continuous	University of Cincinnati	300,000	5/1/1999	8/31/2003	Completed---Published as NCHRP Report 519
12-54	Integral Connections of Modern Steel Bridge Structures	Modjeski & Masters	499,961	7/1/1999	1/31/2004	Completed---Published as NCHRP Report 527
12-55	Load and Resistance Factors for Earth Pressures on Bridge Substructures and Retaining Walls	D'Appolonia	250,000	4/17/2001	1/15/2004	Completed---Publication decision pending
12-55A	Load and Resistance Factors for Earth Pressures on Bridge Substructures and Retaining Walls	Prototype Engineering, Inc.	38,000	7/10/2006	3/27/2007	Contract cancelled; \$62k released
12-56	Application of the LRFD Bridge Design Specifications to High-Strength Structural Concrete: Shear Provisions	University of Illinois	650,000	7/26/2001	8/31/2006	Completed---Published as NCHRP Report 579
12-57	Extending Span Ranges of Precast, Prestressed Concrete Girders	Ralph Whitehead Associates, Inc.	239,979	4/30/2001	9/30/2003	Completed---Published as NCHRP Report 517
12-58	Effective Slab Width for Composite Steel Bridge Members	State University of New York	359,999	7/6/2001	12/30/2004	Completed---Published as NCHRP Report 543
12-59	Design and Construction of Segmental Geosynthetic-Reinforced Soil (GRS) Bridge Abutments for Bridge Support	University of Colorado - Denver	299,998	8/1/2001	12/31/2004	Completed---Published as NCHRP Report 556
12-59(01)	Seismic Design of Geosynthetic-Reinforced Soil (GRS) Bridge Abutments with Modular Block Facing	University of Wisconsin	300,000	1/31/2008	1/30/2011	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-60	Transfer and Development Length of Prestressing Strand and Development and Splice Length of Reinforcement in High-Strength Concrete	Purdue University	600,000	4/16/2002	7/31/2007	Completed---To be published as NCHRP Report 603
12-61	Simplified Shear Design of Structural Concrete Members	University of Illinois	250,000	1/7/2003	7/6/2005	Completed---Published as NCHRP Report 549; appendixes available as NCHRP Web-Only Document 78
12-62	Simplified Live Load Distribution-Factor Equations	BridgeTech, Inc.	249,958	4/8/2003	1/30/2005	Completed---Published as NCHRP Report 592
12-62A	Simplified Live Load Distribution-Factor Equations-Phase II	BridgeTech, Inc.	50,817	6/17/2005	1/31/2007	Completed---Published as NCHRP Report 592
12-63	Legal Truck Loads and AASHTO Legal Loads for Posting	Lichtenstein Consulting Engineers, Inc.	350,000	7/1/2003	10/30/2006	Completed---Published as NCHRP Report 575
12-64	Application of the LRFD Bridge Design Specifications to High-Strength Structural Concrete: Flexure and Compression Provisions	North Carolina State University	630,000	8/15/2003	5/28/2007	Completed---Published as an NCHRP Report
12-65	Full-Depth, Precast-Concrete Bridge Deck Panel Systems	George Washington University	399,989	7/7/2003	12/1/2006	Completed---Published as NCHRP Report 584
12-66	AASHTO LRFD Specifications for Serviceability in the Design of Bridge Foundations	Geosciences Testing & Research, Inc.	500,000	5/1/2004	7/31/2008	Contract termination pending
12-67	Multiple-Objective Optimization for Bridge Management Systems	Purdue University	350,000	2/13/2004	11/17/2006	Completed---Published as NCHRP Report 590
12-68	Improved Rotational Limits of Elastomeric Bearings	University of Washington	350,000	6/18/2004	12/31/2006	Completed---Published as NCHRP Report 596
12-69	Design and Construction Guidelines for Long-Span Decked Precast, Prestressed Concrete Girder Bridges	Construction Technology Laboratories	499,242	6/1/2004	4/30/2009	Research in progress
12-70	Seismic Analysis of Retaining Walls, Buried Structures and Embankments	CH2M Hill	499,970	3/25/2004	7/1/2008	Completed---Published as NCHRP Report 611
12-71	Design Specifications and Commentary for Horizontally Curved Concrete Box-Girder Highway Bridges	Nutt, Redfield & Valentine	350,000	7/18/2005	12/31/2007	Completed---Published as NCHRP Report 620
12-72	Blast-Resistant Highway Bridges: Design and Detailing Guidelines	University of Texas - Austin	1,000,000	6/22/2005	11/30/2008	Research in progress
12-73	Design Guidelines for Durability of Bonded CFRP Repair/Strengthening of Concrete Beams	University of Wyoming	500,000	3/7/2005	9/30/2008	Completed---Publication decision pending
12-74	Development of a Precast Bent Cap System for Seismic Regions	University of California	598,916	9/14/2005	12/31/2008	Research in progress
12-75	Design of FRP Systems for Strengthening Concrete Girders in Shear	University of Missouri	400,000	3/27/2006	7/31/2009	Research in progress
12-76	Protocols for Collecting and Using Traffic Data in Bridge Design	Lichtenstein Consulting Engineers, Inc.	300,000	3/1/2006	9/1/2008	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
12-77	Structural Design with High-Strength Reinforcement	University of Cincinnati	600,000	5/1/2007	4/30/2010	Research in progress
12-78	Evaluation of Load Rating by Load and Resistance Factor Rating	Michael Baker, Jr., Inc.	449,986	3/3/2008	3/2/2010	Research in progress
12-79	Guidelines for Analysis and Construction Engineering of Curved and Skewed Steel Girder Bridges	Georgia Institute of Technology	450,000	4/2/2008	10/1/2010	Research in progress
12-80	LRFD Minimum Flexural Reinforcement Requirements	PBS&J	199,826	2/14/2008	8/13/2009	Research in progress
12-81	Evaluation of Fatigue on the Serviceability of Highway Bridges	Purdue University	500,000	4/23/2008	4/22/2011	Research in progress
12-82	Developing Reliability-Based Bridge Inspection Policies	----	750,000			In development
12-83	Calibration of LRFD Concrete Bridge Design Specifications for Serviceability	----	500,000			In development
12-84	Guidelines for the Load and Resistance Factor Design and Rating of Riveted, Bolted, and Welded Gusset-Plate Connections for Steel Bridges	----	500,000			In development

### AREA THIRTEEN : MAINTENANCE--EQUIPMENT

13-01	Equipment Rental Rates	Ernst & Ernst	22,800 *	2/1/1965	1/31/1966	Completed---Published as NCHRP Report 26
13-02	Guidelines for Selection and Application of Warning Lights on Roadway-Operations Equipment	Virginia Polytechnic Institute	300,000	7/29/2004	12/31/2007	Completed---Published as NCHRP Report 624
13-03	Decision Making for Outsourcing and Privatization of Vehicle and Equipment Fleet Maintenance	TransTech Management, Inc.	300,000	7/9/2007	5/8/2009	Research in progress

### AREA FOURTEEN : MAINTENANCE--MAINTENANCE OF WAY AND STRUCTURES

14-01	Upgrading of Unit Maintenance Cost Index and Development of Interstate Maintenance Requirements	Tallamy Associates	205,128 *	3/1/1965	3/31/1967	Completed---Published as NCHRP Report 42
14-02	Techniques for Reducing Roadway Occupancy During Routine Maintenance Activities	Byrd, Tallamy, MacDonald & Lewis	200,000 *	10/1/1970	3/31/1973	Completed---Published as NCHRP Report 161
14-03	Improved Pavement-Shoulder Joint Design	Georgia Institute of Technology	100,838 *	9/11/1972	3/15/1976	Completed---Published as NCHRP Report 202
14-04	Reconditioning Heavy-Duty Freeways in Urban Areas	Texas A&M University	99,665 *	4/15/1974	3/24/1976	Completed---Published as NCHRP Report 196
14-05	Maintenance Levels-of-Service Guidelines	Woodward-Clyde	204,200 *	1/1/1978	4/30/1980	Completed---Published as NCHRP Report 223
14-05(02)	Maintenance Levels-of-Service Guidelines	Woodward-Clyde	107,950 *	9/15/1981	8/31/1984	Completed---Published as NCHRP Report 273

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
14-06	Evaluating Deferred Maintenance Strategies	ARE, Inc.	325,000 *	6/1/1982	12/31/1985	Completed---Published as NCHRP Report 285
14-07	Interactive Microcomputer Network for Innovative Maintenance Operations	Woodward-Clyde	82,819 *	9/1/1987	6/30/1991	Completed---Report not published
14-08	Chip Seal Coats for High-Traffic-Volume Asphalt Concrete Pavements	Intermountain Research Foundation	80,078	7/6/1987	10/5/1990	Contract cancelled---Summary to be included in 14-08A report
14-08A	Chip Seal Coats for High-Traffic-Volume Asphalt Concrete Pavements	Asphalt Institute	159,922	1/1/1991	12/31/1992	Completed---Agency report available for loan
14-09	Workshop on Research Needs in the Management of Highway Maintenance	Transportation Research Board	42,000 *	6/12/1988	6/15/1988	Completed---Problem statements developed
14-09(01)	Effective Maintenance Budget Strategies	Urban Institute	300,000	11/15/1989	4/30/1994	Completed---Published as NCHRP Report 366
14-09(02)	Incorporation of Maintenance Considerations in Highway Design	Daniel, Mann, Johnson, Mendenhall	168,122 *	1/15/1990	2/27/1992	Completed---Published as NCHRP Report 349
14-09(03)	Maintenance Contracting	Bergstrahl-Shaw-Newman	150,000 *	3/12/1990	9/1/1991	Completed---Published as NCHRP Report 344
14-09(04)	Role of Highway Maintenance in Integrated Management Systems	Cambridge Systematics	225,000	4/15/1991	7/15/1993	Completed---Published as NCHRP Report 363
14-09(05)	Impacts of Environmental, Health, and Safety Regulations on Highway Maintenance	Auburn University	150,000	5/1/1991	5/31/1993	Completed---Agency report available on microfiche
14-09(06)	Professional Development of Maintenance Engineers and Managers	University of Maryland	174,998	2/1/1991	1/31/1993	Completed---Published as NCHRP Report 360
14-10	Improvements in Data Acquisition Technology for Maintenance Management Systems	Urban Institute	300,000 *	5/29/1989	3/31/1993	Completed---Published as NCHRP Report 334; Phase II published as NCHRP Report 361
14-11	Effective Motivation of Highway Maintenance Personnel	Pennsylvania State University	200,000	6/1/1989	11/30/1992	Completed---Report, training manual, and instructor's guide available for loan
14-11(02)	Enhancement to Program for Effective Motivation of Highway Maintenance Personnel	University of Maryland	165,000	5/1/1998	11/15/2000	Completed---Summarized in NCHRP Research Results Digest 257; available on CRP-CD-12
14-12	Highway Maintenance Quality Assurance	ERES Consultants	325,241	3/1/1995	7/31/1998	Completed---Manual published as NCHRP Report 422; agency report available as NCHRP Web-Only Document 8
14-13	Customer-Driven Benchmarking for Highway Maintenance Activities	Booz-Allen & Hamilton	299,819	5/7/1999	3/31/2003	Completed---Published as NCHRP Report 511
14-14	Guide for Optimal Timing of Pavement Preventive Maintenance Treatment Applications	Applied Pavement Technologies	312,397	4/10/2000	9/30/2003	Completed---Published as NCHRP Report 523
14-15	Developing a National Database System for Maintenance Actions on Highway Bridges	University of Colorado - Boulder	427,633	8/26/2005	5/31/2009	Research in progress
14-16	Develop AASHTO Guidelines for Vegetation Control	WeedSmart LLC	300,000	4/28/2006	4/28/2009	Research in progress



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
14-17	Manual for Emulsion-Based Chip Seals for Pavement Preservation	Colorado State University	349,933	8/14/2006	2/13/2009	Research in progress
14-18	Determining Highway Maintenance Costs	Cambridge Systematics	299,977	4/21/2008	4/21/2010	Research in progress
14-19	Culvert Rehabilitation to Maximize Service Life While Minimizing Direct Costs and Traffic Disruption	Louisiana Tech University	749,643	6/9/2008	6/8/2011	Research in progress
<b>AREA FIFTEEN : DESIGN--GENERAL DESIGN</b>						
15-01	Guardrail Design	Cornell Aero Lab	19,723 *	12/15/1965	6/14/1966	Completed---Published as NCHRP Report 36
15-01(02)	Guardrail Performance and Design	Southwest Research Institute	380,000 *	7/1/1967	12/31/1971	Completed---Published as NCHRP Reports 54 and 115; Phase II published as NCHRP Reports 118 and 129
15-02	Design to Control Erosion in Roadside Drainage Channels	University of Minnesota	97,300 *	7/1/1966	6/30/1974	Completed---Ph. I rpt. publ. as NCHRP Rpt. 108; Ph. II rpt. not publ.; summarized in NCHRP RRD 67; for avail. see Summary of Progress Through 1988
15-03	Rational Structural Analysis and Design of Pipe Culverts	Northwestern University	49,937 *	10/1/1967	12/31/1968	Completed---Published as NCHRP Report 116
15-04	Estimating Runoff Rates from Small Rural Watersheds	Travelers Research Center	299,902 *	9/1/1967	3/16/1970	Completed---Published as NCHRP Report 136
15-05	Dynamic Characteristics of Heavy Highway Vehicles	General Motors Corporation	135,000 *	8/15/1967	1/10/1969	Completed---Published as NCHRP Report 105
15-06	Development of Criteria for Safer Luminaire Supports	Texas A&M University	147,254 *	9/1/1967	8/31/1968	Completed---Published as NCHRP Report 77
15-07	Flow Modifications by Storage Loss Through Flood Plain Encroachment	Dames & Moore	99,730 *	5/1/1980	1/31/1982	Completed---Report not published; for avail. see Summary of Progress Through 1988
15-08	Parameters Affecting Stopping Sight Distance and Vehicle Acceleration/Deceleration Characteristics	University of Michigan	274,482 *	5/1/1982	5/31/1984	Completed---Published as NCHRP Report 270
15-09	Encasement of Pipelines Through Highway Roadbeds	Byrd, Tallamy, MacDonald & Lewis	30,000 *	10/1/1986	6/30/1988	Completed---Published as NCHRP Report 309
15-10	Development of a Design/Graphics Interface System	C. W. Beilfuss & Assoc	500,000 *	8/1/1985	11/30/1988	Completed---Published as NCHRP Report 326
15-11	Computer-Aided Analysis of Highway Encroachments on Mobile Boundary Streams	Simons & Associates	246,945 *	7/1/1987	3/31/1990	Completed---Report distributed to sponsors; continued under Project 15-11A
15-11A	BRI-STARS Maintenance Support and Enhancement	Hydrau Tech	99,827	6/1/1991	11/30/1993	Completed---Summarized in NCHRP Research Results Digest 201

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
15-12	Roadway Widths for Low Traffic Volume Roads	CH2M Hill	250,000	5/1/1989	10/31/1995	Completed---Published as NCHRP Report 362
15-13	Long-Term Performance of Geosynthetics in Drainage Applications	Drexel University	455,240	4/1/1990	3/31/1993	Completed---Published as NCHRP Report 367
15-14(01)	Intersection Sight Distance	Midwest Research Institute	350,000	6/1/1992	8/31/1996	Completed---Published as NCHRP Report 383
15-14(02)	Median Intersection Design	Midwest Research Institute	350,000	6/1/1992	5/15/1995	Completed---Published as NCHRP Report 375
15-15	Collection and Presentation of Roadway Inventory Data	MCNC	400,000	2/15/1996	5/31/1999	Completed---Published as NCHRP Report 437
15-16	Superelevation Distribution Methods and Transition Designs	University of Nebraska	45,549	2/1/1997	7/31/1997	Continued under Project 15-16A
15-16A	Superelevation Distribution Methods and Transition Designs	Texas A&M University	154,451	8/1/1997	8/30/1999	Completed---Published as NCHRP Report 439
15-17	Geometric Design Consistency on Higher-Speed, Non-Urban, Two-Lane Roads	Texas A&M University	300,000	6/1/1998	3/31/2003	Completed---Published as NCHRP Report 502
15-18	Design Speed and Operating Speed	Texas A&M University	386,826	12/1/1998	7/15/2002	Completed---Published as NCHRP Report 504 and CRP-CD-38
15-19	Application of Context-Sensitive Design Principles	CH2M Hill	125,000	1/7/2000	8/31/2002	Completed---Published as NCHRP Report 480 and CRP-CD-23
15-20	Planning, Design, and Operation of Pedestrian Facilities	T.Y. Lin Inter. BASCOR, Inc.	224,089	5/11/1999	2/10/2001	Completed---Results provided to AASHTO
15-21	Review of Truck Characteristics as Factors in Roadway Design	Midwest Research Institute	250,000	12/13/2000	7/31/2003	Completed---Published as NCHRP Report 505
15-22	Safety Consequences of Flexibility in Highway Design	University of Kentucky	499,407	9/11/2001	12/30/2004	Completed---Agency report distributed to state DOTs; available to others on request
15-23	Recommended Unit Conversions and Updates of the AASHTO Model Drainage Manual (MDM) and Highway Drainage Guidelines (HDG)	Roy Jorgensen Associates, Inc.	278,494	6/11/2001	7/31/2003	Completed---Final report delivered to AASHTO for use in updating the MDM and HDG
15-24	Hydraulic Loss Coefficients for Culverts	Utah State University	575,000	6/20/2003	1/31/2009	Research in progress---Contractor's draft final report under review
15-25	Alternatives to Design Speed for Selection of Roadway Design Criteria	Midwest Research Institute	500,000	5/13/2004	5/12/2009	Research in progress
15-26	Evaluation of and/or Development of Passing Sight Distance Design Criteria	Midwest Research Institute	299,998	6/1/2004	9/30/2007	Completed---Published as NCHRP Report 605
15-27	Safety and Operational Impacts of Design Element Trade-Offs	University of Kentucky	449,987	7/13/2004	12/31/2008	Awaiting contractor's revised final report
15-28	Modernize and Upgrade CANDE for Analysis and LRFD Design of Buried Structures	Michael Baker, Jr., Inc.	449,987	4/29/2005	3/31/2008	Completed---Published as NCHRP Report 619 and on CRP-CD-69

TABLE 7 (continued)

<b>Project</b>						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
15-29	Design Specifications for Live Load Distribution to Buried Structures	CNA Consulting Engineers	350,000	4/21/2005	9/30/2008	Research in progress
15-30	Median Intersection Design for Rural High-Speed Divided Highways	Iowa State University	200,000	8/1/2005	12/31/2008	Completed---Publication decision pending
15-31	Design Guidance for Freeway Mainline Ramp Terminals	CH2M HILL	80,000	1/27/2005	4/26/2007	Completed---Work continuing under project 15-31A
15-31A	Design Guidance for Freeway Mainline Ramp Terminals	Midwest Research Institute	380,000	11/7/2008	11/6/2010	Research in progress
15-32	Context Sensitive Solutions: Quantification of the Benefits in Transportation	University of Kentucky	450,000	5/25/2006	2/28/2009	Awaiting contractor's final report
15-33	AASHTO Guide for Transportation Landscape and Environmental Design	HNTB Corporation	400,000	3/15/2006	1/1/2009	Research in progress
15-34	Performance-Based Analysis of Geometric Design of Highways and Streets	Pennsylvania State University	600,000	7/14/2006	7/13/2009	Research in progress
15-35	Geometric Design of Driveways	University of Arkansas	350,000	6/2/2006	1/31/2009	Research in progress---Contractor's draft final report under review
15-36	Estimating Joint Probabilities of Design Coincident Flows at Stream Confluences	Kilgore Consulting and Management	400,000	5/11/2006	5/10/2009	Research in progress
15-37	Revision of the AASHTO Guide for the Development of Bicycle Facilities	Toole Design Group	249,976	3/12/2007	3/11/2009	Research in progress
15-38	Design Requirements for Culvert Joints	----	370,000			In development
<b>AREA SIXTEEN : DESIGN--ROADSIDE DEVELOPMENT</b>						
16-01	Effects of Deicing Compounds on Vegetation and Water Supplies	Virginia Polytechnic Institute	217,300 *	3/1/1966	4/30/1972	Completed---Published as NCHRP Reports 91 and 170
16-02	Evaluation of Research on Roadside Development	Western States	100,000 *	10/1/1967	3/31/1969	Completed---Published as NCHRP Report 137
16-03	Erosion Control During Highway Construction	Utah State University	250,000 *	11/1/1973	11/30/1979	Completed---Published as NCHRP Reports 220 and 221
16-04	Design Guidelines for Safe and Aesthetic Roadside Treatments in Urban Areas	Georgia Institute of Technology	350,000	10/24/2003	12/31/2007	Completed---Published as NCHRP Report 612
<b>AREA SEVENTEEN : TRAFFIC--SAFETY</b>						
17-01	Development of Improved Methods for Reduction of Traffic Accidents	Cornell Aero Lab	247,847 *	2/1/1966	5/31/1968	Completed---Published as NCHRP Report 79
17-02	Methods for Evaluating Highway Safety Improvements	ORI	29,973 *	1/10/1972	6/20/1972	Contract cancelled---No report; continued under Project 17-02A
17-02A	Methods for Evaluating Highway Safety Improvements	Jorgensen & Associates	98,403 *	2/1/1973	7/31/1974	Completed---Published as NCHRP Report 162

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-03	Application of Traffic Conflicts Analysis at Intersections	Midwest Research Institute	190,000 *	12/15/1977	10/31/1979	Completed---Published as NCHRP Report 219
17-04	Evaluation of Traffic Controls for Street and Highway Work Zones	BioTechnology	200,000 *	1/2/1978	6/30/1979	Completed---Report included in NCHRP Report 236
17-04(02)	Evaluation of Traffic Cones and Tubes for Street and Highway Work Zones	BioTechnology	125,000 *	4/23/1980	9/30/1981	Completed---Published as NCHRP Report 236
17-05	Effectiveness of Clear Recovery Zones	Midwest Research Institute	200,000 *	4/1/1980	4/30/1982	Completed---Published as NCHRP Report 247
17-06	Service Vehicle Lighting and Traffic Control Systems for Short-Term and Moving Work Zones---Phase I	BioTechnology	85,069 *	11/1/1982	7/24/1984	Completed---Continued under Project 17-06A
17-06A	Service Vehicle Lighting and Traffic Control Systems for Short-Term and Moving Work Zones---Phase II	Transportation Research Corporation	252,277 *	1/2/1990	2/28/1990	Completed---Published as NCHRP Report 337
17-07	Guidelines for Converting STOP to YIELD Control at Intersections	Bellomo-McGee, Inc.	200,000 *	12/16/1988	5/15/1989	Completed---Published as NCHRP Report 320
17-08	Traffic Barrier and Control Treatments for Restricted Work Zones	Texas A&M University	500,000	6/1/1988	6/30/1993	Completed---Published as NCHRP Report 358
17-09	Effect of Highway Standards on Safety	Bellomo-McGee, Inc.	200,000	2/15/1992	12/31/1994	Completed---Published as NCHRP Report 374
17-09(02)	Impacts of Resurfacing Projects With and Without Additional Safety Improvements	Bellomo-McGee, Inc.	300,000	10/1/1995	2/28/2000	Completed---Summarized in NCHRP Research Results Digest 255
17-10	Structural Supports for Highway Signs, Luminaires, and Traffic Signals	University of Alabama - Birmingham	299,970	2/1/1994	12/1/1997	Completed---Published as NCHRP Report 411; specifications adopted by AASHTO
17-10(02)	Structural Supports for Highway Signs, Luminaires, and Traffic Signals	University of Alabama - Birmingham	369,992	3/10/1999	5/31/2002	Completed---Published as NCHRP Report 494
17-11	Determination of Safe/Cost Effective Roadside Slopes and Associated Clear Distances	Texas A&M University	500,000	3/1/1995	7/30/2004	Completed---Research continued under 17-11(02)
17-11(02)	Development of Clear Recovery Area Guidelines	Texas A&M University	270,000	9/7/2008	2/6/2010	Research in progress
17-12	Improved Safety Information to Support Highway Design	Northwestern University	199,982	1/30/1995	12/31/1997	Completed---Published as NCHRP Report 430; summarized in NCHRP Research Results Digest 239
17-13	Strategic Plan for Improving Roadside Safety	----	200,000	4/1/1995	6/30/2000	Completed--Summarized in NCHRP Research Results Digests 220 and 256; agency report available as NCHRP Web-Only Document 33
17-13A	Barrier Runout Length Assessment	Consultant: Richard G. McGinnis/Bucknell Univ.	15,500	5/1/2002	12/31/2004	Completed---Report available on request
17-14	Improved Guidelines for Median Safety	Bellomo-McGee, Inc.	565,000	3/1/1997	9/30/2000	Continued under Project 17-14(02)

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-14(02)	Improved Guidelines for Median Safety	Bellomo-McGee, Inc.	148,500	12/19/2002	9/18/2004	Completed---Contractor's report available on CRP website
17-15	Accident Mitigation on Congested Rural and Exurban Two- and Three-Lane Highways	Texas A&M University	250,000	4/1/1997	11/30/1999	Completed---Published as NCHRP Report 440
17-16	Accident Warrant for Traffic Signals	Bellomo-McGee, Inc.	385,000	3/1/1997	1/31/2003	Completed---Published as NCHRP Report 491
17-17	Development of Guidelines for Nighttime Road Work to Improve Safety and Operations	Last Resource	249,929	1/15/1997	9/30/2000	Completed---Report not published; included in Project 17-17(02)
17-17(02)	Development of Guidelines for Nighttime Road Work to Improve Safety and Operations	Last Resource	221,989	10/1/2000	5/28/2004	Completed---Published as NCHRP Reports 475 and 476; summarized in NCHRP Research Results Digest 293; available on CRP-CD-50
17-18	AASHTO Strategic Highway Safety Plan Implementation Support	Northwestern University	49,989	9/15/1998	8/14/1999	Completed---Report not published; information included in Project 17-18(02) write-up on CRP website
17-18(02)	Implementation of the AASHTO Strategic Highway Safety Plan - Website	Texas A&M University	30,992	11/1/2000	5/1/2002	Completed---Website transferred to AASHTO
17-18(03)	Guidance for Implementation of the AASHTO Strategic Highway Safety Plan	CH2M Hill	4,247,915	3/22/2000	6/30/2009	Research in progress
17-18(03)A	Pooled Fund Study 2 (209): Enhanced Guidance for Implementing Safety Strategies in Support of NCHRP Project 17-18(03)	CH2M Hill	150,000	5/7/2004	12/31/2006	Completed---Provided technical assistance to state DOTs
17-18(04)	Highway Safety Manual	Bellomo-McGee, Inc.	200,000	1/4/2001	10/31/2003	Completed---Summarized in NCHRP Research Results Digest 286; agency report available as NCHRP Web-Only Document 62
17-18(05)	Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide	iTRANS Consulting, Ltd.	268,445	8/28/2001	3/31/2003	Completed---Published as NCHRP Report 501
17-18(05)A	Integrated Safety Management Process--Iowa Technical Support	iTRANS Consulting, Inc.	30,300	5/27/2003	9/26/2003	Completed---Report not published
17-18(05)B	Integrated Safety Management Process--Technical Support	iTRANS Consulting, Inc.	498,604	9/12/2003	12/31/2006	Completed; assisted state DOTs
17-18(06)	AASHTO Strategic Highway Safety Plan Case Studies	Transportation Safety Management Systems	25,000	2/1/2001	6/30/2001	Completed---Summarized in NCHRP Research Results Digest 265
17-18(07)	AASHTO Strategic Highway Safety Plan - Technology Transfer Plan	Roy Jorgensen Associates, Inc.	150,000	7/3/2001	12/30/2002	Completed---Report not published

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-18(08)	Comprehensive Human Factors Guidelines for Road Systems	Westat, Inc.	200,031	9/28/2001	1/31/2005	Completed---Summarized in NCHRP Research Results Digest 296; agency report available as NCHRP Web-Only Document 70
17-18(09)	Coordinated Safety Research Approach	Transportation Research Corp.	49,969	10/23/2001	2/28/2003	Completed---Workshop summary report available on request
17-18(09)A	Coordinated Safety Research Approach	TRB Division B	200,000	3/1/2005	6/30/2008	Completed---Published as TRB Special Report 292
17-18(09)B	Coordinated Safety Research Approach	TRB Division B	75,000	6/30/2003	1/30/2005	Completed---Additional search capability added to TRIS
17-18(09)C	Coordinated Safety Research Approach	TRB Division A	75,000	6/30/2003	3/20/2006	Completed---Summarized in NCHRP Research Results Digest 302
17-18(10)	Safe Landscaping Awareness Course/Landscape Architect Training	University of North Carolina - Chapel Hill	38,000	3/21/2003	3/20/2004	Completed---Training materials provided to FHWA
17-18(11)	Marketing Plan and Products	Van Ryan Banks, Inc.	265,365	4/15/2003	9/30/2005	Completed---Newsletters and one-page summaries of NCHRP Report 500 volumes published
17-18(11)A	Publication of Documents	Synergy Incorporated	4,201	5/22/2003	12/31/2003	Completed
17-18(11)B	Publication of Documents	Synergy Incorporated	4,201	5/22/2003	12/31/2003	Completed
17-18(11)C	Publication of Documents	Synergy Incorporated	2,699	8/28/2003	12/31/2003	Completed
17-18(11)D	Implementation Products	Van Ryan Banks, Inc.	32,529	4/24/2006	2/24/2007	Completed---One-page summaries of NCHRP Report 500 volumes published
17-18(12)	Rewrite of the Unsignalized Intersection Guide for Local Agencies	Consultant: Eugene Wilson	25,000	7/4/2003	11/25/2003	Completed---Report available on request
17-18(13)	Integrated Safety Management Process/Safety-Conscious Planning Coordination	TRB Division A	40,000	9/12/2003	6/30/2007	Completed---See website write-up
17-18(14)	Lane Departure Video	Van Ryan Banks, Inc.	36,840	5/6/2005	9/5/2005	Completed---Video distributed to state DOTs
17-18(15)	Local Highway Agency Safety Guides	CH2M HILL	325,000	6/2/2006	6/30/2009	Research in progress
17-18(16)	Safety Workshops and Case Studies	Mercer Consulting Group	107,284	9/14/2006	10/31/2007	Completed---Workshop summary and case studies posted on AASHTO Safety website
17-18(17)	Facilitating Safety Leadership Forum III	Howard/Stein-Hudson Associates	8,000	4/11/2007	5/15/2007	Completed; provided service
17-18(18)	Safety Report Summaries	Ferguson International LLC	24,570	10/29/2007	12/31/2008	Completed---Publication decision pending
17-18(19)	White Paper on Alternate Strategies for Safety Improvement Investments	CH2M HILL	60,198	10/27/2008	4/29/2009	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-19	Implementation of Model Deployment Strategies In AASHTO's Strategic Highway Safety Plan	----	750,000			Continued under Project 17-18(03); \$750k transferred
17-20	Research for the AASHTO Task Force on Roadside Safety	Various	200,000			Completed---See individual tasks
17-20/Task 01	Publication of the Year 2000 Roadside Design Guide	Trauner Consulting Services	34,999	11/15/2000	11/30/2001	Completed---Final report delivered to AASHTO for use in updating the Year 2000 Roadside Design Guide
17-20/Task 02	Identification of Specific References Used in Developing Criteria and Recommendations in the Roadside Design Guide	Consultant: Kimberly Nystrom	55,900	7/8/2002	6/30/2004	Completed---Sent to AASHTO TFORS
17-20/Task 03	Research for the AASHTO Task Force for Roadside Safety	University of Nebraska - Lincoln	50,000	10/10/2003	2/9/2005	Completed---Sent to AASHTO TFORS
17-20/Task 04	Safety Evaluation and Crash Testing of Secure Mailboxes	George Washington University	25,000	5/16/2002	2/28/2003	Completed---Sent to AASHTO TFORS
17-20/Task 05	Full Scale Crash Test to Evaluate the Safety Performance of Secure Mailboxes	George Washington University	25,000	2/4/2004	1/27/2005	Terminated
17-21	Safety of U-Turns at Unsignalized Median Openings	Midwest Research Institute	320,000	11/6/2000	1/30/2004	Completed---Published as NCHRP Report 524
17-22	Identification of Vehicular Impact Conditions Associated with Serious Ran-Off-Road Crashes	University of Nebraska - Lincoln	634,521	8/15/2001	3/31/2009	Research in progress
17-23	Safety Profile and Other Implications of Changed Speed Limits on High Speed Roads	Charles River Associates	350,000	7/23/2002	4/1/2006	Completed---Summarized in NCHRP Research Results Digest 303
17-24	Use of Event Data Recorder (EDR) Technology for Highway Crash Data Analysis	Rowan University	250,000	5/1/2002	6/30/2004	Completed---Summarized in NCHRP Research Results Digest 298; agency report available as NCHRP Web-Only Document 75
17-25	Crash Reduction Factors for Traffic Engineering and ITS Improvements	University of North Carolina - Chapel Hill	550,000	8/1/2003	2/29/2008	Completed---Published as NCHRP Report 617
17-26	Methodology to Predict the Safety Performance of Urban and Suburban Arterials	Midwest Research Institute	1,096,403	6/2/2003	3/31/2008	Completed---Chapter 10 of Highway Safety Manual to NCHRP Project 17-36 contractor; agency report available as NCHRP Web-Only Document 129
17-26(02)	Software Development of Highway Safety Manual Multilane Rural Highway and Urban/Suburban Arterial Crash Prediction Algorithms	ITT Corporation	194,424	12/14/2007	6/30/2009	Research in progress---Agency report to be available as NCHRP Web-Only Document 129
17-27	Prepare Parts I and II of the Highway Safety Manual	iTRANS Consulting, Inc.	530,520	5/14/2004	6/30/2007	Completed; chapters 1-7 to NCHRP Project 17-36 contractor

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-28	Pavement Marking Materials and Markers: Safety Impact and Cost-Effectiveness	iTRANS Consulting, Inc.	578,305	2/18/2004	2/17/2007	Completed---Agency report available as NCHRP Web-Only Document 92; summarized in NCHRP Research Results Digest 305
17-29	Methodology to Predict the Safety Performance of Rural Multilane Highways	Texas A&M University	700,218	7/1/2004	4/30/2008	Completed---Chapter 9 of Highway Safety Manual to NCHRP Project 17-36 contractor; agency report available as NCHRP Web-Only Document 126
17-30	Traffic Safety Evaluation of Nighttime and Daytime Work Zones	Texas A&M University	500,000	5/1/2004	7/31/2008	Completed---To be published as NCHRP Report 627
17-31	Human Factors Guidelines for Road Systems - Phase 2	Battelle	399,946	8/1/2005	8/31/2008	Completed---Published as NCHRP Reports 600A and 600B
17-32	Guidance for the Design and Application of Shoulder and Centerline Rumble Strips	Midwest Research Institute	600,000	6/10/2005	2/28/2009	Research in progress
17-33	Effectiveness of Behavioral Highway Safety Countermeasures	Preusser Research Group, Inc.	600,000	3/25/2005	3/31/2008	Completed---Published as NCHRP Report 622
17-34	Prepare Parts IV and V of the Highway Safety Manual	Kittelson & Associates	200,000	6/17/2005	12/31/2006	Completed; chapters 11-16 to NCHRP Project 17-36
17-35	Evaluation of Safety Strategies at Signalized Intersections	University of North Carolina - Chapel Hill	750,000	11/1/2006	10/31/2009	Research in progress
17-36	Production of the First Edition of the Highway Safety Manual	Kittelson & Associates	1,060,968	6/19/2006	6/30/2009	Research in progress
17-36 (HSM)	Highway Safety Manual Task Force	----	25,000			Travel Expenses for HSM Review Panel
17-37	Pedestrian Predictive Crash Methodology for Urban and Suburban Arterials	----	400,000			Completed under Project 17-26; \$400k transferred
17-38	HSM Implementation and Training Materials	Oregon State University	400,000	6/25/2008	12/24/2009	Research in progress
17-39	Implementing a Highway Safety Improvement Program	Deja Program Development	86,459	8/22/2006	5/30/2007	Completed---Report available on request
17-40	Model Curriculum for Highway Safety Core Competencies	Cambridge Systematics	325,000	4/4/2007	4/3/2009	Research in progress
17-41	Human Factors Guidelines for Road Systems-Phase III	Battelle Memorial Institute	400,000	3/5/2008	3/4/2010	Research in progress
17-42	Development of Information and Data to Support Improved Safety Management and Communication of Safety Needs	----	350,000			
17-42(02)	Transportation Safety Web Portal	Penna Powers Brian Haynes	75,000	12/14/2007	12/31/2008	Research in progress
17-42(03)	Strategic Highway Safety Plan Peer Exchange	Mercer Consulting Group	23,745	4/1/2008	2/28/2009	Research in Progress



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
17-42(04)	Support for AASHTO Subcommittee on Safety Management	Deja Program Development	72,666	8/1/2008	8/31/2011	Research in Progress
17-42(05)	Safety Leadership Forum	-----	20,050			Contract pending
17-43	Long-Term Roadside Crash Data Collection Program	-----	1,000,000			In development
17-44	Factors Contributing to Median Encroachments and Cross-Median Crashes	-----	500,000			In development
17-45	Interchange Safety Analysis Tool Enhancement	-----	700,000			In development
<b>AREA EIGHTEEN : MATERIALS AND CONSTRUCTION--CONCRETE MATERIALS</b>						
18-01	Revibration of Retarded Concrete for Continuous Bridge Decks	University of Illinois	103,895 *	9/1/1967	12/1/1969	Completed---Published as NCHRP Report 106
18-02	Use of Polymers in Highway Concrete	Lehigh University	300,000 *	10/1/1972	9/30/1975	Completed---Published as NCHRP Report 190
18-02(02)	Polymer Concrete in Highway Bridge Decks	Lehigh University	30,000 *	1/1/1978	3/15/1979	Completed---Report not published; for avail. see Summary of Progress Through 1988
18-02(03)	Long-Term Rehabilitation of Salt-Contaminated Bridge Decks	Lehigh University	199,900 *	5/1/1980	4/29/1983	Completed---Published as NCHRP Report 257
18-03	Silica Fume Concrete for Bridge Decks	Construction Technology Laboratories	314,194	3/1/1995	9/30/1997	Completed---Published as NCHRP Report 410
18-04A	Durability of "Early-Opening-to-Traffic" Portland Cement Concrete for Pavement Rehabilitation: Background and Plan for Evaluation	Texas A&M University	42,968	11/15/1997	9/30/1998	Completed---Agency report available for loan
18-04B	Durability of "Early-Opening-to-Traffic" Portland Cement Concrete for Pavement Rehabilitation	Michigan Tech University	349,734	4/3/2000	7/15/2004	Completed---Published as NCHRP Report 540
18-05	Relationship of Portland Cement Characteristics to Concrete Durability	Pennsylvania State University	400,000	4/7/1997	4/30/2001	Completed---Summarized in NCHRP Research Results Digest 270
18-06	Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements (Phase I)	Michigan State University	19,675	1/4/2000	8/31/2001	Completed---Phase I only; continued under Project 18-06A
18-06A	Service Life of Corrosion-Damaged Reinforced Concrete Bridge Superstructure Elements	Concorr, Inc.	350,000	4/10/2001	11/30/2005	Completed---Published as NCHRP Report 558
18-07	Prestress Losses in Pretensioned High-Strength Concrete Bridge Girders	University of Nebraska - Lincoln	300,000	6/8/1999	8/31/2002	Completed---Published as NCHRP Report 496
18-08	Supplementary Cementitious Materials to Enhance Durability of Concrete Bridge Decks (Phase I)	Purdue University	71,796	8/1/2000	3/31/2002	Terminated

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
18-08A	Supplementary Cementitious Materials to Enhance Durability of Concrete Bridge Decks	Wiss, Janney, Elstner & Associates	400,000	4/16/2003	12/31/2005	Completed---Published as NCHRP Report 566
18-09	Guidelines for Reducing Premature Deterioration of Hydraulic Cement Concrete Pavements	Cancelled				Project cancelled---Smaller study done under 18-09A
18-09A	Guidelines for Reducing Premature Deterioration of Hydraulic Cement Concrete Pavements: Background and Research Plan	Construction Technology Laboratories	50,000	7/7/2000	7/6/2001	Completed---See NCHRP website
18-10	Procedures for Evaluating Air-Entraining Admixtures for Highway Concrete	Construction Technology Laboratories	399,272	2/28/2002	1/31/2006	Completed---Published as NCHRP Report 578
18-11	Improved Specifications and Protocols for Acceptance Tests on Processing Additions in Cement Manufacturing	Construction Technology Laboratories	649,924	2/28/2003	9/30/2007	Completed---Published as NCHRP Report 607
18-12	Self-Consolidating Concrete for Precast, Prestressed Concrete Bridge Elements	Université de Sherbrooke	449,904	8/3/2004	5/16/2008	Completed---Published as NCHRP Report 628
18-13	Specifications and Protocols for Acceptance Tests of Fly Ash Used in Highway Concrete	Michigan Tech University	749,125	7/16/2007	7/15/2010	Research in progress
18-14	Evaluation and Repair Procedures for Precast/Prestressed Concrete Girders with Longitudinal Cracking in the Web	University of Nebraska - Lincoln	300,000	5/1/2007	4/30/2009	Research in progress
18-15	High-Performance/High-Strength Lightweight Concrete for Bridge Girders and Decks	Virginia Polytechnic Institute	749,880	8/21/2007	8/20/2010	Research in progress

**AREA NINETEEN : ADMINISTRATION--FINANCE**

19-01	Budgeting for State Highway Departments	Ernst & Ernst	45,000 *	9/5/1967	9/4/1968	Completed---Report not published; summarized in NCHRP Research Results Digest 20
19-02(01)	Develop Performance Budgeting System to Serve Highway Maintenance Management	Booz-Allen & Hamilton	6,000 *	9/2/1968	10/31/1968	Completed---Working plan; not published
19-02(02)	Develop Performance Budgeting System to Serve Highway Maintenance Management	Ernst & Ernst	6,000 *	9/2/1968	10/31/1968	Completed---Working plan; not published
19-02(03)	Develop Performance Budgeting System to Serve Highway Maintenance Management	Jorgensen & Associates	6,000 *	9/2/1968	10/31/1968	Completed---Continued under Project 19-02(04)
19-02(04)	Develop Performance Budgeting System to Serve Highway Maintenance Management	Jorgensen & Associates	220,000 *	2/1/1969	11/30/1971	Completed---Published as NCHRP Report 131
19-03	Economic Effects of Changes in Legal Vehicle Weights and Dimensions on Highways	Wilbur Smith Associates	96,728 *	9/15/1970	6/14/1972	Completed---Published as NCHRP Report 141

TABLE 7 (continued)

<b>Project</b>						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
19-04	A Review of DOT Compliance with GASB 34 Requirements	PB Consult, Inc.	324,855	4/24/2002	1/31/2004	Completed---Published as NCHRP Report 522
19-05	Assessing and Mitigating Future Impacts to the Federal Highway Trust Fund such as Alternative Fuel Consumption	Cambridge Systematics	100,000	6/21/2002	7/31/2003	Completed---Published as NCHRP Web-Only Document 121
19-06	Identifying and Quantifying Rates of State Motor Fuel Tax Evasion	Battelle Memorial Institute	399,970	7/29/2004	6/30/2008	Completed---To be published as NCHRP Report 623
19-07	GASB 34 - Methods for Condition Assessment and Preservation	PB Consult, Inc.	249,898	3/21/2005	12/1/2007	Completed---Published as NCHRP Report 608
19-08	Costs of Alternative Revenue-Generation Systems	----	200,000			Contract pending
<b>AREA TWENTY : SPECIAL PROJECTS</b>						
20-01	Highway Research Information Service	Highway Research Board	455,000 *	3/16/1964	10/31/1967	Completed---Informal publication only; service implemented
20-02	Research Needs in Highway Transportation	Tallamy/Smith	98,760 *	4/1/1966	12/31/1967	Completed---Published as NCHRP Report 55
20-03	Optimizing Freeway Corridor Operation Through Traffic Surveillance, Communication, and Control	Texas A&M University	594,556 a	12/15/1966	1/31/1969	Completed---Results summarized in Project 20-03C report
20-03A	Optimizing Freeway Corridor Operation Through Traffic Surveillance, Communication, and Control	University of Michigan	525,631 b	11/20/1968	5/31/1971	Completed---Results summarized in Project 20-03C report
20-03B	Optimizing Freeway Corridor Operation Through Traffic Surveillance, Communication, and Control---Summary Reporting	Patrick J. Athol	31,116 *	7/1/1972	9/27/1974	Project cancelled---No final report
20-03C	Summary of the Lodge Freeway Research	Asriel Taragin	10,183 *	11/15/1975	7/15/1976	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-03D	Summary of All Freeway Surveillance, Communication and Control Experience	Voorhees & Associates	40,000 *	5/15/1977	12/31/1978	Completed---Special publication; for avail. see Summary of Progress Through 1988
20-04	Public Preference for Future Individual Transportation	Chilton Research	195,260 *	5/2/1967	1/21/1969	Completed---Published as NCHRP Reports 49 and 82
20-04A	Public Preference for Future Individual Transportation	National Analysts	83,911 *	5/2/1967	1/2/1968	Completed---Published as NCHRP Reports 49 and 82
20-05	Synthesis of Information Related to Highway Problems	TRB Division B	1,200,000 c	12/15/1967		Research in progress; refer to NCHRP Research Results Digest 309 for topic reports published as NCHRP Syntheses

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-06	Legal Problems Arising Out of Highway Programs	TRB Division A	200,000	c 11/1/1968		Research in progress; CRP-CD-20, Volume 1 (Contract Law), Volume 3 (Environmental Law), and Volume 4 (Tort Liability of Highway Agencies)
20-07	Research for AASHTO Standing Committee on Highways	Various	1,200,000	c 12/2/1968		Research in progress---Refer to project writeup at <a href="http://www.trb.org/nchrp">http://www.trb.org/nchrp</a>
20-08	Interactive Graphic Systems for Highway Design	Control Data	49,672	* 9/1/1970	7/31/1971	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-09	Socioeconomic Consequences of Right-of-Way Acquisition Induced Resident Dislocation	RMC Research Corporation	202,579	* 8/1/1972	12/17/1976	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-10	The Benefits of Separating Pedestrians and Vehicles	Stanford University	100,000	* 8/26/1974	4/30/1976	Completed---Published as NCHRP Report 189
20-10(02)	The Benefits of Separating Pedestrians and Vehicles	SRI International	100,000	* 9/1/1978	7/31/1981	Completed---Published as NCHRP Report 240
20-11	Toward Environmental Benefit/Cost Analysis---Measurement Methodology	Polytechnic Institute of New York	100,000	* 9/1/1972	5/31/1974	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-11A	Toward Environmental Benefit/Cost Analysis---Measurement Methodology	Cornell University	27,212	* 9/1/1975	11/30/1976	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-11B	Toward Environmental Benefit/Cost Analysis: Energy-Flow Analysis (Manual)	Cornell University	140,450	* 1/24/1977	5/4/1979	Completed---Report not published; for avail. see Summary of Progress Through 1988; summarized in NCHRP Research Results Digest 114
20-11C	Toward Environmental Benefit/Cost Methodology: Energy-Flow Analysis (Study Design)	Cannon Group	14,786	* 4/1/1977	3/31/1978	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-12	Effects of Air Pollution Regulations on Highway Construction and Maintenance	Howard, Needles, et al.	80,446	* 4/1/1974	7/31/1975	Completed---Published as NCHRP Report 191
20-13	Beneficial Environmental Effects Associated with Freeway Construction	Pennsylvania State University	49,965	* 9/3/1974	8/2/1975	Completed---Published as NCHRP Report 193
20-14	Monitoring Carbon Monoxide Concentrations in Urban Areas	Tech Service Corporation	99,973	* 10/1/1976	3/31/1978	Completed---Published as NCHRP Report 200
20-14A	Statistical Analysis of Ozone Data for Transportation/Air Quality Planning	SRI International	193,907	* 9/15/1979	12/18/1981	Completed---Published as NCHRP Report 238
20-15	Ecological Effects of Highway Fills on Wetlands	University of Massachusetts	152,085	* 12/1/1976	12/31/1979	Completed---Published as NCHRP Reports 218A and 218B
20-16	State Laws and Regulations on Truck Size, Weight, and Speed	R. J. Hansen Associates	281,975	* 10/11/1976	9/1/1978	Completed---Published as NCHRP Report 198

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-17	Statewide Freight Demand Forecasting Procedures	Cambridge Systematics	73,151 *	4/1/1979	7/31/1980	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-17A	Application of Statewide Freight Demand Forecasting Techniques	R. Creighton Associates	193,500 *	6/1/1981	1/31/1984	Completed---Published as NCHRP Report 260
20-18	Evaluation of Highway Air Pollution Dispersion Models	SRI International	207,509 *	3/15/1979	2/28/1982	Completed---Published as NCHRP Report 245
20-19	Pedestrian Convenience and Safety on Suburban and Rural Highways	JHK & Associates	160,000 *	5/1/1985	12/31/1986	Completed---Published as NCHRP Reports 294A and 294B
20-19(02)	Pedestrian Safety and Convenience on Suburban and Rural Highways---Implementation Phase	JHK & Associates	146,218 *	9/1/1987	12/31/1989	Completed---Results incorporated into National Highway Institute courses
20-20	SHRP Pre-Implementation Research	AASHTO	500,000 *	10/1/1984	9/30/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(02)	SHRP Overview and Integration Planning	University of Maryland	90,000	3/15/1985	5/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(03)	SHRP Detailed Planning for Research on Asphalt Properties	ARE, Inc.	115,000	3/15/1985	1/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(05)	SHRP Detailed Planning for Research on Maintenance Effectiveness	Texas Research and Development Foundation	90,000	3/15/1985	1/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(06)	SHRP Detailed Planning for Research on Bridge Component Protection	David G. Manning	80,000	3/15/1985	1/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(07)	SHRP Detailed Planning for Research on Cement and Concrete	Construction Technology Laboratories/PCA	75,000	3/15/1985	1/31/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-20(08)	SHRP Detailed Planning for Research on Snow and Ice Removal	USA CRREL	73,781	4/21/1985	2/26/1986	Completed---Report not published; for avail. see Summary of Progress Through 1988
20-21	Development of an Automated Field Survey Data Collection System	ARE, Inc./Cooper Tech	200,000 *	2/3/1986	5/5/1987	Completed---Published as NCHRP Report 295
20-22	Factors to be Considered by Highway Agencies in the Identification and Remediation of Hazardous Waste Sites	HMM Associates	148,015 *	11/1/1986	7/1/1988	Completed---Published as NCHRP Report 310
20-23	Kinematic Differential GPS Satellite Surveying	GPS Services/National Geodetic Survey	298,793	9/15/1988	9/14/1990	Completed---Report distributed to sponsors; summarized in NCHRP Research Results Digests 185 and 199

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24	Administration of Highway and Transportation Agencies	Apogee Research	125,000 *	5/11/1987	9/30/1988	Completed---Report distributed to sponsors; summarized in NCHRP Research Results Digests 170, 183, and 193
20-24(01)	Using Market Research to Improve the Management of Transportation Systems	Apogee Research	199,923 *	10/1/1988	9/30/1989	Completed---Published as NCHRP Report 329
20-24(02)	Executive Management Information Systems for State Departments of Transportation	Andersen Consulting	100,000 *	5/1/1989	10/4/1989	Completed---Report distributed to sponsors; summarized in NCHRP Research Results Digest 173
20-24(03)	Expanding the Civil Engineering Pool	Pennsylvania State University	298,780	7/1/1990	6/30/1994	Completed---Phases I and II published as NCHRP Report 347; Phase III published as NCHRP Report 347-Part II
20-24(03)A	Civil Engineering Careers in Transportation---Outreach Program	AASHTO	100,000	5/1/1992	8/31/1993	Completed---Summarized in NCHRP Research Results Digest 196, revised
20-24(04)	Senior Executive Service, Participant's Manual	Braun, Johns & Golden	25,000 *	1/1/1988	9/30/1991	Completed---Report provided to AASHTO for publication
20-24(05)	Public Outreach in Transportation Management	Frank Wilson & Associates	99,974 *	8/1/1991	1/31/1993	Completed---Published as NCHRP Report 364
20-24(06)A	Performance Measures for State Highway and Transportation Agencies	Highway Users Foundation	84,891 *	8/1/1991	6/2/1993	Completed---Published as NCHRP Report 357
20-24(06)B	Business Systems Plan for Highway Engineering Information	Prodata, Inc.	149,977	8/26/1991	10/31/1992	Completed---Report not published; agency report available for loan
20-24(06)C	Information Systems for Transportation Agencies	Stone & Webster Transportation Services	185,660	2/15/1995	6/30/1998	Completed---Report distributed to sponsors; agency report available for loan
20-24(07)	Alternatives to the Motor Fuel Tax for Financing Surface Transportation Improvements	Cambridge Systematics	300,000	3/1/1992	10/15/1994	Completed---Published as NCHRP Report 377
20-24(07)A	Alternative Approaches to the Taxation of Heavy Vehicles	Cambridge Systematics	200,000	2/1/1996	10/31/1997	Completed---Published as NCHRP Report 416
20-24(08)	Project 20-24 Series---Revisited	Apogee Research	20,000	4/22/1992	12/31/1994	Completed---Agency report available for loan
20-24(09)	State Departments of Transportation---Strategies for Change	National Academy of Public Administration	279,855	6/15/1993	12/14/1994	Completed---Published as NCHRP Report 371
20-24(10)	Customer-Based Quality in Transportation	Howard/Stein-Hudson Associates	100,000	2/1/1994	3/31/1995	Completed---Published as NCHRP Report 376
20-24(11)	Asset Management Guidance for Transportation Agencies	Cambridge Systematics	664,234	10/19/1999	11/15/2002	Completed---Published by AASHTO at <a href="http://downloads.transportation.org/amguide.pdf">http://downloads.transportation.org/amguide.pdf</a> ; summarized in NCHRP Research Results Digest 266
20-24(12)	Avoiding Delays During the Construction Phase of Highway Projects	Pennsylvania State University	120,592	4/18/2000	12/15/2001	Completed---Agency report to be available as an NCHRP Web-Only Document

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(12)A	Improving the Time Performance of Highway Construction Contracts	Pennsylvania State University	250,000	9/3/2004	12/31/2006	Completed---No report
20-24(13)	Innovative Financing Clearinghouse	Parsons Brinckerhoff Quade & Douglas	199,359	8/18/2000	9/14/2002	Completed---Website transferred to AASHTO
20-24(14)	Managing Change in State Departments of Transportation	Various	200,000	11/10/2000	4/15/2001	Completed---Agency report available as NCHRP Web-Only Document 39
20-24(14)A	Innovations In DOT Communications, Image, And Positioning	Howard/Stein-Hudson Associates	25,000	10/26/2000	4/30/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 4
20-24(14)B	Innovations In Partnering And Relationship Building In State DOTs	HDR, Inc.	25,000	10/26/2000	4/30/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 7
20-24(14)C	Innovations in Strategic Leadership and Performance Measurement for State DOTs	Consultant: Theodore Poister	25,000	10/26/2000	5/31/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 1
20-24(14)D	Innovations in Private Involvement in Project Delivery	Consultant: Donn Hancher	25,000	10/26/2000	5/31/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 2
20-24(14)E	Innovations In Institutionalizing Systems Operations	Consultant: Philip Tarnoff	25,000	10/26/2000	5/31/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 3
20-24(14)F	Innovations In Workforce Strategies	Texas A&M University	25,000	11/15/2000	5/31/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 5
20-24(14)G	Innovations In Organization Development as a Result of Information Technology	Battelle Columbus	25,000	10/26/2000	4/30/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 6
20-24(14)H	Innovative Finance	Cambridge Systematics	25,000	11/20/2000	5/31/2001	Completed---Agency report available as NCHRP Web-Only Document 39, Scan 8
20-24(14)I	Managing Change in State Departments of Transportation	Consultant: Robert Johns	25,000	10/26/2000	5/31/2001	Completed---No report
20-24(14)J	Managing Change in State Departments of Transportation	Consultant: Stephen Lockwood	25,000	10/31/2000	5/31/2001	Completed---No report
20-24(15)	Scoping a Comprehensive Process to Serve Reauthorization Programs & a Review of the Condition and Performance Reporting Process	Consultant: Alan E. Pisarski	60,000	12/1/2000	12/31/2001	Completed---Report provided to AASHTO
20-24(16)	AASHTO Experience in Transportation Enhancements	Transmanagement, Inc.	38,903	12/15/2000	4/15/2002	Completed---Report sent to AASHTO
20-24(17)	National Conference on Historic Preservation	Transmanagement, Inc.	49,572	6/15/2001	6/15/2003	Completed---Report sent to AASHTO
20-24(18)	Outsourcing of State DOT Delivery of Capital Programs	Science Applications International Corporation	99,992	3/28/2002	4/30/2003	Completed---Agency report available as NCHRP Web-Only Document 59
20-24(19)	State DOTs and E-Business	Booz-Allen & Hamilton	150,000	9/26/2003	9/25/2004	Completed---Contractor's report available on CRP website

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(20)	Using Performance Measures to Manage Change in State Departments of Transportation	TransTech Management, Inc.	100,000	4/16/2002	7/31/2003	Completed---Final report published by AASHTO
20-24(21)	Characteristics of the 21st Century Operations-Oriented State DOT	PB Consult, Inc.	100,000	5/29/2002	10/30/2004	Completed---Results provided to AASHTO
20-24(22)	Best Practices in Partnering with Public Resource Agencies	TransTech Management, Inc.	28,000	10/10/2002	6/30/2003	Completed---Brochure published by AASHTO
20-24(23)A	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy--Agriculture	North Dakota State University	50,000	5/15/2002	11/21/2003	Completed---Report available on agency website at <a href="http://www.ugpti.org/forum/">http://www.ugpti.org/forum/</a>
20-24(23)A(01)	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy--Agriculture	North Dakota State University	30,305			Completed---Supplemental payment
20-24(23)B	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy--International Trade	California State University	49,051	9/15/2002	3/31/2003	Completed---Agency report available at <a href="http://www.metrans.org/calendar.htm">http://www.metrans.org/calendar.htm</a>
20-24(23)C	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy--Congestion	UCLA Foundation	50,000	7/30/2003	12/31/2003	Completed---Agency report available at <a href="http://www.uclaextension.edu/publicpolicy">http://www.uclaextension.edu/publicpolicy</a>
20-24(23)D	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy--Travel, Tourism, and Recreation	Aubrey C. King and Associates	7,500	8/4/2005	12/31/2005	Completed
20-24(23)D(01)	Assessing the Importance of Transportation for Major Industries and Sectors of the U.S. Economy with a Focus on Travel, Tourism, and Recreation	Aubrey C. King and Associates	42,500	1/9/2006	9/8/2007	Completed---Final report delivered to AASHTO
20-24(24)A	Transportation Mobility, Access, and Safety for an Aging Population	Consultant: Jon Burkhardt	15,000	5/23/2003	10/15/2003	Completed---See NCHRP website
20-24(24)B	Transportation Mobility, Access, and Safety for an Aging Population	Consultant: John W. Eberhard	15,000	5/23/2003	12/31/2003	Completed---See NCHRP website
20-24(24)B(01)	Transportation Mobility, Access, and Safety for an Aging Population	Eno Transportation Foundation	84,274	4/9/2004	9/30/2005	Completed---See NCHRP website
20-24(25)	Improving Project Costing and Incorporation of New Attributes -- Highways and Transit	AECOM Consulting Transportation Group	125,000	4/3/2002	7/31/2003	Completed---Final report sent to AASHTO
20-24(26)A	Finance Trends -- Trends in Non-Federal Funding and Debt	PB Consult, Inc.	100,000	2/28/2002	8/15/2002	Completed---Final report sent to AASHTO
20-24(26)B	Trends in Non-Federal Funding and Debt	Urban Land Institute	75,000	3/4/2002	8/31/2002	Completed---Final report sent to AASHTO
20-24(27)	Expanded State and National Investment Analysis Capability--Highways	Cambridge Systematics	249,776	2/14/2002	2/28/2003	Completed---Final report sent to AASHTO
20-24(28)	Rate of Return From Highway Investment	Delcan, Inc.	99,998	10/15/2002	7/31/2003	Completed---Final report sent to AASHTO



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(29)	CEO Peer Exchange Workshop for Strategic Leadership	University of Minnesota	99,335	11/15/2002	11/14/2003	Completed---Agency report available from AASHTO and website for the AASHTO Standing Committee on Quality
20-24(29)(02)	CEO Peer Exchange Workshop for Strategic Leadership	University of Minnesota	15,012	7/1/2003	12/31/2003	Completed---Travel support
20-24(30)	Performance Measurement In Context Sensitive Design	TransTech Management, Inc.	100,000	7/2/2003	10/1/2004	Completed---Agency report available as NCHRP Web-Only Document 69
20-24(31)	Effective Program Delivery in a Constrained Fiscal Environment	TransTech Management, Inc.	199,999	6/4/2004	6/1/2007	Completed---Final report delivered to AASHTO
20-24(32)	AASHTO CEO Briefing	Tom Warne & Associates, LLC	20,000			Completed---No report
20-24(33)	Transportation Vision 2010 and Beyond	Various				
20-24(33)A	21st Century Freight Mobility	ICF Consulting, Inc.	80,000	9/12/2003	7/30/2004	Completed---See NCHRP website
20-24(33)B	Transportation, Technology, and the 21st Century Vehicle	Delcan, Inc.	75,000	8/22/2003	8/31/2004	Completed---See NCHRP website
20-24(33)C	Vision 2010	Tom Warne & Associates, LLC	75,000	9/24/2003	7/31/2004	Completed---See NCHRP website
20-24(34)	Commuting in America III	Alan E. Pisarski	100,000	11/17/2003	9/30/2005	Completed---Published jointly as NCHRP Report 550 and TCRP Report 110
20-24(35)	Communicating Urban Congestion Information	Texas A&M University	100,000	8/20/2004	11/19/2006	Completed---Agency report available on NCHRP website
20-24(36)	Updating AASHTO's Strategic Plan in CY2004	TransTech Management, Inc.	100,000	3/30/2004	9/30/2005	Completed---See AASHTO's website at <a href="http://www.transportation.org">http://www.transportation.org</a>
20-24(36)A	Updating AASHTO's Strategic Plan in CY2004	TransTech Management, Inc.	50,000	6/20/2004	6/23/2004	Workshop support completed
20-24(37)	Strategic Performance Measures for State DOTs: Benchmarking Performance	TransTech Management, Inc.	100,000	3/19/2004	1/31/2006	Completed---Agency report available from AASHTO and website for the AASHTO Standing Committee on Quality
20-24(37)A		TransTech Management, Inc.	75,000	9/8/2006	5/7/2007	Completed---Agency report available from AASHTO and website for the AASHTO Standing Committee on Quality
20-24(37)B	Measuring Performance among State DOTs: Sharing Best Practices (International Roughness Index)	Spy Pond Partners	109,999	9/19/2007	5/18/2008	Completed---Agency report available from AASHTO
20-24(37)C	Measuring Performance Among State DOTs, Sharing Best Practices	-----	75,000			Contract pending
20-24(38)	CEO Engagement Options for Discussing Strategic Issues and Sharing Best Practices	University of Minnesota	49,654	4/16/2004	1/31/2005	Completed---See NCHRP website

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(39)	Alternative Organizational Designs for State Transportation Departments	TransTech Management, Inc.	220,000	9/22/2005	7/31/2008	Completed---Final report delivered to AASHTO
20-24(40)	Analysis and Benchmarking of State DOT Recruitment and Hiring Practices	B.T. Harder, Inc.	49,658	9/21/2004	12/31/2006	Completed---Final report delivered to AASHTO
20-24(41)	Project Summaries for State DOT CEOs	CTC & Associates LLC	8,840	10/13/2006	3/31/2007	Completed---Publication on NCHRP website
20-24(42)	Comparison of State DOT Quality Management Systems	Oasis Consulting Services	98,850	1/6/2005	7/7/2006	Completed---Final report delivered to AASHTO
20-24(43)	Innovative Contracting for Major Transportation Projects	Trauner Consulting Services	36,497	6/1/2005	11/1/2005	Completed---Final report delivered to AASHTO
20-24(44)	Highway Safety Leadership Organizational Issues: A Survey of States and Recommendations for Sustaining Progress	Thomas M. McGovern	100,000	10/25/2005	8/31/2007	Completed---Report available on request
20-24(45)	Executive Seminar, Coordinating Transportation and Land Development: Outlook, Challenges, Success	Local Government Commission	60,000	6/17/2005	1/31/2006	Completed---See NCHRP website
20-24(46)	Freight Transportation: New Roles for State DOTs	Cambridge Systematics	79,544	4/12/2005	10/31/2008	Completed---Final report delivered to AASHTO
20-24(47)	Racial and Gender Diversity in State DOTs and Transit Agencies: Phase I Benchmark Scoping	University of Minnesota	50,000	7/15/2005	3/15/2006	Completed---Published as NCHRP Report 585/TCRP Report 120
20-24(48)	Analysis and Benchmarking of State DOT Human Resource Activities	ERS Consulting	50,000	12/23/2005	12/31/2007	Completed---Final report delivered to AASHTO
20-24(49)	Future Financing to Meet Highway and Transit Needs	Cambridge Systematics	375,000	11/23/2005	1/22/2007	Completed---Agency report available as NCHRP Web-Only Document 102
20-24(50)	In-Service Training Needs for State DOTs	Tom Warne & Associates, LLC	50,000	4/1/2005	3/31/2006	Completed---Agency report delivered to AASHTO and available on NCHRP project web page
20-24(51)	State DOT CEO Leadership Forum - 2006	University of Minnesota	99,280	12/27/2005	3/26/2007	Completed---Agency report available from AASHTO and website for the AASHTO Standing Committee on Quality
20-24(51)A	Evolving Roles and Partnerships of State DOTs	PB Consult, Inc.	15,000	5/4/2006	1/3/2007	Completed---See NCHRP website
20-24(51)B	Building Credibility with Customers/Stakeholders	CH2M HILL	15,000	4/25/2006	12/25/2006	Completed---See NCHRP website
20-24(51)C	State DOT Funding and Finance	Cambridge Systematics	15,000	4/25/2006	12/25/2006	Completed---See NCHRP website
20-24(52)	Future Options for the National System of Interstate and Defense Highways	PB Consult, Inc.	726,793	5/11/2006	12/5/2007	Completed---Final report delivered to AASHTO
20-24(52)A	(Task 14) Developing a Process to Assess Potentially Underestimated Highway Reconstruction Needs in the US DOT Condition and Performance and AASHTO's Bottom Line Reports	----				Completed---Final report delivered to AASHTO

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(53)	Twenty-First Century Leadership and Management Techniques for State DOTs	Oasis Consulting Services	136,000	3/21/2007	11/1/2008	Research completed
20-24(54)	2006 Bottom Line Report State and National Investment Analysis: Highways	----	50,000			
20-24(54)A	Safety Investment Needs Assessment	CH2M HILL	60,000	4/6/2006	10/5/2006	Completed---See NCHRP website
20-24(54)B	Right-of-Way and Environmental Mitigation Costs--Investment Needs Assessment	AECOM Consulting Transportation Group	60,000	4/4/2006	12/3/2006	Completed---See NCHRP website
20-24(54)C	System Operations Investment Needs, Measurement, and Analysis	Cambridge Systematics	45,000	4/4/2006	10/3/2006	Completed---See NCHRP website
20-24(54)E	Inflation Effects on National Investment Requirements	Cambridge Systematics	45,000	4/14/2006	10/13/2006	Completed---See NCHRP website
20-24(54)F	2006 AASHTO Bottom Line Scoping	Alan E. Pisarski	40,000	4/12/2006	4/30/2007	Completed; report to AASHTO
20-24(54)G	2006 AASHTO Bottom Line Report Support	Cambridge Systematics	300,000	11/7/2007	5/6/2009	Research in progress
20-24(55)	National Summit on Future Transportation Funding and Finance Strategies: States and Metropolitan Regions	Cambridge Systematics	185,000	1/26/2007	1/25/2008	Completed---Final report delivered to AASHTO
20-24(56)A	National Leadership Retreat for State and Local Officials to Advance a Vision of the Transportation System Required to Meet Future Needs	North Dakota State University	55,827	6/12/2007	5/11/2008	Completed---See NCHRP website
20-24(56)B	National Leadership Retreat for State and Local Officials to Advance a Vision of the Transportation System Required to Meet Future Needs	Housman & Associates	94,000	4/5/2007	10/4/2007	Completed---See NCHRP website
20-24(57)	AASHTO New CEO Briefings	Tom Warne & Associates, LLC	59,600	4/17/2007	7/16/2008	Completed
20-24(58)	Toward Developing Performance Based Federal-Aid Highway Programs	Cambridge Systematics	150,000	3/4/2008	3/3/2009	Research in progress
20-24(59)	Strategies for Reducing the Impacts of Surface Transportation on Global Climate Change	PB Consult, Inc.	150,000	3/18/2008	3/17/2009	Research in progress
20-24(60)	Updating AASHTO's Strategic Plan in CY 2008	Gordon Proctor & Associates, Inc.	175,000	3/11/2008	9/10/2009	Research in progress
20-24(61)	Issues and Practices in Performance-Based Maintenance and Operations Management	PB Consult, Inc.	150,000	7/24/2008	7/23/2009	Research in progress
20-24(62)	Identification of Marketing Tools that Resonate with Lawmakers and Key Stakeholders to Support and Increase Funding and Revenue for the Nation's Transportation System	PB Consult, Inc.	200,000	10/3/2008	10/2/2009	Research in progress

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-24(63)	Partnership Approaches to Identify, Promote, and Implement Congestion Management Strategies	Cambridge Systematics	125,000	3/4/2008	3/3/2009	Research in progress
20-24(64)	Implications for Transportation of a Conformity-Style Approach to Reduce Greenhouse Gases, and Assessment of Alternative Policies to Integrate GHG Objectives into Transportation Decisions	----	367,000			In development
20-24(65)	Strengthened Economic Basis for Systematic Selection of Highway and Transit Projects	----	350,000			In development
20-24(66)	Update of Technology and Alternative Fuels Assessment	----	100,000			In development
20-24(67)	State DOT CEO Leadership Forum-Spring/Summer 2009; Pilot Study of State Driven Performance Based Management Reporting	University of Minnesota	150,000	10/7/2008	4/6/2010	Research in progress
20-24A	Research Supporting the NCHRP Project Panel on Administration of Highway and Transportation Agencies	----				Research in progress---Refer to individual projects in the 20-24 series
20-25	Training Needs for Highway Construction Personnel	University of Maryland	73,728 *	6/15/1989	12/31/1990	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 206
20-25(02)	Training for Highway Construction Personnel	SNI International Resources	224,790	11/1/1991	6/30/1996	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 206
20-25(03)	Development of Training Material for Highway Construction Personnel	SNI International Resources	299,998	4/17/1995	8/7/1997	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 228
20-26	Bond and Insurance Coverages for Highway Construction Contractors	Texas A&M University	99,999 *	6/1/1989	9/30/1990	Completed---Published as NCHRP Report 341
20-27	Adaptation of Geographic Information Systems for Transportation	University of Wisconsin	220,000	3/1/1990	6/30/1993	Completed---Published as NCHRP Report 359; summarized in NCHRP Research Results Digests 180 and 191
20-27(02)	Development of System and Application Architectures for Geographic Information Systems in Transport	University of Wisconsin - Madison	200,000	4/1/1994	8/31/1997	Completed---Part I report summarized in NCHRP Research Results Digest 218; Part II report summarized in NCHRP Research Results Digest 221
20-27(03)	Guidelines for the Implementation of Multimodal Transportation Location Referencing Systems	University of Wisconsin - Madison	136,000	3/1/1998	4/30/2001	Completed---Published as NCHRP Report 460
20-28	Hazardous Wastes in Highway Rights-of-Way	Transportation Research Board	300,000	4/16/1990	2/1/1992	Completed---Published as NCHRP Report 351

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-29	Development of a Multimodal Framework for Freight Transportation Investment: Consideration of Rail and Highway Trade-Offs	Texas A&M University	150,000	5/15/1992	8/31/1994	Completed---Report not published pending completion of continuation project
20-29(02)	Development of a Computer Model for Multimodal, Multicriteria Transportation Investment Analysis	Texas A&M University	217,500	12/15/1995	5/31/1999	Completed---Summarized in NCHRP Research Results Digest 258
20-30	NCHRP--IDEA Program	TRB Division E	1,000,000	c 7/8/1992		Research in progress; see project write-up on CRP website
20-31	Public Policy for Surface Freight Transportation	TRB Division B	200,000	12/1/1992	9/4/1996	Completed---Published as TRB Special Report 246
20-32	Development of a Comprehensive Thesaurus for Transportation Research	CDB Enterprises	225,000	12/1/1993	8/31/1996	Completed---Report not published
20-32(02)	Refinement of Transportation Research Thesaurus and Implementation of Updated TRIS Keyword Index	CDB Enterprises	199,965	12/1/1997	9/30/2000	Completed---Published as NCHRP Report 450 and available on CRP-CD-6
20-33	Facilitating the Implementation of Research Findings	RAND Corporation	499,955	1/22/1993	1/15/1996	Completed---Summarized in NCHRP Research Results Digest 207 and NCHRP Report 382
20-33(02)	The Role of Procurement and Contracting Approaches in Facilitating the Implementation of Research Findings	Trauner Consulting Services	299,993	2/15/1997	12/31/1998	Completed---Published as NCHRP Report 428; summarized in NCHRP Research Results Digest 225
20-34	Developing Measures of Effectiveness for Truck Weight Enforcement Activities	Transportation Research Corporation	499,625	1/1/1994	3/18/1998	Completed---Agency report available as NCHRP Web-Only Document 13; summarized in NCHRP Research Results Digest 229
20-35	Plan for SHRP Follow-Up Studies	TRB Division D	100,000	6/1/1993	9/30/1995	Completed---Agency report available for loan
20-36	Highway Research and Technology--International Information Sharing	TRB Division D	850,000	c 1/26/1993		Research in progress
20-36/Tour 2	Transportation Systems Professional Delegation To India	KT Analytics, Inc.	10,000	7/30/2008	7/29/2009	Research in Progress
20-36/Tour 2A	Transportation Systems Professional Delegation To India	Consultant: People To People	76,455	7/29/2008	1/31/2009	Research in Progress
20-36A	Scoping Study for a Joint FHWA/AASHTO Scanning Mission to China	Consultant: Wei-Bin Zhang	5,000	7/1/2003	9/24/2003	Completed---Agency report available upon request
20-36B	Scan on Transportation and Land Use Planning	----	128,752			Contract pending
20-37	Strategic Direction for the NCHRP and Other AASHTO Research Activities	Apogee Research	243,642	3/1/1994	3/31/1995	Completed---Report not published
20-38	Development of a Manual for State Transportation Research	Consultants: Reilly, Horowitz, Harder	118,000	9/1/1994	6/30/1997	Completed---Agency report available for loan
20-39	Improved User Access to TRIS Through the AASHTO VAN	Texas Transportation Institute	35,944	11/1/1994	7/31/1995	Completed---Report provided to AASHTO

TABLE 7 (continued)

Project							
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **	
20-39(02)	Improved Transportation Research-In-Progress Data System	Texas A&M University	484,808	3/28/2000	2/8/2009	Research in progress	
20-40	Conversion of AASHTO Publications to Metric Units	Texas A&M University	1,208,581	11/10/1994	1/31/1999	Completed---Summarized in NCHRP Research Results Digest 240	
20-41	Approaches for Increasing Private-Sector Involvement in Highway Innovation Process	TRB Division B	62,500	11/1/1994	6/30/1996	Completed---Published as TRB Special Report 249	
20-42	Sustainable Transportation	TRB Division B	150,000	5/1/1994	7/31/1997	Completed---Published as TRB Special Report 251	
20-43	Application of CD-ROM Technology for AASHTO Technical Documents	Applied Research Associates	319,936	1/8/1996	9/30/1998	Completed---Results provided to AASHTO	
20-44	Accelerating the Application of NCHRP Research Results	TRB Division D	150,000 <sup>c</sup>	8/1/1995		Support for various implementation activities; ongoing	
20-44C	Policy Implications of the Economic Value of Transportation	Apogee Research	25,471	8/1/1996	12/31/1996	Completed---Report sent to AASHTO	
20-44D	Recommended Specifications for Modular Bridge Expansion Joints	Consultant: Robert Dexter	10,000	1/1/2002	5/31/2002	Completed---Specifications under review by AASHTO	
20-44E	AASHTO CEO Briefing	Tom Warne & Associates, LLC	40,000	12/23/2002	6/30/2003	Completed---No report	
20-44F	NCHRP Impacts on Practice	CTC & Associates LLC	12,750	10/23/2006	4/22/2007	Completed---See "Impacts on Practice" on NCHRP website	
20-44G	Case Studies on Impacts on Practice	CTC & Associates LLC	21,250	3/1/2008	11/30/2008	Research in progress	
20-45	Scientific Approaches for Transportation Research	Georgia Institute of Technology	199,999	3/23/1998	3/31/2001	Completed---Available on CRP-CD-22; NHI course available	
20-46	Systems Approach to Evaluating Innovations for Integration into Highway Practice	Worcester Polytechnic Institute	121,866	7/1/1998	6/30/2000	Completed---Published as NCHRP Report 442	
20-47	Quality and Accuracy of Positional Data in Transportation	University of Wisconsin	25,000	7/28/1999	7/27/2001	Contract cancelled	
20-47(01)	Quality and Accuracy of Positional Data in Transportation	Battelle Columbus	275,000	12/1/2000	6/1/2003	Completed---Published as NCHRP Report 506 and CRP-CD-41	
20-48	Accessibility of Non-English Language Transportation Information	AppTek-I.&H	174,228	8/24/1999	11/1/2001	Completed---Summarized in NCHRP Research Results Digest 267	
20-48(01)	Making the Business Case for Translating Non-English Transportation Information	Consultant: John Metcalf	30,000	6/1/2002	3/31/2003	Completed---Summarized in NCHRP Research Results Digest 279	
20-49	Support for LTPP Advisory Structure	TRB Division E	400,000	3/9/1998	3/8/2003	Completed	
20-50(01)	LTPP Data Analysis: Data Availability and Facilitation	Consultant: Dr. Alaeddin Mohseni	50,000	2/11/2002	10/31/2002	Services completed	

TABLE 7 (continued)

Project		Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
No.	Title					
20-50(02)	LTPP Data Analysis: Relative Performance of Jointed Plain Concrete Pavements with Scaled and Unsealed Joints	Kathleen T. Hall	74,963	7/29/1999	5/1/2001	Completed---Agency report available as NCHRP Web-Only Document 32
20-50(03/04)	LTPP Data Analysis: Effectiveness of Maintenance and Rehabilitation Options	Kathleen T. Hall	250,000	10/14/1999	3/31/2002	Completed---Agency report available as NCHRP Web-Only Document 47
20-50(05)	LTPP Data Analysis: Variations in Pavement Design Inputs	Consulpav International	249,991	10/13/1999	10/12/2001	Completed---Agency report available as NCHRP Web-Only Document 48
20-50(06)	LTPP Data Analysis: Verification of Pavement Design Values Using Construction Test Data for SPS-1 and SPS-2 Sites	Cancelled				Project cancelled
20-50(07/12)	LTPP Data Analysis: Daily and Seasonal Variations in Insitu Material Properties	University of Tennessee	349,969	2/7/2000	8/31/2003	Completed---Agency report available as NCHRP Web-Only Document 60
20-50(08/13)	LTPP Data Analysis: Factors Affecting Pavement Smoothness	Soil & Materials Engineers, Inc.	199,998	10/25/1999	12/30/2001	Completed---Agency report available as NCHRP Web-Only Document 40; summarized in NCHRP Research Results Digest 264
20-50(09)	LTPP Data Analysis: Feasibility of Using FWD Deflection Data to Characterize Pavement Construction Quality	Consulpav International	174,996	5/2/2000	6/3/2002	Completed---Agency report available as NCHRP Web-Only Document 52
20-50(10)	LTPP Data Analysis: Factors Affecting the Performance of Flexible and Rigid Pavements	Arizona State University	46,387	4/17/2000	10/16/2001	Contract terminated---Continued under Project 20-50(10/16)
20-50(10/16)	LTPP Data Analysis: Influence of Design and Construction Features on the Response and Performance of New Flexible and Rigid Pavements	Michigan State University	299,301	6/27/2002	2/28/2005	Completed---Agency report available as NCHRP Web-Only Document 74
20-50(11)	LTPP Data Analysis: Significance of Traditional Materials Pay Factors to Pavement Performance	Cancelled				Project cancelled
20-50(14)	LTPP Data Analysis: Significance of "As-Constructed" AC Air Voids to Pavement Performance	Applied Pavement Technologies	100,000	6/5/2000	6/28/2002	Completed---Summarized in NCHRP Research Results Digest 269
20-50(15)	LTPP Data Analysis: Confidence of WIM Axle Load Data	Cancelled				Project cancelled
20-51(01)	LTPP Product Development: Workshop on Pavement Smoothness	Soil & Materials Engineers, Inc.	56,000	1/24/2000	12/31/2001	Completed---Agency report available as NCHRP Web-Only Document 42
20-51(02)	LTPP Product Development: PCC Pavement Practice Manual and Workshop	Transferred	100,000			Transferred to FHWA
20-51(03)	LTPP Product Development: Pavement Smoothness Specification for Approaches to WIM Equipment Sites	Transferred	100,000			Transferred to FHWA

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-52	TRAC PAC2 -- A Hands-on Educational Program	Commonwealth of Virginia	350,094	5/30/2000	5/29/2002	Completed---New modules transferred to AASHTO
20-52(01)	Implementing TRAC PAC2 -- A Hands-on Educational Program	TransTech Management, Inc.	200,000	2/24/2003	3/1/2005	Completed---Report sent to AASHTO
20-53	Using Customer Needs to Drive Transportation Decisions	Howard/Stein-Hudson Associates	149,985	5/11/2001	11/30/2002	Completed---Published as NCHRP Report 487
20-54	Accelerating Opportunities for Innovation in the Highway Industry	TRB Division A/Consultant T. Ferragut	170,000	5/1/2000	4/30/2008	Continuing
20-55	TRB Study on Future Surface Transportation Agency Human Resource Needs	TRB Division B	100,000	9/5/2000	3/31/2003	Completed---Published as TRB Special Report 275
20-56	New Services for AASHTO's World Wide Web Site	Logistics Management Institute	474,144	3/25/2002	10/30/2003	Completed---Results provided to AASHTO
20-56A	Survey of AASHTO Web Site Users	Penn, Schoen & Berland Associates, Inc.	35,000	8/15/2001	10/31/2001	Completed---Results provided to AASHTO
20-57	Analytic Tools Supporting Transportation Asset Management	Cambridge Systematics	749,908	4/24/2002	3/1/2005	Completed---Published as NCHRP Report 545
20-59	Surface Transportation Security Research	Various				
20-59(01)	AASHTO Security Research Workshop and Forum	TransTech Management, Inc.	100,000	1/2/2003	4/30/2004	Completed---Final report sent to AASHTO
20-59(02)	Bridge/Tunnel/Highway Infrastructure Vulnerability Workshops	Science Applications International Corporation	277,000	9/10/2002	6/30/2004	Completed---Published as NCHRP Report 525, Volume 4
20-59(03)	FHWA/AASHTO Blue Ribbon Panel on Bridge and Tunnel Security	Science Applications International Corporation	79,804	10/15/2002	9/18/2003	Completed---Final report available on AASHTO and FHWA websites
20-59(04)	White Paper on Highway Security Issues for Reauthorization	Consultant: Stephen Lockwood	25,000	12/19/2002	5/30/2003	Completed---Final report delivered to AASHTO
20-59(05)	National Needs Assessment for Ensuring Transportation Infrastructure Security	Science Applications International Corporation	138,862	5/23/2002	1/31/2003	Completed---Final report available on AASHTO website
20-59(06)	Responding to Threats: A Field Personnel Manual	Science Applications International Corporation	50,000	5/1/2003	12/31/2003	Completed---Published as NCHRP Report 525, Volume 1
20-59(06)A/B	System Security Awareness for Transportation Employees	Rutgers, The State University of New Jersey	250,000	8/20/2004	9/30/2009	Research in progress---Published as NCHRP Report 525, Volume 7, and CRP-CD-59
20-59(07)	Transportation Security Information Clearinghouse	Premier Technology Group, Inc.	124,950	4/16/2003	7/31/2004	Completed---Final report sent to AASHTO
20-59(07)A	White Paper to Identify and Evaluate Highway Asset ISAC Implementation Options	CACI--Premier Technology, Inc.	25,000	3/31/2004	12/31/2004	Completed---Final report sent to AASHTO
20-59(08)	Emergency Transportation Operations Preparedness and Response Workshop: Adaptations for Rural and International Border Crossing Situations	Science Applications International Corporation	180,000	9/10/2002	3/31/2004	Completed---Final report sent to AASHTO



TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-59(09)	Methods for Determining Transportation and Economic Consequences of Terrorist Attacks	Science Applications International Corporation	250,000	3/20/2003	9/30/2005	Completed---Published as NCHRP Report 525, Volume 11
20-59(10)	Secure Communication Infrastructure	McCormick, Taylor and Associates, Inc.	351,000	7/15/2002	6/30/2004	Completed---Published as NCHRP Report 525, Volume 2
20-59(11)	Emergency Traffic Operations Management	Science Applications International Corporation	455,000	3/3/2003	1/31/2007	Completed---Published as NCHRP Report 525, Volume 6
20-59(12)	Follow-up State DOT Transportation Security Survey	-----	5,000			Completed---Final report sent to AASHTO
20-59(13)A	Follow-up on A Guide to Updating Emergency Response Plans for Terrorist Incidents	Parsons Brinckerhoff Quade & Douglas	6,000	3/26/2003	4/26/2003	Completed---Final report sent to AASHTO
20-59(13)B	Follow-up on A Guide to Highway Vulnerability Assessment for Critical Asset Identification and Protection	Science Applications International Corporation	35,000	5/20/2002	8/21/2004	Completed---Final report sent to AASHTO
20-59(14)	Research Support to the AASHTO Special Committee on Transportation Security (SCOTS)	TransTech Management, Inc.	223,306	1/22/2003	12/31/2007	Research in progress---Initial product published as NCHRP Report 525, Volume 5
20-59(15)	AASHTO Modifications of Consultant Reports	-----				In development
20-59(16)	Preparation of Educational Materials: Outreach	TransTech Management, Inc.	50,000	1/16/2004	2/28/2005	Completed---Final report sent to AASHTO
20-59(16)A	Security Funding Resources: A Reference Guide for State Transportation Agencies	Science Applications International Corporation	50,000	6/16/2004	12/15/2004	Completed---Final report sent to AASHTO
20-59(16)B	Security Framework: Fundamentals of Transportation Security for DOTs	TransTech Management, Inc.	74,973	4/4/2007	10/3/2007	Completed---Final report sent to AASHTO
20-59(17)	Guide to Risk Management of Multimodal Transportation Infrastructure	Science Applications International Corporation	644,751	2/23/2005	10/31/2008	Completed---Published as NCHRP Report 525, Volume 15
20-59(18)	Guidelines for Transportation Emergency Training Drills and Exercises	McCormick, Taylor and Associates, Inc.	100,000			Completed---Jointly funded with TCRP; published as NCHRP Report 525, Volume 9
20-59(19)	Transportation Response Options: Scenarios of Infectious Disease, Biological Agents, Chemical, Biological, Radiological, or Nuclear Exposure	Science Applications International Corporation	251,000	10/23/2003	12/31/2005	Completed---Published as NCHRP Report 525, Volume 10
20-59(20)	Enhanced Communications Interoperability: Assessment of Emerging Voice/Data Integration Tools	Cancelled	100,000			Project cancelled
20-59(21)	Continuity of Operations Plans for Transportation Agencies	McCormick, Taylor and Associates, Inc.	200,000	7/21/2004	3/20/2005	Completed---Jointly funded with TCRP; published as NCHRP Report 525, Volume 8
20-59(22)	Guidelines for Emergency Quarantine Closures of Local and State Roads	Midwest Research Institute	200,000	8/30/2006	5/31/2008	Completed---Published as NCHRP Report 525, Volume 13

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-59(23)	A Guide to Emergency Response Planning at State Transportation Agencies	Telvent Farradyne Inc.	300,000	12/4/2006	1/31/2009	Research in progress--- Contractor's draft final report under review
20-59(24)	A Guide to Transportation and Hazards Resources	University of Colorado - Boulder	75,000	8/17/2007	1/31/2009	Research in progress--- Published as NCHRP Report 525, Volume 14; jointly funded with TCRP
20-59(25)	Security Research Plan	San Jose State University Foundation	75,000	1/25/2007	10/24/2007	Completed---Final report sent to AASHTO
20-59(26)	National Needs Assessment for Ensuring Transportation Infrastructure Security (2009-2015)	Telvent Farradyne Inc.	75,000	3/1/2007	2/1/2008	Completed---Final report sent to AASHTO
20-59(28)	Security 101: Physical Security Standards for Transportation	Countermeasures Assessment & Security Experts, LLC	50,000	11/6/2006	6/30/2008	Completed---To be published as NCHRP Report 525, Volume 16
20-59(29)	Research Implementation Plan	----	75,000			In development
20-59(30)	Role of Transportation in the Incident Command System Structure and the National Incident Management System Structure	----	100,000			In development
20-59(31)	Co-Location of Emergency Operations Centers and Intelligent Transportation Centers	----	250,000			In development
20-59(32)	All-Hazards Emergency Evacuation Guide for State Departments of Transportation	----	150,000			In development
20-59(33)	Pre-Planned Recovery and Accepted Practices for Replacement of Transportation Infrastructure	----	150,000			In development
20-59(34)	Economic Implications of Loss of Transportation Infrastructure: Point, Network, and Multiple Losses-- Proposal for a Nationally Accepted Framework	----	100,000			In development
20-60	Performance Measures and Targets for Transportation Asset Management	Cambridge Systematics	350,000	7/15/2003	9/30/2005	Completed---Published as NCHRP Report 551
20-61	Study on Transportation of Radioactive Waste	National Research Council	50,000	3/25/2003	3/24/2005	Completed---Published as National Research Council Report, "Going the Distance"
20-62	Study on Long-Term Viability of Fuel Taxes for Transportation Finance	TRB Division B	100,000			Completed---Published as TRB Special Report 285
20-63	Performance Measurement Tool Box and Reporting System for Research Programs and Projects	Texas A&M University	300,000	1/16/2004	4/28/2006	Completed---Follow-on underway; see 20-63A
20-63A	Development of Research Performance Measurement (RPM) System -- Version 1.1	Texas A&M University	81,748	12/11/2006	1/31/2009	Research in progress
20-64	XML Standard for Exchange of Transportation Data (Trans-XML)	Cambridge Systematics	500,000	3/1/2004	10/1/2006	Completed---Published as NCHRP Report 575

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-65	Research for the AASHTO Standing Committee on Public Transportation	----	300,000			Research in progress---Refer to project writeup on CRP website
20-66	Strategic Plan for Transportation Information Management	----	250,000			Completed---Published as TRB Special Report 284
20-67	Making Transportation Tunnels Safe and Secure	----	200,000			Completed---Published as NCHRP Report 525, Volume 12; jointly funded with TCRP
20-68	US Domestic Scan Program	Cambridge Systematics	50,000	9/30/2004	7/30/2005	Completed---See NCHRP website
20-68(01)	US Domestic Scan Program Pilot	Cambridge Systematics	269,533	1/20/2006	4/19/2008	Completed---See NCHRP website
20-68A	US Domestic Scan Program	Arora and Associates, P.C.	500,000	12/27/2007	12/26/2010	Research in progress
20-69	Guidance for Transportation Project Management	Edwards & Kelcey, Inc.	249,943	2/7/2006	3/31/2009	Research in progress
20-70	Transportation Research Thesaurus Improvements	TRB Division B	90,000	9/30/2005	10/1/2006	Completed---Results integrated with the Transportation Research Thesaurus
20-71	Effective Experimental Design and Data Analysis in Transportation Research	Michigan State University	249,947	4/23/2007	4/22/2009	Research in progress
20-72	Tools to Aid State DOTs in Workforce Issues	Spy Pond Partners	300,000	3/1/2007	2/28/2009	Research in progress
20-73	Accelerating Transportation Project and Program Delivery: Conception to Completion	Edwards & Kelcey, Inc.	299,960	4/2/2007	4/1/2009	Research in progress
20-74	Developing an Asset Management Plan for the Interstate Highway System	Cambridge Systematics	499,992	4/2/2007	1/1/2009	Research in progress
20-74A	Development of National Level of Service Criteria for the Interstate Highway System	Dye Management Group	400,000	3/31/2008	9/30/2010	Research in progress
20-75	Implementing Transportation Knowledge Networks	Spy Pond Partners	200,000	3/27/2007	11/1/2008	Research in progress
20-75A	Identifying Transportation Libraries and Information Centers	----	90,000			In development
20-76	Development of Standards and Models of a Disparity/Availability Study Standard for State DOT Disadvantaged Business Enterprise (DBE) Programs	National Economic Research Associates, Inc.	278,997	4/5/2007	12/31/2008	Research in progress
20-77	Transportation Operations Training Framework	University of Maryland	300,000	7/11/2007	4/10/2009	Research in progress
20-78	Communicating the Value of Research	NuStats LLC	308,000	3/30/2007	8/30/2009	Research in progress
20-79	Expansion of the Transportation Research Thesaurus	CDB Enterprises	80,000	7/3/2008	7/2/2009	Research in progress
20-80	Future Strategies for the AASHTO Standing Committee on Research	----	200,000			Various studies

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
20-80(01)	Background Information on National Transportation Research for the AASHTO Standing Committee on Research	CTC & Associates LLC	49,878	8/22/2007	12/21/2007	Completed---Contractor's final report used by SCOR
20-80(02)	Longer-Term, Strategic Issues Facing the Transportation Industry Workshop	ICF Consulting, Inc.	93,184	6/27/2008	12/26/2008	Completed---Publication decision pending
20-81	Challenges and Successes in Attracting and Retaining a Skilled Transportation Workforce	----	350,000			In development
20-82	Next Generation of the FHWA Transportation Pooled Fund (TPF) Website	----	400,000			In development
20-83	Long-Range Strategic Issues Facing the Transportation Industry	----	5,000,000			In development

**AREA TWENTY-ONE : SOILS AND GEOLOGY--TESTING AND INSTRUMENTATION**

21-01	Instrumentation for Measurement of Moisture	Research Triangle Institute	35,027 *	8/25/1969	2/24/1971	Completed---Published as NCHRP Report 138
21-02	Instrumentation for Moisture Measurement---Bases, Subgrades, and Earth Materials (Sensor Development)	Southwest Research Institute	64,976 *	2/1/1972	1/31/1974	Completed---Report not published; included in Project 21-02(03) report
21-02(02)	Instrumentation for Moisture Measurement---Bases, Subgrades, and Earth Materials (Sensor Development)	State University of New York - Buffalo	29,953 *	4/1/1972	9/30/1973	Completed---Report not published; included in Project 21-02(03) report
21-02(03)	Instrumentation for Moisture Measurement---Bases, Subgrades, and Earth Materials (Sensor Evaluation)	Southwest Research Institute	154,452 *	9/3/1974	12/31/1979	Completed---Report not published; summarized in NCHRP Research Results Digest 121; for avail. see Summary or Progress Through 1988
21-03	Instrumentation for Measuring Scour at Bridge Piers and Abutments	Ayres Associates	915,918	12/4/1989	3/31/1997	Completed---Phase I report summary in NCHRP Research Results Digest 189; no Phase II report; Phase III published as NCHRP Reports 396, 397A, and 397B
21-04	Sealing Geotechnical Exploratory Holes to Protect the Subsurface Environment	Strata Engineering Corporation	344,510	3/1/1991	11/30/1995	Completed---Published as NCHRP Report 378
21-05	Determination of Unknown Subsurface Bridge Foundations	Olson Engineering	350,000	4/27/1992	8/28/1995	Completed---Agency report available for loan; summarized in NCHRP Research Results Digest 213
21-05(02)	Unknown Subsurface Bridge Foundation Testing	Olson Engineering	380,000	2/15/1996	6/30/2001	Completed---Report not published; agency report available for loan
21-06	Corrosion in the Soil Environment: Soil Resistivity and pH Measurements	Corpro Companies, Inc.	599,449	4/3/2000	12/31/2008	Research in progress
21-07	Development of Portable Scour Monitoring Equipment	Ayres Associates	299,938	5/2/2000	12/31/2002	Completed---Published as NCHRP Report 515

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
21-08	Assessment of Innovative Load Testing of Deep Foundations	Geosciences Testing & Research, Inc.	200,000	8/23/2000	6/30/2004	Completed---Agency report available as NCHRP Web-Only Document 84
21-09	Intelligent Soil Compaction Systems	Colorado School of Mines	599,879	8/30/2006	2/28/2009	Research in progress---Contractor's draft final report under review
<b>AREA TWENTY-TWO : DESIGN--VEHICLE BARRIER SYSTEMS</b>						
22-01	Concepts for Improved Traffic Barrier Systems	Walter W. White	25,000 *	10/1/1970	12/31/1971	Completed---Report not published; for avail. see Summary of Progress Through 1988
22-01A	Testing and Evaluation of Bridge Rail Concepts	Texas A&M University	40,000 *	3/1/1974	5/30/1975	Completed---Report not published; for avail. see Summary of Progress Through 1988; summarized in NCHRP Research Results Digest 81
22-02	Traffic Barrier Performance and Design	Southwest Research Institute	205,000 *	1/1/1972	3/31/1975	Completed---Task 1 reports not published; summarized in NCHRP Research Results Digests 84 and 102; Task 2 report published as NCHRP Report 153
22-02(02)	Multiple Service Level Highway Bridge Railings---Performance and Design Criteria	Southwest Research Institute	195,000 *	8/1/1976	4/30/1979	Completed---Agency reports on Phase I and Phase II available for loan
22-02(03)	Multiple Service Level Highway Bridge Railings---Selection Procedures	Southwest Research Institute	200,000 *	1/1/1979	5/31/1981	Completed---Published as NCHRP Report 239
22-02(04)	Procedures for Testing Highway Appurtenances	Southwest Research Institute	30,000 *	5/1/1979	2/28/1981	Completed---Published as NCHRP Report 230
22-03	Field Evaluation of Vehicle Barrier Systems	Calspan Corporation	25,000 *	1/1/1974	2/15/1975	Completed---Report not published; summarized in NCHRP Research Results Digest 76
22-03A	Field Evaluation of Vehicle Barrier Systems	Arthur L. Elliott	10,000 *	7/1/1974	12/31/1974	Completed---Report not published; summarized in NCHRP Research Results Digest 76
22-04	Performance of Longitudinal Traffic Barriers	Southwest Research Institute	503,954 *	7/1/1983	7/15/1987	Completed---Published as NCHRP Report 289
22-05	Develop Performance Standards & Hardware for Low Service Level Guardrail Systems	Southwest Research Institute	200,000	5/1/1985	3/15/1992	Completed---Continued under Project 22-05A
22-05A	Warrants for the Installation of Low Service Level Guardrail Systems	Wilbur Smith Associates	100,000 *	5/1/1990	1/31/1992	Completed---Agency report and User's Guide available for loan; summarized in NCHRP Research Results Digest 194
22-06	Roadside Safety Design for Small Vehicles	Texas A&M University	350,000 *	6/1/1985	11/30/1988	Completed---Published as NCHRP Report 318

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
22-07	Update of "Recommended Procedures for Safety Performance Evaluation of Highway Appurtenances"	Texas A&M University	200,000 *	6/1/1989	8/31/1992	Completed---Published as NCHRP Report 350
22-08	Evaluation of Performance Level Selection Criteria for Bridge Railings	Texas A&M University	200,000	4/15/1989	12/31/1995	Completed---Agency report available for loan
22-09	Improved Procedures for Cost-Effectiveness Analysis of Roadside Safety Features	Texas A&M University	250,000	9/1/1991	10/31/1998	Completed---Report not published; to be included in Project 22-09(02)
22-09(02)	Roadside Safety Analysis Program (RSAP)-Engineer's Manual	Consultant: King Mak	65,200	6/4/2001	11/30/2002	Completed---Published as NCHRP Report 492; software available on CRP-CD-33
22-09(03)	Roadside Safety Analysis Program (RSAP) Technical Assistance	Consultant: King Mak	89,970	2/11/2004	3/31/2006	Cancelled
22-09A	Roadside Safety Analysis Program	Consultant: Khasnabis	25,000	4/15/1997	4/30/1998	Completed---Report not published
22-10	Updated Materials for a Traffic Barrier/Small Sign Support Hardware Guide	Momentum Engineering	380,000	1/2/1991	12/31/1996	Completed---Two guides published by AASHTO
22-11	Evaluation of Roadside Features to Accommodate Vans, Mini-Vans, Pickup Trucks, & 4-Wheel Drive Vehicles	Texas A&M University	399,997	6/1/1994	6/30/2001	Completed---Published as NCHRP Report 471
22-12	Guidelines for the Selection, Installation, and Maintenance of Highway Safety Features	Texas A&M University	430,218	6/1/1995	10/31/2000	Terminated---Transferred to Project 22-12(02)
22-12(02)	Selection Criteria and Guidelines for Highway Safety Features	University of Nebraska - Lincoln	64,592	9/12/2003	3/30/2009	Research in progress---Contractor's draft final report in review
22-12(03)	In Service Evaluation of Bridge Rails and Development of Guidelines for the Use of Test Level 2, 3, 4, and 5 Bridge Rail	-----	250,000			In development
22-13	In-Service Performance Of Traffic Barriers	University of Iowa	520,000	4/1/1996	2/28/1999	Completed---Report not published; included in Project 22-13(02)
22-13(02)	Expansion and Analysis of In-Service Barrier Performance Data and Planning for Establishment of a Database	Worcester Polytechnic Institute	280,000	4/1/1999	9/30/2002	Completed---Published as NCHRP Report 490
22-14	Improvement of Procedures for the Safety-Performance Evaluation of Roadside Features	Texas A&M University	250,000	3/1/1997	5/31/2001	Completed---Report not published; recommended 22-14(02)
22-14(02)	Improvement of Procedures for the Safety-Performance Evaluation of Roadside Features	University of Nebraska	833,940	8/9/2002	6/30/2008	Completed---To be published by AASHTO
22-14(03)	Evaluation of Existing Roadside Safety Hardware using Updated Criteria	Texas A&M University	300,000	4/16/2007	10/15/2009	Research in progress
22-15	Improving the Compatibility of Vehicles and Roadside Safety Hardware	George Washington University	300,000	2/8/1999	3/31/2003	Completed---Agency report available as NCHRP Web-Only Document 61

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
22-16	Development and Testing of a New Guardrail System	West Virginia University	200,000	7/16/1999	6/30/2002	Completed---Summarized in NCHRP Research Results Digest 273
22-17	Recommended Guidelines for Curb and Curb-Barrier Combinations	Worcester Polytechnic Institute	500,000	4/19/2000	4/18/2004	Completed---Published as NCHRP Report 537
22-18	Crashworthy Work-Zone Traffic Control Devices	Texas A&M University	300,000	9/1/2000	8/31/2005	Completed---Published as NCHRP Report 553
22-19	Aesthetic Concrete Barrier and Bridge Rail Designs	Texas A&M University	579,992	9/1/2002	9/5/2005	Completed---Published as NCHRP Report 554
22-20	Design of Roadside Barrier Systems Placed on MSE Retaining Walls	Texas A&M University	600,000	7/1/2004	1/31/2009	Research in progress
22-21	Median Cross-Section Design for Rural Divided Highways	Midwest Research Institute	800,000	1/24/2006	1/23/2009	Research in progress
22-22	Effectiveness of Traffic Barriers on Non-Level Terrain	Texas A&M University	500,000	12/12/2006	6/12/2009	Research in progress
22-23	Criteria for Restoration of Longitudinal Barriers	Virginia Polytechnic Institute	300,000	6/1/2006	6/30/2009	Research in progress
22-24	Guidelines for Verification and Validation Procedures for Computer Simulation used in Roadside Safety Applications	Worcester Polytechnic Institute	300,000	4/5/2007	10/4/2009	Research in progress
22-25	Development of Guidance for the Selection, Use and Maintenance of Cable Barrier Systems	George Washington University	399,717	4/28/2008	7/28/2009	Research in progress
22-26	Identification of Factors Related to Serious Injury and Fatal Motorcycle Crashes into Traffic Barriers	----	500,000			Contract pending
22-27	Update Roadside Safety Analysis Program (RSAP) Software and Default Data Elements	----	400,000			Contract pending
<b>AREA TWENTY-THREE : SOILS AND GEOLOGY--PROPERTIES</b>						
23-00	No Projects	No Projects				
<b>AREA TWENTY-FOUR : SOILS AND GEOLOGY--MECHANICS AND FOUNDATIONS</b>						
24-01	Manual on Subsurface Investigations	Haley & Aldrich	75,000 *	4/2/1979	12/31/1980	Completed---Report published by AASHTO
24-02	Reinforcement of Earth Slopes and Embankments	Dames & Moore	150,000 *	8/22/1983	5/21/1987	Completed---Published as NCHRP Report 290
24-03	Laboratory Evaluation of Piles Installed with Vibratory Drivers	University of Houston	200,000 *	1/6/1986	8/31/1988	Completed---Published as NCHRP Report 316
24-04	Load Factor Design Criteria for Highway Structure Foundations	Virginia Polytechnic Institute	459,152 *	9/1/1987	2/28/1991	Completed---Published as NCHRP Report 343
24-05	Downdrag on Bitumen-Coated Piles	Texas A&M University	385,000	6/15/1988	8/31/1994	Completed---Published as NCHRP Report 393

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
24-06	Expert System for Stream Stability and Scour Evaluation	University of Washington	514,931	3/15/1993	6/30/1999	Completed---Published as NCHRP Report 426
24-07	Countermeasures to Protect Bridge Piers from Scour	University of Minnesota	400,000	5/1/1995	10/31/1998	Completed---Agency report available for loan
24-07(02)	Countermeasures to Protect Bridge Piers from Scour	Ayres Associates	815,000	4/1/2001	12/31/2006	Completed---Published as NCHRP Report 593
24-08	Scour at Bridge Foundations: Research Needs	University of Louisville	166,575	2/1/1995	1/31/1997	Completed---Agency report available for loan
24-09	Static and Dynamic Lateral Loading of Pile Groups	Auburn University	499,962	6/15/1997	12/31/2000	Completed---Published as NCHRP Report 461
24-10	Thermally Sprayed Metallic Coatings to Protect Steel Pilings	Ocean City Research Corporation	300,000	7/2/1999	2/28/2003	Completed---Published as NCHRP Report 528
24-10(02)	Thermally Sprayed Metallic Coatings to Protect Steel Pilings	Corrpro Companies, Inc.	60,215	10/7/2005	1/31/2009	Research in progress
24-11	Guidelines for Geofoam Applications in Embankment Projects	University of Illinois	199,979	7/7/1999	8/30/2002	Completed---Published as NCHRP Report 529 and NCHRP Web-Only Document 65
24-11(02)	Guidelines for Geofoam Applications in Slope Stability Projects	University of Memphis	300,000	10/2/2006	3/31/2009	Research in progress---Interim report under review
24-12	Controlled Low-Strength Material for Backfill, Utility Bedding, Void Fill, and Bridge Approaches	Delaware Transportation Institute	176,506	9/1/1998	8/31/2001	Completed---Contract transferred to University of Texas
24-12(01)	Controlled Low-Strength Material for Backfill, Utility Bedding, Void Fill, and Bridge Approaches	University of Texas - Austin	279,352	3/10/2000	12/31/2006	Completed---Published as NCHRP Report 597
24-13	Evaluation of Metal Tensioned Systems in Geotechnical Applications	D'Appolonia	500,000	8/15/1998	3/31/2002	Completed---Published as NCHRP Report 477
24-13(01)	Evaluation of Metal Tensioned Systems in Geotechnical Applications	D'Appolonia Engineering Division	38,100	5/17/2002	11/30/2002	Completed---Workshop materials available for loan
24-13(02)	Evaluation of Metal Tensioned Systems in Geotechnical Applications	D'Appolonia	2,980	5/21/2003	5/31/2003	Completed
24-13(03)	Evaluation of Metal Tensioned Systems in Geotechnical Applications	D'Appolonia	4,657	8/14/2003	12/31/2003	Completed
24-14	Scour at Contracted Bridge Sites	University of Louisville	500,000	3/16/1998	8/31/2004	Completed---Agency report available as NCHRP Web-Only Document 83
24-15	Pier Scour and Contraction Scour in Cohesive Soils	Texas A&M University	350,000	2/1/1999	11/30/2002	Completed---Published as NCHRP Report 516
24-15(02)	Abutment Scour in Cohesive Materials	Texas A&M University	500,000	6/25/2004	3/31/2009	Research in progress---Contractor's draft final report under review
24-16	Methodology for Predicting Channel Migration	Ayres Associates	549,981	1/11/1999	6/30/2003	Completed---Published as NCHRP Report 533, NCHRP Web-Only Document 67, CRP-CD-48, and CRP-CD-49



TABLE 7 (continued)

Project							
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **	
24-17	LRFD Deep Foundation Design	University of Massachusetts - Lowell	300,000	5/13/1999	9/30/2002	Completed---Published as NCHRP Report 507 and CRP-CD-39	
24-18	Countermeasures to Protect Bridge Abutments from Scour	University of Mississippi	443,198	7/9/2001	8/1/2003	Terminated due to PI relocation	
24-18A	Countermeasures to Protect Bridge Abutments from Scour	Michigan Tech University	363,116	8/29/2003	12/31/2006	Completed---Published as NCHRP Report 587	
24-19	Environmentally Sensitive Channel- and Bank-Protection Measures	Salix Applied Earthcare	349,811	5/30/2001	11/30/2004	Completed---Published as NCHRP Report 544	
24-20	Prediction of Scour at Bridge Abutments	University of Iowa	699,611	4/12/2002	12/31/2008	Research in progress--- Contractor's draft final report under review	
24-21	LRFD Soil Nailing Design and Construction Specifications	GeoSyntec Consultants	200,000	6/20/2003	1/31/2009	Research in progress--- Contractor's draft final report under review	
24-22	Selecting Backfill Materials for MSE Retaining Walls	Geo Testing Express, Inc.	689,973	7/23/2003	2/28/2009	Research in progress--- Contractor's draft final report under review	
24-23	Riprap Design Criteria, Specifications, and Quality Control	Ayres Associates	350,000	4/1/2003	9/30/2006	Completed---Published as NCHRP Report 568	
24-24	Criteria For Selecting Numeric Hydraulic Modeling Software	Ocean Engineering Associates	174,957	6/16/2004	12/31/2006	Completed---Agency report available as NCHRP Web-Only Document 106	
24-25	Guidelines for Risk-Based Management of Bridges with Unknown Foundations	GKY & Associates, Inc.	200,000	6/16/2004	11/15/2006	Completed---Agency report available as NCHRP Web-Only Document 107	
24-26	Effects of Debris on Bridge-Pier Scour	Ayres Associates	600,000	6/18/2004	12/31/2008	Research in progress--- Contractor's draft final report under review	
24-27	Evaluation of Bridge Scour Research	----	350,000			In development	
24-27(01)	Evaluation of Bridge Scour Research: Pier Scour Processes and Prediction	University of Iowa	175,000	10/17/2007	4/16/2009	Research in progress	
24-27(02)	Evaluation of Bridge Scour Research: Abutment and Contraction Scour Processes and Prediction	Georgia Institute of Technology	175,000	1/16/2008	6/15/2009	Research in progress	
24-27(03)	Evaluation of Bridge Scour Research: Geomorphic Processes and Prediction	----	70,000			In development	
24-27(04)	Facilitation of NCHRP Workshop on Abutment Scour and 5-Year Plan Development	University of Maryland	18,200	6/23/2008	7/31/2008	Completed	
24-28	LRFD Metal Loss and Service-Life Strength Reduction Factors for Metal-Reinforced Systems in Geotechnical Applications	McMahon & Mann Consulting Engineers PC	600,000	6/1/2006	6/30/2009	Research in progress	
24-29	Scour at Bridge Foundations on Rock	MACTEC Engineering and Consulting, Inc.	750,000	8/22/2006	8/21/2009	Research in progress	

TABLE 7 (continued)

<b>Project</b>						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
24-30	Improving the Lateral Capacity of Highway Bridge Foundations in Weak Soils	Brigham Young University	499,758	6/2/2006	6/1/2009	Research in progress
24-31	AASHTO LRFD Design-Construction Specifications of Shallow Foundations for Highway and Bridge Structures	Geosciences Testing & Research, Inc.	379,344	1/30/2007	1/29/2009	Research in Progress
24-32	Scour at Wide Piers and Long Skewed Piers	Ocean Engineering Associates	298,982	7/2/2007	10/1/2009	Research in progress
24-33	Development of Design Methods for In-stream Flow Control Structures	University of Minnesota	600,000	9/2/2008	9/1/2011	Research in progress
<b>AREA TWENTY-FIVE : TRANSPORTATION PLANNING--IMPACT ANALYSIS</b>						
25-01	Effects of Highway Runoff on Wetlands	Rexnord, Inc.	162,189 *	2/16/1981	3/16/1984	Completed---Published as NCHRP Report 264
25-02	Predicting Stop-and-Go Traffic Noise Levels	Vanderbilt University	63,145 *	1/18/1988	5/31/1989	Completed---Published as NCHRP Report 311
25-03	Guidelines for the Development of Wetland Replacement Areas	URS Consulting	311,102	4/1/1989	9/30/1997	Completed---Published as NCHRP Report 379
25-04	Determining Economic Impacts on Adjacent Businesses Due to Restricting Left Turns	Cambridge Systematics	300,000	6/15/1992	3/31/1995	Completed---Summarized in NCHRP Research Results Digest 231
25-05	Remote Sensing and Other Technologies for the Identification and Classification of Wetlands	Normandeau Associates	299,770	6/1/1992	2/21/1996	Completed---Report not published
25-06	Intersection Air Quality Modeling (HYROAD)	Systems Applications International	2,630,000	2/1/1993	1/31/2003	Completed---Agency documentation available as CRP-CD-32; HYROAD model listed as alternative model on US EPA website for downloading
25-07	Improving Transportation Data for Mobile Source Emissions Estimates	University of Tennessee	200,000	12/1/1993	10/31/1995	Completed---Published as NCHRP Report 394
25-08	Impact of Highway Capacity Improvements on Air Quality and Energy Consumption	TRB Division B & EO	100,000	3/1/1993	7/30/1995	Completed---Published as TRB Special Report 245
25-09	Environmental Impact of Construction and Repair Materials on Surface and Ground Waters	Oregon State University	1,355,373	3/1/1994	6/30/2000	Completed---Published as NCHRP Reports 443 and 448 and available on CRP-CD-7
25-09(01)	Environmental Impact of Construction and Repair Materials on Surface and Ground Waters--Outreach and Training	Oregon State University	99,957	5/16/2002	12/31/2004	Completed---Workshop materials available for loan
25-10	Estimating the Indirect Effects of Proposed Transportation Projects	Louis Berger & Associates	287,666	12/1/1993	5/31/1996	Completed---Published as NCHRP Report 403
25-10(02)	Continuation Funding for Estimating the Indirect Effects of Proposed Transportation Projects	Louis Berger & Associates	199,265	5/20/1999	5/1/2001	Completed---Published as NCHRP Report 466

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
25-11	Development of a Modal-Emissions Model	University of California - Riverside	2,342,604	8/15/1995	9/30/2000	Completed---Publication decision pending; Comprehensive Modal Emissions Model available at <a href="http://www.cert.ucr.edu/cmem">http://www.cert.ucr.edu/cmem</a>
25-12	Wet Detention Pond Design for Highway Runoff Pollution Control	Washington State University	580,218	4/15/1996	2/2/2002	Completed---Report not published; agency report available for loan
25-13	Assessments of Impacts of Bridge Deck Runoff Contaminants on Receiving Waters	CH2M Hill	129,556	3/15/1997	12/31/2001	Completed---Summarized in NCHRP Research Results Digest 235
25-13(02)	Assessments of Impacts of Bridge Deck Runoff Contaminants on Receiving Waters	CH2M Hill	254,280	10/1/1999	12/31/2001	Completed---Published as NCHRP Report 474
25-14	Heavy-Duty Vehicle Emissions	Cambridge Systematics	500,000	12/1/1998	10/31/2002	Completed---Report not published
25-15	Short-Term Monitoring for Compliance with Air Quality Standards	CH2M Hill	200,000	12/1/1998	6/15/2002	Completed---Published as NCHRP Report 479
25-16	Guidance for Selecting Compensatory Wetland Mitigation Options	A.D. Marble & Co., Inc.	224,784	3/1/1999	7/1/2002	Completed---Summarized in NCHRP Research Results Digest 251; published as NCHRP Report 482
25-17	Transportation Effects of the 1997 Changes to the National Ambient Air Quality Standards (NAAQS)	ENVIRON International Corporation	539,995	3/1/1999	11/30/2002	Completed---Original project report updated with Project 08-36 finds; publication decision pending
25-18	Particulate Matter (PM2.5 and PM10) Apportionment for On-Road Mobile Sources	ARCADIS Geraghty & Miller	1,199,986	4/1/1999	5/31/2006	Completed---Agency report to be available as an NCHRP Web-Only Document
25-19	Evaluation of Methods, Tools, and Techniques to Assess the Social and Economic Effects of Transportation Projects	University of Iowa	199,935	3/29/1999	4/1/2001	Completed---Published as NCHRP Report 456
25-20	Management of Runoff from Surface Transportation Facilities -- Synthesis and Research Plan	GKY & Associates, Inc.	149,889	4/14/1999	3/31/2001	Completed---Agency report available as NCHRP Web-Only Document 37; CD-ROM desk reference available upon request
25-20(01)	Evaluation of Best Management Practices for Highway Runoff Control	Oregon State University	699,826	8/22/2002	5/31/2006	Completed---Published as NCHRP Report 565
25-20(02)	Identification of Research Needs Related to Highway Runoff Management	Venner Consulting	49,993	4/22/2003	12/31/2003	Completed---Published as NCHRP Report 521
25-21	Assessment of Short-Term Versus Long-Term Air Quality Effects of Traffic Flow Improvement Projects	Dowling Associates	375,000	10/19/1999	4/30/2003	Completed---Published as NCHRP Report 535
25-22	Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions	CH2M Hill	179,994	3/10/2000	12/15/2001	Completed---Available as CRP-CD-14

TABLE 7 (continued)

Project						
No.	Title	Research Agency	Contract Amount	Starting Date	Completion Date	Project Status **
25-22(02)	Technologies to Improve Consideration of Environmental Concerns in Transportation Decisions	CH2M Hill	250,000	5/7/2004	4/30/2006	Completed---Summarized in NCHRP Research Results Digest 304
25-23	Environmental Information Management and Decision Support System for Transportation	Booz-Allen & Hamilton	248,767	5/19/2000	8/19/2002	Completed---Published as NCHRP Report 481
25-23(02)	Software for an Environmental Information Management and Decision Support System	Cambridge Systematics	400,000	6/2/2004	12/31/2006	Completed---Summarized in NCHRP Research Results Digest 317
25-24	Monitoring, Analyzing, and Reporting on the Environmental Streamlining Pilot Projects	Vanasse Hangen Brustlin, Inc.	299,988	7/13/2001	9/30/2005	Completed---Summarized in NCHRP Research Results Digest 300; agency report available as NCHRP Web-Only Document 79
25-25	Research for the AASHTO Standing Committee on the Environment	----	500,000			Research in progress---Refer to project writeup on CRP website
25-25A	Research for the AASHTO Standing Committee on the Environment	----				In development
25-26	Development of a Low Impact Development Design and Construction Manual for Transportation Systems	----	500,000			Combined (\$400k) with 25-20(01); \$100k returned to program
25-27	Evaluation of the Use and Effectiveness of Wildlife Crossings	Utah State University	643,996	6/1/2004	5/31/2008	Completed---Published as NCHRP Report 615
25-28	Predicting and Mitigating Hydroacoustic Impacts on Fish from Pile Installation	Battelle Memorial Institute	449,999	11/23/2005	11/22/2008	Research in progress
25-29	Developing Design and Management Guidelines for Historic Road Corridors	Otak, Inc.	102,437	4/7/2006	11/16/2007	Terminated as of 16 Nov 2007
25-29A	Guidelines for Design and Management of Historic Road Corridors	TranSystems Corporation	215,655	3/27/2008	1/27/2010	Research in progress
25-30	Use of Temporary Bridging to Avoid Impacts to Waters and Wetlands During Highway Construction	Mulkey Engineers & Consultants	100,000	6/5/2006	5/31/2008	Completed---Summarized in NCHRP Research Results Digest 330
25-31	Guidelines for Evaluating and Selecting Modifications to Existing Roadway Drainage Infrastructure to Improve Water Quality in Ultra-Urban Areas	GeoSyntec Consultants	299,957	8/8/2008	8/7/2010	Research in progress

\*\* Information on all projects initiated under the NCHRP from its inception in 1962 through 1988 is included in the Special Edition of Summary of Progress through 1988. Subsequent to 1988, information about project status is available on the NCHRP World Wide Web site at <http://www.trb.org/CRP/NCHRP/NCHRPPProjects.asp>

<sup>a</sup> NCHRP funds obligated under the \$314,340 four-way agreement among the National Academy of Sciences, Michigan Department of State Highways, Wayne County, and the City of Detroit.

<sup>b</sup> NCHRP funds obligated under the \$70,000 five-way agreement among the National Academy of Sciences, Michigan Department of State Highways, Wayne County, the City of Detroit, and the University of Michigan.

<sup>c</sup> Continuing activity. Amount shown is for latest fiscal year in which funding was provided.

## HOW TO OBTAIN PUBLICATIONS AND OTHER MATERIALS

### ***Items for Sale***

1. NCHRP Reports, Syntheses, Research Results Digests, Legal Research Digests, and CD-ROMs.
2. Research agencies' final reports (photocopy rates apply for hard copy).
3. Other TRB publications.

Payment may be made by check or money order (payable to Transportation Research Board) or by Visa, MasterCard, or American Express. Only charge-card orders will be accepted by telephone (202/334-3213) or fax (202/334-2519). Be sure to include expiration date. Mail orders to the following address:

*Transportation Research Board  
Lockbox 289  
Washington, DC 20055*

To order NCHRP publications on the Internet, use the following address:

<http://www.trb.org/bookstore>

Follow the online instructions. Payment must be made using VISA, MasterCard, or American Express.

### ***Items Available Free of Charge Online***

Since 2001, NCHRP Reports, Syntheses, Research Results Digests, Legal Research Digests, and Web-Only Documents have been posted on the TRB website in PDF format [see <http://www.trb.org/trb/publications/publications.asp> under the heading "National Cooperative Highway Research Program (NCHRP)"].

### ***Items for Loan***

1. Some research agencies' final reports, manuals, videotapes, etc., are identified in the project summaries and are available on a loan basis upon written request to: *Cooperative Research Programs, Transportation Research Board, 500 Fifth Street NW, Washington, DC 20001*
2. Loan requests for films and tapes should be directed to:

*TRB Library  
Transportation Research Board  
500 Fifth Street NW  
Washington, DC 20001*

Mailing and handling charges may be assessed, especially where 1st-class delivery is requested; an invoice will accompany the loaned item.

### ***Summary of Progress Through 1988—Special Edition***

This document can be viewed online as *NCHRP Web Document 7*. See the TRB publications homepage (<http://www.trb.org/trb/publications/publications.asp>). Under the heading "National Cooperative Highway Research Program (NCHRP)," click on "NCHRP Web-Only Documents."