

OKLAHOMA DEPARTMENT OF TRANSPORTATION



**State Planning and Research Work Program
FFY 2018**

(October 1, 2017 to September 30, 2018)

Part 1

Strategic Asset and Performance Management

Part 2

Office of Research and Implementation

**Prepared by the
Oklahoma Department of Transportation
in cooperation with the
US Department of Transportation
Federal Highway Administration**

October 2017

This page is intentionally blank.

Executive Summary

This document describes the Federal Fiscal Year (FFY) 2018 State Planning and Research Work Program for the Oklahoma Department of Transportation (ODOT). This program is prepared and submitted according to provisions of Title 23, United States Code, regulated under 23 CFR Part 420. Part 1 of the work program describes the Strategic Asset and Performance Management Division (SAPM) and Part 2, the Office of Research and Implementation activities, as well as, national pooled fund studies. The work program is developed and updated annually in cooperation with the Federal Highway Administration.

SAPM activities to be conducted in FFY 2018 include data collection/analysis/reporting, Transportation Asset Management Program (TAMP), and Performance Measures, mapping, and planning coordination/studies. Additional efforts are planned for data collection and pavement structural condition. Funding for the SAPM portion of the work program is approximately \$9 million in Federal Fiscal Year 2018.

Research activities for FFY 2018 will include six new projects and sixteen continuing projects. Some of the focus areas for current research projects include: design/construction/maintenance of infrastructure and safety. ODOT is participating in fifteen national pooled fund projects, one of which Oklahoma acts as the lead state. Funding for the research program totals approximately \$5.6 million in FFY 2018.

The detailed projects for each section are listed by item number and include a description of the purpose and scope of the project, the accomplishments during the current federal fiscal year (FFY 2017) and the proposed activities for the upcoming fiscal year (FFY 2018). In addition, the Financials Section shows the amount programmed for the FFY 2017 in the last work program, an estimate of the total funds that will be expended by the end of FFY 2017, and the projected costs for the upcoming fiscal year (FFY 2018).



U.S. Department
of Transportation
**Federal Highway
Administration**

Oklahoma Division

September 26, 2017

5801 N. Broadway Ext. Ste. 300
Oklahoma City, OK 73118
Phone: 405-254-3300
Fax: 405-254-3302
www.fhwa.dot.gov/okdiv

In Reply Refer To:
HDA-OK

J. Michael Patterson
Executive Director
Oklahoma Department of Transportation
200 NE 21st Street
Oklahoma City, OK 73105

Dear Mr. Patterson:

The FHWA-OK Division has reviewed Fiscal Year 2018 State Planning and Research (SPR) Part I (Planning) and Part II (Research) Work Programs and Budget for the Oklahoma Department of Transportation (ODOT) as submitted by Ms. Dawn R. Sullivan, Director of Capital Programs, on September 12, 2017. Based on our review we hereby approve the FY 2018 SPR Part I and Part II work program and budget.

We have authorized \$9,219,550.00 (including LTAP) as the Federal share of funds associated with the FY 2018 SPR Part I work program and budget. We have authorized \$4,109,000.00 as the Federal share of funds associated with the FY 2018 SPR Part II work program and budget.

We commend ODOT for committing more than the required federal minimum (25%) in Research funding, and for continued support of Local Technical Assistance Programs (LTAP) administered by the Center for Local Government Technology (CLGT) at Oklahoma State University. We also commend ODOT for continuing to implement Freight Transportation, Transportation Asset Management and Transportation Performance Management initiatives. These programs directly address federal priorities contained in the latest USDOT authorizing legislation: Fixing America's Surface Transportation (FAST) Act (P.L. 114-94).

As discussed with staff, we look forward to your submittal of the annual performance and expenditure reports for FY2017 (Title 23 CFR 420.117(b) by December 30, 2017.

If you have any questions or comments regarding our approval, please contact Mr. Isaac N. Akem, Community Planner at 405-254-3343 (Part I), or Mr. Waseem Fazal, Pavement & Materials Engineer at 405-254-3332 (Part II).

Sincerely,

Basharat Siddiqi
Division Administrator

State Planning & Research Program Management	1
Directory.....	3
State Planning & Research Financial Summary Request for Funding	5
SP&R Part I Financial Summary Sheet	7
1101 Continuing Inventory Data Studies	9
1102 Highway Performance Monitoring System	10
1103 Geographical Information Management System for Transportation	11
1201 County, City and Other Planning Maps	12
1301 Coverage Count Program.....	13
1302 Permanent Traffic Count Program	14
1304 Purchase of Traffic Counting Equipment.....	15
1305 Vehicle Classification Counting Program.....	16
1306 Weigh-in-Motion Program.....	17
1308 Traffic Monitoring System	18
1309 Traffic Analysis and Projections	19
1310 Skid Studies Program.....	20
1404 Safety Planning	21
1405 Motorcycle Safety & Education Program	22
1440 Local Technical Assistance Program	23
1510 Justification Studies.....	25
1601 Federal-Aid Systems Coordination.....	26
1603 Highway Needs Study.....	27
1604 Pavement Management System	28
1700 General Urban Transportation Planning.....	29
1701 Oklahoma City Area Regional Transportation Study	30
1702 Tulsa Metropolitan Area Transportation Study.....	31

1703 Lawton Metropolitan Area Transportation Study	32
1709 Ft. Smith Transportation Study.....	33
1710 Regional Transportation Planning.....	34
1902 Statewide Long Range Transportation Planning.....	35
1904 Air Quality Planning	36
1905 Freight Transportation Planning	37
1910 Public Participation and Visualization Techniques	38
1913 Bicycle and Pedestrian Planning	39
1914 Transportation Asset Management Plan.....	40
1915 Performance Measures Coordination	41
1916 OK Archeological Survey (OAS) GIS Digitization	42
SPR PART-2	43
SPR Part 2 Financial Summary Sheet.....	44
SPR PART 2 - RESEARCH, SPRY-0010(071)RS, JP#01946(70)	45
2100 Transportation Research Board (TRB) Participation	47
2115 Long Term Pavement Performance (LTPP)	48
2120 Technical Assistance Special Studies.....	49
2130 General Research Activities	50
2156 Roadside Vegetation Management (RVM) Training & Consultation	51
2157 Herbicide Research Program	52
2160 OU / SPTC Agreement	53
2161 Management of the ODOT Transportation Library.....	54
2208 Development and Implementation of a Mechanistic and Empirical Pavement Design Guide (MEPDG) for Rigid Pavements - Phase 3	55
2228 Overturning Forces at Bridge Abutments and the Interaction of Horizontal Forces from Adjacent Roadways Phase 3	56
2243 Recommended Fatigue Test for ODOT	57

2252 Development of Inexpensive Vehicle Sensor Node System for Volume, Turn Movement and Collision Avoidance - Phase 3	58
2256 Understanding the Behavior of Prestressed Concrete Girders	59
2258 Evaluate Densifier-Over-Shotblasting (DOS) Treatment Performance for Pavements and Bridge Decks.....	60
2260 Shrinkage Induced Deformations in Steel Bridges Made Composite with Concrete Deck Slabs – Phase 3....	61
2262 Feasibility Study of GRS Systems for Bridge Abutments in Oklahoma - Phase 2.....	62
2265 Precast Prestressed Concrete Pavement to Abate Settlement Problems under Bridge Approach Slabs	63
2266 The Use of Resistivity Testing for Quality Control of Concrete Mixtures - Phase 2	64
2268 Use of a Novel Controlled Release Surface Curing Agent for Bridge Decks.....	65
2270 Development of an Asphalt Pavement Test Facility at the OSU Unmanned Aerial Vehicle (UAV) Facility	66
2272 Performance of Moisture Barriers to Enhance Pavement Performance over Swelling Soils	67
2273 Development of Guidelines for Selection and Evaluation of Tack Coats in Oklahoma.....	68
2274 Development of Concrete Mixtures to Mitigate Bridge Deck Cracking, Validated Using 3D Bridge Deck Surface Evaluations.....	69
2275 Development of Aggregate Characteristics-Based Preventive Maintenance Treatments Using 3D Laser Imaging and Aggregate Imaging Technology for Optimized Skid Resistance of Pavements.....	70
2276 Evaluation of Ultra-High Performance Concrete for Use in Bridge Connection & Repairs.....	71
2277 Compilation of Local Studies and Regional Calibration of Pavement ME Design for Rigid and Flexible Pavements in Oklahoma	72
2278 Recycling and Reuse of Materials in Transportation Projects-Current Status and Potential Opportunities Including Evaluation of RCA Concrete Pavements along an Oklahoma Interstate Highway.....	73
2279 Probabilistic Approach for the Design of Drilled Shafts Socketed in weak rock in OK	74
2280 Development of Rating Tool for Prestressed Concrete Bridges Vulnerable to Shear	75
2281 Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges	76
2282 Vehicle Classification and Bluetooth MAC's for Origin-Destination Measurements	77
2300 Research Implementation	78
2300(16-01) National Performance Management Research Data Set (NPMRDS) - Speed Data Validation for Traffic Performance Measurement	79
2300(16-03) Oklahoma Public and Tribal Transportation Infrastructure Employee Occupational Safety and Health Training and Evaluation.....	80

2301 Improving the Efficiency and Accuracy of ODOT Temp. Traffic Monitoring Systems.....	81
2302 Load Test Monitoring of I-235 Bridge Repairs	82
2303 Development of Intelligent Vehicle Counting and Classification Sensor (iVCCS).....	83
2304 Rehabilitation for the Bridge Approach Slab of the Blue River Site Using Precast Concrete Pavement.....	84
2305 Implement Balanced Asphalt Mix Design in Oklahoma	85
2306 Continuous Friction Measurement Equipment (CFME) for Highway Safety Management in Oklahoma.....	86
2400 Oklahoma State University Master Agreement for Research and Investigation Services	87
2700 New and Equal Product Evaluation Program	88
TPF-5 (255) Highway Safety Manual Implementation	89
TPF-5 (267) Accelerated Performance Testing for the NCAT Pavement test track (2018-2020)	90
TPF-5 (267) Accelerated Performance Testing for the NCAT Pavement test track (2012-2017)	91
TPF-5 (269) Development of an Improved Design Procedure for Unbonded Concrete Overlays	92
TPF-5 (288) Western Road Usage Charging Consortium.....	93
TPF-5 (297) Improving Specifications to Resist Frost Damage in Modern Concrete Mixtures.....	94
TPF-5 (312) Western Maintenance Partnership	95
TPF-5 (313) Technology Transfer Concrete Consortium (TTCC).....	96
TPF-5 (326) Develop and Support Transportation Performance Management Capacity Development Needs for State DOTs	97
TPF-5 (328) Strain-based Fatigue Crack Monitoring of Steel Bridges using Wireless Elastomeric Skin Sensors....	98
TPF-5 (335) 2016 through 2020 Biennial Asset Management Conference and Training on Implementation Strategies.....	99
TPF-5 (357) Implement Shakecast across Multiple State Departments for Rapid Post Earthquake Response	100
TPF-5 (364) Utilization of Laser Induced Breakdown Spectroscopy (LIBS) for Real-Time Testing and Quality Control Monitoring of Aggregate Materials used in Highway Construction	101
TPF-5 (418) National Cooperative Highway Research Program (NCHRP).....	102
TPF-5 (###) TRB Core Program Services for a Highway RD&T Program –FFY 2018 (TRB FY 2019).....	103

State Planning & Research Program Management

October 1, 2017

Dawn R. Sullivan, P.E.
Director of Capital Programs

Beckie Lyons, CPO, CPM
SP&R Program Manager
Office of Capital Programs

Part 1

Matt Swift, P.E.
Division Engineer
Strategic Asset & Performance Management

Randy Lee, P.E.
Assistant Division Engineer
Strategic Asset & Performance Management

Part 2

David A. Ooten, P.E.
State Research Engineer
Office of Research & Implementation

Ron F. Curb, P.E.
Assistant State Research Engineer
Office of Research & Implementation

Bryan Hurst, APO IV
SP&R Part 2 Program Administrator
Office of Research & Implementation

Directory

Capital Programs Division

Sullivan, Dawn R.	Director of Capital Programs	405-522-6000
Lyons, Beckie	SP&R Program Manager	405-522-6002

Office of Research and Implementation

Cooper, Bryan	Transportation Manager I	405-736-9475
Curb, Ron	Assistant State Research Engineer	405-522-3795
Hook, Gary	Implementation Engineer	405-522-1042
Hurst, Bryan	SP&R Research Administrator	405-522-3794
Ooten, David	State Research Engineer	405-521-2671
Stephens, Teresa	Professional Engineer	405-522-1062

Programs Division

Adkins, Sam	Programs Division Manager	405-521-2521
-------------	---------------------------	--------------

Strategic Asset & Performance Management Division

Blakeslee, Matthew	Professional Engineer	405-522-6713
Chaney, Laura	Planning & Performance Branch Manager	405-521-2705
Fridrich, Aaron	Field Data Collection Manager	405-736-9466
Gonzalez, Angel	Pavement Management Engineer	405-522-5904
Johnson, Daryl G.	Professional Engineer III	405-522-6376
Lee, Randy	SAPM Assistant Division Engineer	405-522-1447
Maxwell, Ron	Inventory Branch Manager	405-521-2728
Planteen, Jeremy	Branch Manager	405-521-2729
Swift, Matthew	SAPM Division Engineer	405-521-2704

Traffic Division

McGovern, Ginger	Engineering Manager	405-521-2867
------------------	---------------------	--------------

State Planning & Research Financial Summary

OKLAHOMA DEPARTMENT OF TRANSPORTATION

State Planning & Research (SPR) Financial Summary Sheet Federal Fiscal Year 2018

Program Period October 1, 2017 through September 30, 2018

SPR Part 1 - Planning, SPRY-0010(070)PL, JP# 01946(69)

A. Estimated Costs

SPR Part 1 - Planning	\$	8,791,639.00
Metropolitan Planning	\$	2,957,869.00
Total Estimated Costs	\$	11,749,508.00

B. Available Funds

SPR Part 1 Available Funds for FFY18	\$	10,102,370.00
PL Funding	\$	2,957,869.00
Local	\$	886,260.00
Total Available Funds	\$	13,946,499.00

C. Proposed Financing

Type	Federal	Rate	State	Local
SPR	\$8,791,639	80%	\$0.00	\$0.00
PL	\$2,957,869	80%	\$0.00	\$886,260

Total Proposed Financing JP 01946(69) \$ 8,791,639.00

SPR Part 2 - Research, SPRY-0010(071)RS, JP# 01946(70)

A. Estimated Costs

SPR Part 2 - Research	\$	4,109,000.00
Total Estimated Cost	\$	4,109,000.00

B. Available Federal Funds

SPR Part 2 Available Balance FFY 2018	\$	3,585,570.00
SPR Part 1 Available Balance (remainder from Part I)	\$	1,310,731.00
Total Available Funds	\$	4,896,301.00

C. Proposed Financing

Type	Federal	Ratio	State
SPR Part 2	\$4,109,000	80%	\$0.00

Total Proposed Financing JP 01946(70) \$4,109,000.00

SPR Part 1 & Part 2 Totals

Total SPR Available Balance	\$	13,687,940.00
Total Other Funds (PL, State, Local)	\$	3,844,129.00
Total Available Funding	\$	17,532,069.00
Total SPR Part 1 and Part 2		
Estimated Costs	\$	12,900,639.00

Total SPR Pooled Fund Commitments \$ 1,471,500.00

Total SPR Research Funding \$ 5,580,500.00

% of SPR Funds for Research 41%

Total LTAP \$ 285,685 SPR PT. 1; \$73,315 STATE; \$150,000 LTAP \$ 509,000.00

SP&R Part 1 Financial Summary Sheet

SP&R PART 1 - Planning, SPRY-0010(070)PL, JP# 01946(69)						
FEDERAL FISCAL YEAR 2018						
		PROGRAMMED				
GIS AND DATA MANAGEMENT		SP&R	State	PL	Local	Total
1101	Continuing Inventory Data Studies	\$700,000.00	\$0.00	\$0.00	\$0.00	\$700,000.00
1102	Highway Performance Monitoring System	\$102,000.00	\$0.00	\$0.00	\$0.00	\$102,000.00
1103	Geographical Information Management System for Transportation	\$875,000.00	\$109,048.00	\$0.00	\$0.00	\$984,048.00
TOTAL GIS AND DATA MANAGEMENT		\$1,677,000.00	\$109,048.00	\$0.00	\$0.00	\$1,786,048.00
TRAFFIC AND DATA COLLECTION						
1301	Coverage Count Program	\$680,000.00	\$0.00	\$0.00	\$0.00	\$680,000.00
1302	Permanent Traffic County Program	\$1,000,000.00	\$0.00	\$0.00	\$0.00	\$1,000,000.00
1304	Purchase of Traffic County Equipment	\$245,000.00	\$0.00	\$0.00	\$0.00	\$245,000.00
1305	Vehicle Classification Counting Program	\$580,000.00	\$0.00	\$0.00	\$0.00	\$580,000.00
1308	Traffic Monitoring System	\$360,000.00	\$0.00	\$0.00	\$0.00	\$360,000.00
1309	Traffic Analysis and Projections	\$183,000.00	\$0.00	\$0.00	\$0.00	\$183,000.00
1310	Skid Studies Program	\$100,000.00	\$0.00	\$0.00	\$0.00	\$100,000.00
TOTAL TRAFFIC AND DATA COLLECTION		\$3,148,000.00	\$0.00	\$0.00	\$0.00	\$3,148,000.00
ECONOMIC, SAFETY, AND FISCAL STUDIES						
1404	Safety Planning	\$3,000.00	\$0.00	\$0.00	\$0.00	\$3,000.00
1405	Motorcycle Safety and Education Program	\$50,000.00	\$0.00	\$0.00	\$0.00	\$50,000.00
1510	Justification Studies	\$20,000.00	\$0.00	\$0.00	\$0.00	\$20,000.00
TOTAL ECONOMIC, SAFETY, AND DATA COLLECTION		\$73,000.00	\$0.00	\$0.00	\$0.00	\$73,000.00
SYSTEMS AND PROGRAMS						
1601	Federal Aid Systems Coordination	\$85,000.00	\$0.00	\$0.00	\$0.00	\$85,000.00
1604	Pavement Management Systems	\$1,500,000.00	\$0.00	\$0.00	\$0.00	\$1,500,000.00
TOTAL SYSTEMS AND PROGRAMS		\$1,585,000.00	\$0.00	\$0.00	\$0.00	\$1,585,000.00
URBAN / REGIONAL TRANSPORTATION PLANNING						
1700	General Urban Transportation Planning Activities	\$10,000.00	\$0.00	\$0.00	\$0.00	\$10,000.00
1701	Oklahoma City Area Regional Transportation Study (OCARTS)	\$15,000.00	\$0.00	\$1,588,416.00	\$397,104.00	\$2,000,520.00
1702	Tulsa Metropolitan Area Transportation Study	\$15,000.00	\$0.00	\$1,130,327.00	\$282,581.00	\$1,427,908.00
1703	Lawton Metropolitan Area Transportation Study	\$15,000.00	\$0.00	\$217,402.00	\$43,480.00	\$270,882.00
1709	Ft.Smith Transportation Study	\$10,000.00	\$0.00	\$21,724.00	\$4,345.00	\$41,069.00
1710	Regional Transportation Planning	\$700,000.00	\$0.00	\$0.00	\$158,750.00	\$858,750.00
TOTAL URBAN TRANSPORTATION PLANNING		\$765,000.00	\$0.00	\$2,957,869.00	\$886,260.00	\$4,609,129.00
LONG RANGE PLAN / OTHER PLANNING ACTIVITIES						
1902	Statewide Long Range Transportation	\$10,000.00	\$0.00	\$0.00	\$0.00	\$10,000.00
1904	Air Quality Transportation Planning	\$15,000.00	\$0.00	\$0.00	\$0.00	\$15,000.00
1905	Freight Planning	\$435,000.00	\$0.00	\$0.00	\$0.00	\$435,000.00
1913	Bicycle & Pedestrian Planning	\$80,000.00	\$0.00	\$0.00	\$0.00	\$80,000.00
1914	Transportation Asset Management Plan	\$350,000.00	\$0.00	\$0.00	\$0.00	\$350,000.00
1915	Performance Measurement Coordination	\$400,000.00	\$0.00	\$0.00	\$0.00	\$400,000.00
1916	Oklahoma Archeological Survey GIS Digitization	\$253,639.00	\$0.00	\$0.00	\$0.00	\$253,639.00
TOTAL OTHER		\$1,543,639.00	\$0.00	\$0.00	\$0.00	\$1,543,639.00
GRAND TOTAL SPRY-0010(070)PL		\$8,791,639.00	\$109,048.00	\$2,957,869.00	\$886,260.00	\$12,744,816.00
LTAP Project TTY-LTAP (006) TT						
FEDERAL FISCAL YEAR 2018 JP # 30001(17)						
LOCAL TECHNICAL ASSISTANCE PROGRAM		SPR	State	PL	Federal	Total
1440	Local Technical Assistance Program	\$285,685.00	\$73,315.00	\$ 0.00	\$150,000.00	\$509,000.00
Total With LTAP Cost		\$9,077,324.00	\$182,363.00	\$2,957,869.00		\$13,253,816.00

1101 Continuing Inventory Data Studies

PURPOSE AND SCOPE: Catalogue physical characteristics of statewide public roads, which are used to update the Department's Oracle Spatial Road Inventory Database. Generate maps to conduct meetings with County Commissioners relating to inventory modifications. These are based on completed construction projects and County Action Reports. Use SQL queries, procedures and reports to extract inventory data to publish various mileage reports for state, federal and public needs. Maintain data for the National Network of Defense, NHS System, Control Section and Public Roads. Produce AVMT figures that will be used to calculate Annual Accident and Fatality Rates. Keep abreast of the latest technological advances through the attendance of seminars and conferences.

ACCOMPLISHMENTS DURING FFY 2017: The County Road inventory procedures were continued with thirteen field inventories completed: (Cherokee, Cleveland, Comanche, Haskell, Hughes, Kay, Kingfisher, Okmulgee, Osage, Payne, Pottawatomie, Tulsa and Woodward). Six counties were reassessed and updated: Cotton, Garfield, Haskell, Kingfisher, Lincoln and Marshall. Verified and processed all Highway Construction projects, Open to Traffic Reports, County Action Reports and Graphical Roadway Network (NLF) revisions. The following publications or reports were completed: 2017 Certification of County Road Mileage, 2016 Oklahoma Statewide Statistics Book, 2017 HPMS Report, Travel Summary Tables and 2017 Statewide Mileage Table Book. Completed modifications to the functional classification, and urban boundaries due to the 2010 census.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to code and update the Department's Central Database files. Incorporate technological advancements in data collection to streamline field inventory operations. Sixteen counties are scheduled to be inventoried: (Atoka, Beaver, Beckham, Bryan, Carter, Garvin, Grant, Harper, Johnston, Love, McClain, McIntosh, Muskogee, Ottawa, Pontotoc and Seminole.) Ten counties are scheduled to be reassessed and coded: Creek, Delaware, Grady, Murray, Okfuskee, Pawnee, Pittsburg, Rogers, Stephens and Wagoner. Continue monitoring all County Action Reports, Highway Construction projects and collecting HPMS data items. Use GPS technology to continue to identify traffic count sites in Oklahoma. Compile and publish various state and federal reports including: 2018 Certification of County Road Mileage, 2017 Oklahoma Statewide Statistics Book, 2018 HPMS Mileage and Travel Summary Tables.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$685,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$645,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$700,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Ron Maxwell, Inventory Branch Manager, 405-521-2728

1102 Highway Performance Monitoring System

PURPOSE AND SCOPE: To collect, process, and compile data and information as needed to prepare and submit an accurate and timely HPMS submission to the Federal Highway Administration (FHWA) according to the reporting requirements established.

ACCOMPLISHMENTS DURING FFY 2017: ODOT continued to update the existing web-based HPMS Console V2 to accommodate changes occurring to the new FHWA HPMS Version 8 software. Three (3) new validation constraints from the previous submittal year were added. Field review documents were produced for 30 sample sections with the primary vicinity located around the southwestern and northeastern regions of the state. The 2016 HPMS data submittal was completed. SQL statements were added to accommodate submitting IRI for the NHS system by a tenth of mile. Continue to update and verify sample items through field inspection, ODOT Video-Log, Google-Street view; Bing-StreetSide, etc. participated in numerous webinar's pertaining to HPMS, NPMRDS and FAST.

PROPOSED ACTIVITIES FOR FFY 2018: ODOT will continue to focus on data quality improvement and add more validation cross-checks to the console for a clean submittal. Visidata video log along with Google Earth and Street view will be used to verify and collect HPMS sample data. A HPMS sample adequacy review will be conducted and additional samples will be added in the appropriate categories. Any changes in the HPMS data structure and HPMS console interface as required by changing FHWA requirements will be implemented and tested. Field review documents will be generated and a HPMS data field review will be conducted in cooperation with the Local FHWA Division. The 2017 HPMS data submittal will be transmitted to FHWA using the HPMS Console V2 and the FHWA Version 8 web-based software.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$102,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$93,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$102,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Ron Maxwell, Inventory Branch Manager, 405-521-2728

1103 Geographical Information Management System for Transportation

PURPOSE AND SCOPE: To design, develop, implement and maintain a Geospatial Information Management System for Transportation (GIMS-T). The system supports transportation related decision making by producing high quality map products and reports generated from enterprise data as well as geospatial data management for various ODOT divisions. The maps convey specific topics of interest that require customer input and the use of complex GIS software. GIS services are offered to ODOT staff as well as customers outside the Department. The system utilizes aerial photography, GPS, and other sources of data. The efficient use of resources requires a considerable investment in hardware, software, and training for GIMS-T staff. New methods and software are continuously being investigated and tested in order to improve the effectiveness, efficiency, and usability of the Departments applications.

ACCOMPLISHMENTS DURING FFY 2017: Generated numerous custom maps and KML files, such as 8 Year Work Plan maps, MAP-21, Freight Plan & Environmental maps. Improved support to ODOT Map & Data Portals by providing the agency and the general public with a wide range of ODOT GIS data on desktop and mobile platforms. ROW digitization efforts continued. Provided geospatial data management and visualization services for numerous ODOT divisions. Products provided to Senior Staff, Division Field Engineers and others. Conducted GIS training sessions and developed training material for various Department employees. County & City Maps converted to GIS and automated as a more modern way of production. Map activities were previously contained within Item 1201 and are now accomplished with this item.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to expand the Map & Data Portal, including the ROW digitization adding additional roadways. Convert State Map, Bike Map, and Rail Map to GIS include other map products where appropriate. Support ODOT personnel, other state agencies and partners with maps for transportation needs. Coordinate with the Environmental, ROW, Rail, Outdoor Advertising, Facilities, Project Management, and Traffic Engineering Divisions to identify needs and develop solutions that will enable them to efficiently and accurately perform their individual missions. Purchase and implement HPMS automation software as part of Roads & Highways Implementation. Publish State Map (2nd printing).

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$350,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$325,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$875,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Jeremy Planteen, Branch Manager II Phone: 405-521-2729

1201 County, City and Other Planning Maps

PURPOSE AND SCOPE: The purpose and scope of the Cartographic Design Section is to produce County and City maps showing the most current, reliable, and accurate information for roads, hydrography, street names, and city limits and historical boundaries with symbology for man-made culture and natural features. The CADD maps are implemented using Microstation V8i software, allowing integration into most GIS database line work. All County and City maps denote 2010 US Census populations. Individual map design features are available in DGN format to facilitate CADD uses or as reference files for our GIS projects. Special purpose planning maps and supporting graphics provided to Strategic Asset & Performance Management Division.

ACCOMPLISHMENTS DURING FFY 2017: Several county and city maps were completed. Full-size printable PDF map files are free to the general public and government agencies via our website at: <http://www.okladot.state.ok.us/maps/index.htm>. Page links are listed under Oklahoma's General County Roads and Oklahoma's Incorporated City Maps.

PROPOSED ACTIVITIES FOR FFY 2018: Due to organizational restructuring, this item is combined with Item 1103 (Geographical Information Management System for Transportation).

County & City Maps converted to GIS and automated as a more modern way of production.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$324,500	SPR	\$109,048	STATE
Estimated Cost FFY 2017	\$200,000	SPR	\$109,048	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Jeremy Planteen, Branch Manager II, 405-521-2729

1301 Coverage Count Program

PURPOSE AND SCOPE: To collect traffic data on state highways, interstates and the National Functional Classified System for establishing average daily traffic volumes. Approximately 3,300 short duration locations are counted on the highway system and 11,700 on the secondary system, which includes the county road coverage and urban city street coverage in cities populations over 5,000. State highway and interstate locations are counted on a three-year cycle along with the county and city system coverage. Counts collected on the highway system are incorporated into an Annual Average Daily Traffic (AADT) map published annually for distribution. Counts collected on the county and city system are recorded and retained for office use. Highway traffic maps are published for public distribution.

ACCOMPLISHMENTS DURING FFY 2017: Short duration traffic counts were completed on the state highway system, county off-system and small urban system in 27 counties scheduled for FFY 2017. Continuous updating of the GPS coordinates and site characteristics for all traffic count sites on all systems was performed. A project to completely overhaul the Oklahoma Traffic Count Information System Web Page is progressing and nearing completion.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to analyze all road systems for areas where coverage is deficient, establish new count locations as needed, and retire locations that are no longer needed. Collect short duration traffic counts on the state highway system, county off-system, and small urban system in 25 counties scheduled for FFY 2018. Update GPS coordinates and site characteristics for all traffic count sites on all systems as needed. Consideration will be given for initiating a new Short Duration Traffic Count Contract for the collection of traffic counts in the Cleveland County, Comanche County, Oklahoma County and Tulsa County areas, as well as, any additional counts deemed necessary. A new enhanced version of the Oklahoma Traffic Count Information System Web Page will be produced, which will include enhanced maps and report printing. A new technology for collecting and transmitting short term counts will be implemented. This will enhance the efficiency and accuracy of the traffic counts going into the traffic count database. Attend seminars, conferences, and workshops to keep abreast of the latest technological advances in traffic counting equipment and data collection processes.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$700,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$545,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$680,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1302 Permanent Traffic Count Program

PURPOSE AND SCOPE: To collect hourly and 15 minute increment traffic data by lane for traffic monitoring design needs. There are 72 Automatic Vehicle Classification (AVC) station locations and 24 Weigh-in-Motion (WIM) station locations in Oklahoma. The traffic data obtained are the basis for seasonal and axle factor variation as recommended for traffic monitoring in FHWA's Traffic Monitoring Guide. The Oklahoma Traffic Statistics Report is generated from the data collected at these sites.

ACCOMPLISHMENTS DURING FFY 2017: The Traffic Monitoring Systems (TMS) Operations and Maintenance Services are provided through two contracts, the TMS Data Collection Contract and the TMS Site Repair Contract. The contractor provided enhanced services and expertise, particularly in the area of data collection, systems validation and TMS site repair. The TMS site operational rate experienced a marked increase. Additionally, improved systems diagnostics and trend analysis provided by contract data systems experts have resulted in a much needed systems approach towards operations and maintenance support as evident in the detailed construction and renovation project coordination executed during this period. The scope of work to be accomplished during FFY 2017 included renovation of twenty-five (25) existing sites (5 WIM and 20 AVC). Site visits to carry out routine maintenance and equipment testing were completed at all 96 AVC/WIM sites this year. Twenty-three WIM sites were converted to AVC sites by September 30, 2017.

PROPOSED ACTIVITIES FOR FFY 2018: The TMS Data Collection Contract will continue to improve data collection efficiency. The TMS Site Repair Contract will commence with ongoing repair and replacement construction projects identified and planned during FY 2017. Both of these contracts will be renewed in FFY 2018. Execute scheduled maintenance for up to 96 sites. Site renovations and repairs were completed to an estimated 30 permanent sites.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$775,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$715,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$1,000,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1304 Purchase of Traffic Counting Equipment

PURPOSE AND SCOPE: To improve the efficiency of the traffic counting operation by systematic replacement of older outdated equipment and stolen or damaged equipment as well as support of increased equipment requirements resulting from expanded operations.

ACCOMPLISHMENTS DURING FFY 2017: Equipment purchases executed in FFY 2017 continued to support on-going projects in traffic monitoring systems operations in both permanent sites and short-duration count site locations.

PROPOSED ACTIVITIES FOR FFY 2018: The proposed construction of new traffic monitoring stations, replacement of old equipment comprises the majority of the expenditure requirement for FFY 2018. As older, outdated data recorders become uneconomically repairable and obsolete, timely replacement becomes vital to maintaining data integrity and continuity of operations in the permanent traffic monitoring stations and particularly the short duration count program which depends on hardware availability and continuous replacement of road tubes and accessories.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$190,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$245,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$245,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1305 Vehicle Classification Counting Program

PURPOSE AND SCOPE: To gather vehicle classification data and develop estimates of the composition of traffic on the various Functional Classifications of roadways in the state and to collect complex traffic data required for planning, traffic, and design studies. Data gathered and used to facilitate these studies includes machine counts, vehicle classification counts, and turning movement studies with pedestrian and bicycle counts.

ACCOMPLISHMENTS DURING FFY 2017: Vehicle classification data collection continued at the short term sites in support of the traffic analyst's effort in the development of updated annual average truck volumes. The vehicle classification counting program for FFY 2017 cycle 3 was completed by contract with STS (Southern Traffic Services) for collection of all classification data statewide including multi-lane urban, multi-lane rural, and 2-lane highway sites. Special studies were conducted throughout the year providing timely data for traffic engineers, planners, and designers in the department's central office divisions as well as for traffic engineers, construction and maintenance managers in the eight field divisions.

PROPOSED ACTIVITIES FOR FFY 2018: The vehicle classification counting program for FY 2018 will be completed by STS (Southern Traffic Services). STS will be collecting cycle 1 classification data statewide including multi-lane urban, multi-lane rural and 2-lane highway sites. During FFY 2018, various special studies will be conducted throughout the year providing timely data for traffic engineers, planners and designers in the department's central office division as well as for traffic engineers, construction, and maintenance managers in the eight field divisions. Continue to provide resources to fulfill the requests for various types of traffic studies and produce all reports associated with those studies.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$570,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$560,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$580,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1306 Weigh-in-Motion Program

PURPOSE AND SCOPE: To collect and conduct preliminary analysis of data describing vehicle characteristics and vehicle weight trends. The Department uses this data as an intricate part of the Traffic Monitoring System. These data collection systems provide axle weight factors used in design and pavement management studies and to fulfill FHWA requirements for the Strategic Highway Research Program (SHRP) and the Long Term Pavement Performance (LTPP) program. The Department operates 24 permanent weigh in motion (WIM) data collection sites and 72 Automatic Vehicle Classifier (AVC) sites located throughout the state.

ACCOMPLISHMENTS DURING FFY 2017: The progress made in the TMS Data Collection contract resulted in the collection of monthly data from 72 AVC and 24 WIM sites. The contractor is continuing efforts to develop data validation software using historical data. The contract also provides ongoing support for the digital wireless communication network. The wireless network conversions continue to improve the speed and dependability of traffic data transfers as compared to land line telephone service. The contractor provided traffic data transfers to an IP address on the internet which allowed import into the department's Traffic Operations and Planning Software database. The contractors are improving software to remotely program and configure traffic data recorders. The TMS Repair contract provided ongoing, essential repairs/replacements of defective sensors, and equipment to maintain operational efficiency. The contractor continues to operate the Virtual Weigh Station (WIM 33) at Purcell, Oklahoma. It is anticipated that ODOT will convert 23 existing WIM sites to AVC sites by September 30, 2017.

PROPOSED ACTIVITIES FOR FFY 2018: All WIM sites are scheduled to be converted to AVC sites by the end of FFY 2017 and ODOT will cease collecting weight data and only collect volume & class from the WIM site locations in FFY2018. The reporting of this data will be collected through 1302 The Permanent Traffic Count Program.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$360,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$335,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1308 Traffic Monitoring System

PURPOSE AND SCOPE: The purpose of Oklahoma Traffic Monitoring System (TMS) is to manage, estimate, report, and publish traffic data estimates, including data from public and private non-state government entities, as specified in the Highway Performance Monitoring System and FHWA's Traffic Monitoring Guide. TMS is comprehensive statewide traffic data gathering, editing, and reporting system created to fulfill the requirements of the Safe, Accountable, Flexible, and Efficient Transportation Equity Act-A Legacy for Users (SAFETEA-LU) and the subsequent MAP-21 and FAST Act legislation.

ACCOMPLISHMENTS DURING FFY 2017: All FHWA Traffic Submittals for 2016 HPMS were completed May of 2017. Annual AADT processing including continuous counter analysis and annualized factor generation was completed for the traffic year 2016. Most data processing has been reformatted, warehoused, and automated in the Oracle system. The traffic count data was checked for accuracy along with the correction of count site placement in the Highway Inventory File. 2016 AADT, Peak Hour, Truck estimates, and Forecast AADTs were updated on existing HPMS Sample locations. 2016 Truck counts from contract, state forces, and the Oklahoma Turnpike Authority were also used to update the 2016 NHS Truck System. Cycle 2 statewide vehicle classification counts were completed by Southern Traffic Services. The annual publication of the 2016 AADT Map job task was transferred to GIS Branch. The 2016 Oklahoma Traffic Characteristics Report was initiated. The new statewide ramp system was partially estimated to 2016 AADTs. A count site inventory database was created to manage and report collected data. The 2016 AADT updates for the RFC system were completed, along with most of the small urban systems.

PROPOSED ACTIVITIES FOR FFY 2018: The Vehicle Classification Contract will continue monitoring activities, revise and streamline the process of recording, and compile short term counts, and produce seasonal and axle factors for AADT estimation in the HPMS System. Additional software will be added as needed to perfume accurate data reporting. Continue to develop programming for an automated estimation process for statewide AADTs. Keep personnel informed of technological advances through attendance of seminars, conferences, and workshops.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$360,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$340,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$360,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Daryl Johnson, P.E., 405-522-6376

1309 Traffic Analysis and Projections

PURPOSE AND SCOPE: To provide traffic forecasts for geometric and structural design of new highways, roadway planning functions, roadway maintenance, and improvement of existing highways. The existing or assigned traffic volumes are projected twenty (20) years into the future for design and operational analysis purposes. Design Hourly Volume (DHV) of the Annual Average Daily Traffic (AADT), percent of trucks of the AADT and DHV, and the percent of heavy trucks (of AADT) are prepared for each request of design traffic information. Writing specifications, review and correction, and approval of consultant engineering contract Design Traffic Projects and Research Projects are performed as needed.

ACCOMPLISHMENTS DURING FFY 2017: Design traffic was furnished to the city and county governments, design and environmental consultants, and various divisions within ODOT. Information prepared for the larger population areas was based on site specific, special traffic counting, and regional transportation studies in those cities. Traffic Growth for urban, rural communities and small cities was prepared utilizing a linear regression model, using historical data. Forecasts also consider delay/capacity, population trends, employment, and development plans. Approximately 113 requests for design traffic were completed. Several engineering contract consultant design traffic analyses were overseen, edited, and approved at some level of completion. The Oklahoma Vehicle Classification Accuracy Research project was completed. A Research project for NPMRDS, speed data, analysis, and error identification has been initiated and is underway.

PROPOSED ACTIVITIES FOR FFY 2018: Design traffic data will continue to be furnished for cities, counties, and to ODOT divisions upon approved requests. Consultant Design Projects will be overseen through completion. Traffic analysis and projections will be completed, as requested for all programmed planning, construction, and maintenance projects. Remain informed of technological advances through attendance of seminars, conferences, and workshops.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$183,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$180,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$183,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Daryl Johnson, P.E., 405-522-6376

1310 Skid Studies Program

PURPOSE AND SCOPE: To assess skid resistance for pavement surfaces of Oklahoma's highway system in accordance with the guidelines of the Highway Safety Improvement Program and ASTM standards. The scope of the program includes scheduled testing of all roadways comprising the National Highway System in a three-year test cycle. This also includes the annual testing of all interstate highways and the Strategic Highway Research Program (SHRP) sites. Conduct special skid resistance testing as requested.

ACCOMPLISHMENTS DURING FFY 2017: The annual test cycle for FFY 2017 encompassed pavement friction testing of US 69 and all Interstates. FFY 17 testing cycle totaled 1,800 miles. Skid testing & data collection began in April of 2017 and completion is expected by September 30, 2017.

PROPOSED ACTIVITIES FOR FFY 2018: The FFY18 test cycle encompasses US 69 and all interstates, to be completed by the fall of 2018. Calibration of the skid testing equipment is done on a biannual basis and will be scheduled for (fall/2018) FFY 2019.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$175,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$160,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$100,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Aaron Fridrich, Transportation Manager II, 405-636-4180 ext. 221

1404 Safety Planning

PURPOSE AND SCOPE: The project scope is designed to address transportation safety in the implementation of Statewide Long Range Transportation Plan (LRTP) and to ensure compatibility with the Strategic Highway Safety Plan.

ACCOMPLISHMENTS DURING FFY 2017: Provided review of projects and programs to ensure consistency with the LRTP and inclusion in the STIP, as requested. Coordinated with ODOT Traffic Engineering Division in development of safety performance measures. Collaborated with ODOT Traffic Engineering Division in implementation and update of Oklahoma's Strategic Highway Safety Plan in accordance with MAP-21 and the FAST Act.

PROPOSED ACTIVITIES FOR FFY 2018: Provide review of projects and programs to ensure consistency with the LRTP and inclusion in the STIP, as requested. Collaborate with ODOT Traffic Engineering Division in implementation of Oklahoma's Strategic Highway Safety Plan.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$3,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$2,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$3,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1405 Motorcycle Safety & Education Program

PURPOSE AND SCOPE: The statewide motorcycle safety and education program seeks to reduce motorcycle crashes that result in fatalities and injuries. The program focuses on educating motorcyclists about safe riding habits and techniques to prevent crashes. The Oklahoma Highway Patrol (OHP), in coordination with the ODOT Traffic Engineering Division's Collision Analysis & Safety Branch, conducts motorcycle safety course and participates in education, outreach, and public awareness activities as a means of improving motorcycle user safety on the public roadways.

ACCOMPLISHMENTS DURING FFY 2017: The Oklahoma Highway Patrol, in partnership with ODOT, continued implementation of a statewide motorcycle safety and education program. The program included classroom and experiential educational training and public outreach events. An annual report of completed training is given to ODOT each fiscal ending year.

PROPOSED ACTIVITIES FOR FFY 2018: The Oklahoma Highway Patrol, in partnership with ODOT, will continue implementation of the statewide motorcycle safety and education program. The program will include classroom and experiential educational training and public outreach and awareness. OHP will use ODOT collision data to examine program effectiveness and use variables such as age, locations, types of crash etc., to further refine program strategies.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$99,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$75,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$50,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Ginger McGovern, Engineering Manager, 405-521-2867

1440 Local Technical Assistance Program

PURPOSE AND SCOPE: The Local Technical Assistance Program (LTAP) is an education program contracted through Oklahoma State University's Center for Local Government Technology (CLGT) to provide training and technical assistance to county, municipal, and tribal governments responsible for the planning, maintenance, and construction of transportation systems at the local level. This is accomplished by (1) conducting classes, workshops, conferences, seminars, and other training opportunities; (2) providing on-site technical assistance; (3) maintaining a lending library of publications, videotapes, DVDs, and other technology resource documents; (4) providing information and technical assistance on new and existing technologies; (5) coordinating with faculty and staff at OSU, ODOT, FHWA, and within industry to provide technical expertise and support; (6) providing a website and list-serve; (7) maintaining a database of rural, local, and state transportation officials and other resources in Oklahoma and nationwide; and (8) working collaborative with CLGT's Southern Plains Tribal Technical Assistance Program (SPTTAP) and Transportation Intern Program (TIP).

ACCOMPLISHMENTS DURING FFY 2017: Conducted 221 training sessions to 4,495 individuals for a total of 30,911 training hours; awarded Roads Scholar Completion Certificates; conducted the annual LTAP Advisory Meeting and developed and conducted new training courses as requested; conducted training in the FHWA focus areas of Roadway Safety, Worker Safety, Work Zone Safety, Infrastructure Management, and Workforce Development; conducted FHWA Every Day Counts webinars and associated supplementary training; conducted seminars in conjunction with industry professionals on emerging technologies; maintained the LTAP website and list-serve; published various books, plans and DVDs for distribution; served as chapter headquarters for the American Public Works Association Oklahoma chapter and planned and conducted their annual conference; coordinated training activities with CLGT's Southern Plains TTAP; coordinated activities with CLGT's Transportation Intern Program to include those promoting the use of GIS/GPS technologies; attended various association and professional meetings to include the Association of County Commissioners of Oklahoma, County Officers and Deputies Association, Oklahoma Municipal League, National LTAP Association and LTAP Region VI Meeting; provided program progress reports to ODOT and FHWA.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to develop activities to facilitate the implementation of FHWA's Every Day Counts initiatives; continue the Roads Scholar curriculum in conducting at least two of each course offering during the fiscal year; participate in Association of County Commissioners of Oklahoma, County Officers and Deputies Association, Oklahoma Municipal League, National LTAP Association and LTAP Region VI meetings and conferences; continue to teach and develop courses in the FHWA focus areas of Roadway Safety, Worker Safety, Work Zone Safety, Infrastructure Management, and Workforce Development; continue to serve as the state office of the Oklahoma Chapter of APWA; continue to implement principals taught in LTAP courses through the projects conducted by students assisting agencies through the Transportation Intern Program; serve on various local and national committees; provide technical assistance as requested; continue to provide website, list-serve, books, plans, tapes, DVD's, etc. for distribution; conduct LTAP Advisory Meeting and develop requested activities where possible; provide program progress reports to ODOT and FHWA.

Continued on next page.

1440 Local Technical Assistance Program (Continued)

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$211,427	SPR	\$80,108	STATE	\$282,675	FHWA
Estimated Cost FFY 2017	\$211,000	SPR	\$67,325	STATE	\$258,888	FHWA
Projected Cost FFY 2018	\$285,685	SPR	\$73,315	STATE	\$150,000	FHWA

CONTACT INFORMATION

Bryan Cooper, Transportation Manager, 405-636-4199

1510 Justification Studies

PURPOSE AND SCOPE: To study the economic, environmental and other effects of design features of roadway improvements such as interchanges, grade separations, by-passes, utility structures, pedestrian structures, etc., for the purpose of determining the economic and engineering feasibility of such proposals.

ACCOMPLISHMENTS DURING FFY 2017: Reviewed consultant studies as needed.

PROPOSED ACTIVITIES FOR FFY 2018: Consultant studies will be overseen as needed. Keep informed of technological advances through attendance of seminars, conferences, and workshops.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$20,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$20,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Daryl Johnson, P.E., 405-522-6376

1601 Federal-Aid Systems Coordination

PURPOSE AND SCOPE: To coordinate the States Highway System, Federal-Aid Highway System, National Highway System, and the Functional Classification System in Oklahoma. Coordinate all highway and roadway classification revisions pertaining to these systems. To record, maintain research, and provide any documents and historical data relating or pertaining to these systems. To communicate, inform, and coordinate with city, county, state, and federal officials regarding these systems.

ACCOMPLISHMENTS DURING FFY 2017: All Functional Classification System revisions based on the 2010 census were recorded to the appropriate data base. New Urban and Rural Functional Classification System Books were published with all updated revisions made since 2012. Three Functional Classification Revisions were approved by the FHWA located within Mayes and Choctaw Counties. Additionally, many ENHS revisions were approved by the FHWA within the Oklahoma City Urbanized Area and around the State of Oklahoma.

PROPOSED ACTIVITIES FOR FFY 2018: Provide coordination of State Highway and Functional Class revisions with the ODOT Central Office, Division Engineers, FHWA and appropriate local, state and federal officials. Three Functional Classification revisions are awaiting FHWA approval in Dewey County and numerous highway revisions will be presented to the State Transportation Commission for approval within the Federal Fiscal Year.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$ 85,500	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$ 85,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$ 85,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1603 Highway Needs Study

PURPOSE AND SCOPE: To estimate the current and future needs of the State Highway System. To produce a statewide annual condition and needs report showing the investment needed to eliminate all poor roadways on the State Highway System over a twenty-year period. To maintain a database indicating ratings for roadways and bridges along with suggested improvements and costs. To produce analyzed data for inclusion in the Highway Performance Monitoring System.

ACCOMPLISHMENTS DURING FFY 2017: Compiled field data for the 2017 Field Division Notebooks. Compile maintenance and construction costs for the statewide annual condition and needs report. Produced a statewide annual condition and needs report showing the investment needed to eliminate all poor roadways on the State Highway System over a twenty-year period. Documented current processes and evaluated strategies to improve reporting process. Produced analyzed data for inclusion in the Highway Performance Monitoring System.

PROPOSED ACTIVITIES FOR FFY 2018: Due to organizational restructuring, this item has been combined with item 1604 (Pavement Management System).

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$369,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$218,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Angel Gonzalez, Pavement Management Engineer, 405-522-5904

1604 Pavement Management System

PURPOSE AND SCOPE: To develop and implement the Department's Pavement Management System. To maintain a computer database of pavement distresses and other roadway characteristics used for the analysis of pavement condition and performance. Maintain application software necessary to analyze roadway information for pavement management. Supply data for inclusion in the Highway Performance Monitoring System (HPMS). Estimate the current and future needs of the State Highway System by producing a statewide annual condition and needs report. Maintain a database indicating ratings for roadways and bridges with suggested improvements and costs.

ACCOMPLISHMENTS DURING FFY 2017: Performed Pavement Management System analysis of the National Highway System (NHS) and the State Highway System (SHS) in Oklahoma. Continue implementation of analysis software upgrade. Treatment costs and triggers were updated. Technical support for the video log software was provided. Data collection on all NHS routes, including Turnpike routes on the NHS, and all SHS routes. Attended the Transportation Research Board Annual Meeting in Washington, D.C. as well as webinars and workshops to keep informed of the latest technological advances and practices. Documented current processes and evaluated strategies to improve analysis processes. HPMS reporting was updated in Oracle database. Integration analysis of software for pavement surface and geometric conditions was completed. Historical data analysis was compiled and added into the Pavement Management System. Upgraded 3P guidelines incorporating additional pavement preservation treatments.

PROPOSED ACTIVITIES FOR FFY 2018: Perform Pavement Management System analysis of the NHS and SHS in Oklahoma. Continue implementation of analysis software upgrade for deterioration curves, pavement strategies, and project optimization. Provide technical support for the video log software. Perform data collection on all NHS routes and all SHS routes maintained by the Department, as well as all non-highway samples required for HPMS. Keep informed of the latest technological advances and practices by attending the Transportation Research Board Annual meeting in Washington, D.C. as well as webinars and workshops.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$1,130,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$954,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$1,500,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Angel Gonzalez, Pavement Management Engineer, 405-522-5904

1700 General Urban Transportation Planning

PURPOSE AND SCOPE: This item includes coordinating with staff in the Strategic Asset and Performance Management and various other ODOT Divisions which cannot be ascribed to specific transportation studies contained in the unified planning work programs of the SPR work program. Provide linkage between transportation planning and project development, environmental review, and other topics as needed.

ACCOMPLISHMENTS DURING FFY 2017: Provided coordination with ODOT Central Office, Field Divisions and local, state and federal officials. Shared pertinent planning data and information as needed. Provided technical assistance concerning transportation planning and the FAST Act. Attended workshops, seminars, and conferences related to transportation planning, freight, and statewide transportation planning.

PROPOSED ACTIVITIES FOR FFY 2018: Provide coordination with ODOT Central Office, Field Divisions and local, state and federal officials. Disseminate pertinent planning data and information as needed. Provide technical assistance as requested concerning transportation planning and the FAST Act. Pursue professional enrichment through attendance at workshops, seminars and conferences.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$10,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$9,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$10,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1701 Oklahoma City Area Regional Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Association of Central Oklahoma Governments (ACOG) in the execution of the Unified Planning Work Program (UPWP), Transportation Improvement Program (TIP), and Long Range Transportation Planning (LRTP) for the Oklahoma City Area Regional Transportation Study Area (OCARTS).

ACCOMPLISHMENTS DURING FFY 2017: Transportation planning for the OCARTS Area was carried out as described in the FFY 2017 Unified Planning Work Program (UPWP). Accomplishments during FY 2017 included: preparation and finalization of the FY 2018 UPWP was completed; the Transportation Improvement Program (TIP) for FFY 2018-2021 was developed and adopted; the 2040 OCARTS Metropolitan Transportation Plan (MTP), known, as Encompass 2040, was adopted; prioritized list of improvements consistent with Encompass 2040; final adoption of the 2016 Congestion Management Process; final adoption of OCARTS area performance measures and tracking processes; selection of FFY 2015-2020 Transportation Alternatives Program (TAP) projects; continuation of Regional Transit Dialogue and Regional Transit Authority Task Force activities; continued coordination with local governments regarding federal transportation funding opportunities; air quality planning and compliance with the federal transportation law; completion of the 2016 FHWA and FTA quadrennial certification review.

PROPOSED ACTIVITIES FOR FFY 2018: Implement the 2040 Oklahoma City Area Regional Transportation Study (OCARTS) Plan, entitled Encompass 2040. An emphasis will be placed on financial feasibility, public involvement, consideration of social, economic and environmental impacts of transportation decisions, and performance-based planning. Long Range Planning including major streets and highways; Short Range Planning and coordination; analyze data on regional employment and growth; promote the use of alternative forms of transportation; analyze socioeconomic and land use data in relation to land development; maintain the geographic information system (GIS) for integrated analysis; track Encompass 2040 performance measures; implementation of a transportation project tracking system; preparation for the 2045 long-range metropolitan transportation plan; continue work with air quality, ozone reduction and environmental programs.

FINANCIALS	Amount	Fund	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$15,000	SPR	\$2,061,220	PL	\$ 515,305	LOCAL
Estimated Cost FFY 2017	\$15,000	SPR	\$2,061,220	PL	\$ 515,305	LOCAL
Estimated Cost FFY 2018	\$15,000	SPR	\$1,588,416	PL	\$ 397,104	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1702 Tulsa Metropolitan Area Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Indian Nations Council of Governments (INCOG) in the execution of the Unified Planning Work Program (UPWP), Transportation Improvement Program (TIP), and Long Range Transportation Planning (LRTP) for the Tulsa Metropolitan Area Transportation Study Area (TMATS).

ACCOMPLISHMENTS DURING FFY 2017: Transportation planning for the Tulsa TMA was carried out as described in the FFY 2017 Unified Planning Work Program (UPWP). Accomplishments during FFY 2017 included: preparation and finalization of the FFY 2018 UPWP was completed; the Transportation Improvement Program (TIP) for FFY 2015-2018 was monitored and maintained; the Long Range Transportation Plan (LRTP) Connections 2035, adopted on December 13, 2012, was monitored and maintained; continued the coordination of the Ozone Alert! Green Traveler Alternative programs; continued to identify the needs of the elderly, disabled, low-income households and under-represented citizens through the Coordinated Public Transit Human Services Transportation Plan; secured funding for the phase II of the grant to expand access to transportation services for Veterans through the FTA funded Veterans Transportation Community Living Initiative.

PROPOSED ACTIVITIES FOR FFY 2018: Complete the update of the Metropolitan Transportation Plan, Connections 2045; data collection and monitoring of social, economic, environmental and transportation system data; Long Range Planning including major streets and highways; Short Range Planning and coordination; Regional Trails, Bicycle and Pedestrian Master Plan (The GO Plan) for future long range transportation development; develop the Transportation Improvement Program for FFY 2018-2021; continue to coordinate the OZONE ALERT! Program, Clean Cities Program and the Transportation Resource Center; update the Congestion Management Process as part of the 2045 Regional Transportation Plan; continue assisting member governments in the planning, funding and implementation of a regional bicycle and pedestrian system; address transportation needs of the disabled, elderly and low income households; continue the implementation of the Transportation Alternatives (TA) program.

FINANCIALS	Amount	Fund	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$15,000	SPR	\$ 1,230,000	PL	\$ 307,500	LOCAL
Estimated Cost FFY 2017	\$15,000	SPR	\$ 1,230,000	PL	\$ 307,500	LOCAL
Estimated Cost FFY 2018	\$15,000	SPR	\$ 1,130,327	PL	\$ 282,581	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1703 Lawton Metropolitan Area Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Lawton Metropolitan Planning Organization (LMPO) in the Lawton Metropolitan area.

ACCOMPLISHMENTS DURING FFY 2017: Transportation planning for the Lawton Metropolitan Planning Area was carried out as described in the FFY 2017 Unified Planning Work Program (UPWP). Accomplishments during FFY 2017 included: preparation and finalization of the FFY 2018 UPWP was completed; the FFY 2017 Agreement was executed and authorization to expend federal funds effective July 1, 2016 through June 30, 2017 was granted by FHWA; published the Annual Listing of Obligated Projects; preparation of the annual transportation planning funding documents; continued work of a feasibility study to provide a freight route to the Lawton Industrial Park from Interstate 44; continued the air quality education program in cooperation with local media and the Lawton Metropolitan Area Air Quality Committee.

PROPOSED ACTIVITIES FOR FFY 2018: As defined in the UPWP; Analyze pedestrian facilities, assessing safety and condition, and evaluating if compliant with ADA; Continue development of conceptual design for freight route connecting US 62 to the West Industrial Park; Identify streets exceeding Level of Service D using the 2014 traffic counts; identify priority corridors where access management techniques can improve traffic flow and safety; continue research of right-of-way widths of all streets and create map; hire a consultant to perform travel demand model forecasting for update of the Metropolitan Transportation Plan (MTP). Establish performance measure targets; continue bus route study and hire consultant to prepare design concept of multi-modal transportation transfer center and hubs; research grant opportunities for bus transfer center; prepare FFY 2018-2021 Transportation Improvement Program (TIP); continue the public awareness campaign for air quality; and continue the bicycle safety education campaign.

FINANCIALS	Amount	Fund	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$15,000	SPR	\$ 193,136	PL	\$ 38,627	LOCAL
Estimated Cost FFY 2017	\$15,000	SPR	\$ 193,136	PL	\$ 38,627	LOCAL
Estimated Cost FFY 2018	\$10,000	SPR	\$ 217,402	PL	\$ 43,480	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1709 Ft. Smith Transportation Study

PURPOSE AND SCOPE: Assist and oversee transportation planning processes and coordination with the Frontier Metropolitan Planning Organization in the Ft. Smith Metropolitan Area.

ACCOMPLISHMENTS DURING FFY 2017: Transportation planning for the Frontier Metropolitan Planning Area was carried out as described in the FFY 2017 Unified Planning Work Program (UPWP). Accomplishments during FFY 2017 included publishing the Annual Listing of Obligated Projects; data collection and monitoring of social, economic and transportation system data, preparation of the annual transportation planning funding documents and maintenance and update of the Frontier MPO website; development of the 2040 Metropolitan Transportation Plan (MTP).

PROPOSED ACTIVITIES FOR FFY 2018: The Oklahoma Department of Transportation will continue coordination with the Frontier Metropolitan Planning Organization and the Arkansas Department of Transportation (ARDOT) in maintaining the 3-C planning process in the Fort Smith area. Monitor the transportation planning process for compliance with administrative, financial and legal requirements for maintaining a continuous, cooperative and comprehensive process. Continue staff education, training and attendance at workshops and seminars.

FINANCIALS	Amount	Fund	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$10,000	SPR	\$36,000	PL	\$7,200	LOCAL
Estimated Cost FFY 2017	\$10,000	SPR	\$36,000	PL	\$7,200	LOCAL
Estimated Cost FFY 2018	\$15,000	SPR	\$21,724	PL	\$4,345	LOCAL

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1710 Regional Transportation Planning

PURPOSE AND SCOPE: To provide transportation planning assistance for the non-metropolitan areas of the State thru the Oklahoma Association of Regional Councils (OARC). The rural transportation program will assist ODOT in meeting Federal and State requirements for the Statewide Planning Process to address the transportation needs in non-metropolitan areas. Develop and provide ongoing public participation for the transportation planning process.

ACCOMPLISHMENTS DURING FFY 2017: Transportation planning for the four pilot Regional Transportation Planning Organization (RTPO) regions was carried out as described in the RTPOs FFY 2017 Planning Work Program (PWP). Accomplishments during FFY 2017 included data collection and monitoring of social, economic, and transportation system data preparation and maintenance of the annual transportation planning funding documents and update of the RTPO websites; SORTPO completed three county Long Range Transportation Plans (LRTP) and completed socioeconomic and demographic data collection in four other counties; NORTPO completed two county LRTP; CORTPO completed three county LRTP and completed socioeconomic and demographic data collection for one other county; Grand Gateway RTPO completed one county LRTP.

PROPOSED ACTIVITIES FOR FFY 2018: The Oklahoma Department of Transportation will continue coordination with the pilot RTPOs in maintaining the 3-C planning process in non-metropolitan areas. Monitor the transportation planning process for compliance with administrative, financial, and legal requirements for maintaining a continuous, cooperative, and comprehensive process. Continue staff education, training, and attendance at workshops and seminars; data collection and monitoring of social, economic, environmental and transportation system data; development and maintenance of the Geospatial Information System; continued development of other counties Long Range Transportation Plans; begin updating and compiling data collected from each county plan, per RTPO region, for the development of a Regional Long Range Transportation Plan.

FFY 2018 Pilot RTPOs	Amount	Fund	Amount	Fund
Central Oklahoma Economic Development District	\$125,000	SPR	\$31,250	LOCAL
Grand Gateway Economic Development District	\$125,000	SPR	\$31,250	LOCAL
Northern Oklahoma Development Authority	\$125,000	SPR	\$31,250	LOCAL
Southwestern Oklahoma Development Authority & Association of South Central Oklahoma Governments	\$260,000	SPR	\$65,000	LOCAL

FINANCIALS

Programmed Amount FFY 2017	\$500,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$500,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$700,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1902 Statewide Long Range Transportation Planning

PURPOSE AND SCOPE: To maintain the Oklahoma Long Range Transportation Plan (LRTP) and other associated statewide planning activities in accordance with the provisions of federal law.

ACCOMPLISHMENTS DURING FFY 2017: Finalized approval and publication of 2015-2040 Oklahoma Long Range Transportation Plan, and coordinated with the Metropolitan Planning Organizations (MPOs) and local governments in relation to long range transportation plans. Provided assistance to ODOT project development activities as needed in relation to project consistency with LRTP policies. Provided assistance with reviewing notices of proposed rulemaking (NPRMs) related to the State LRTP.

PROPOSED ACTIVITIES FOR FFY 2018: Continue maintenance and implementation of Long Range Transportation Plan. Continue coordination with MPOs and local governments in relation to long range transportation plans. Review new federal rule making, FAST Act guidance, and pertinent state legislative transportation issues. Evaluate federal regulations and prepare outline of planning factors and issues to be covered in FAST Act compliant 2020-2045 Long Range Transportation Plan.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$15,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$7,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$10,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1904 Air Quality Planning

PURPOSE AND SCOPE: Monitor and participate in air quality transportation planning developments relating to requirements of the Clean Air Act Amendments and SAFETEA-LU. Represent the Department in air quality non-attainment and transportation conformity actions. Analyze and comment on air quality non-attainment and transportation regulations and laws. Maintain information flow to and from decision-makers regarding air quality/transportation issues, developments, regulations, and laws. Continue staff education, training and attendance at workshops and seminars. Assist the Department to be a progressive participant in reducing the impacts of transportation-related pollution.

ACCOMPLISHMENTS DURING FFY 2017: Participated in the air quality/transportation planning activities of Lawton Metropolitan Planning Organization (LMPO), Association of Central Oklahoma Governments (ACOG), and Indian Nations Council of Governments (INCOG). Attended air quality meetings with partners at the Federal Highway Administration (FHWA) and Oklahoma Department of Environmental Quality (ODEQ). Researched and maintained resource materials on air quality/transportation issues; and reviewed and commented on MPO air quality education programs. Coordinated the planning process for air quality modeling funding and actions between the States, MPOs, ODOT and the ODEQ. Monitored regulations on National Ambient Air Quality Standards (NAAQS), Climate Change and Greenhouse Gas Emissions.

PROPOSED ACTIVITIES FOR FFY 2018: Maintain research and participation in air quality/transportation issues, developments, regulations, and laws. Hire a consultant firm to provide an analysis of potential designated non-attainment areas throughout the state and assist with interagency coordination. Continue to develop education materials and resources for Department personnel regarding air quality and transportation. Continue to monitor the air quality regulations and impact to the Department. Attend air quality/transportation planning activities of the LMPO, ACOG, and INCOG. Participate in MPO and ODEQ air quality/transportation initiatives, educational programs, and efforts to reduce pollution. Continue partnership with ACOG and INCOG to enhance and extend data collection and modeling outside of the study areas to establish base data for air quality issues in rural/donut areas. Facilitate meetings of the Oklahoma Transportation Air Quality Work Group. Continue staff education through courses, seminars, and conferences.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$ 25,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$ 25,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$ 15,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1905 Freight Transportation Planning

PURPOSE AND SCOPE: To coordinate freight planning and freight data analysis with the Long Range Transportation Plan (LRTP), the Oklahoma Statewide Freight and Passenger Rail Plan, waterway freight planning reports and project development processes. To ensure Oklahoma's freight planning efforts are in compliance with federal legislation.

ACCOMPLISHMENTS DURING FFY 2017: Initiated development of Oklahoma Freight Transportation Plan, 2018-2022. MPO coordination began regarding recommendation for Critical Urban Freight Corridors. Convened the Freight Advisory Committee. Developed draft state proposal for rural freight connectors. Monitored federal rules related to the National Highway Freight Network.

PROPOSED ACTIVITIES FOR FFY 2018: Managed and completed Oklahoma Freight Transportation Plan, 2018-2022 and related documentation. This will include information and analysis related to freight bottleneck, delay and reliability; including critical urban and rural freight connections. Products include a Freight Transportation Plan, and Freight Investment element, both developed in assistance from the Freight Advisory Committee. Development of written procedures in development of State Freight Transportation Plan. Coordinate with MPOs regarding urban and state freight transportation planning efforts. Continue communication and analysis regarding freight analysis framework (FAF) data, freight congestion, performance measures and multimodal freight.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$950,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$995,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$435,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1910 Public Participation and Visualization Techniques

PURPOSE AND SCOPE: Develop and implement Public Participation Plan (PPP) that encourages full public participation in the transportation planning and programming process, including, but not limited to; the Statewide Transportation Improvement Program (STIP), the Long Range Transportation Plan (LRTP), and the National Environmental Policy Act (NEPA) process.

ACCOMPLISHMENTS DURING FFY 2017: Provided Public Involvement for construction projects, planning projects, division needs, and Environmental needs. Conducted special outreach to non-metropolitan public officials as well as those with limited English proficiency. Developed new and improved presentation and visualization processes and techniques. Improved venues, a more robust email blast system, and better commenting systems are being tested. Provided visualization of proposed projects as well as proposed and existing conditions for presentation to the public and other agencies at public and stakeholder meetings.

PROPOSED ACTIVITIES FOR FFY 2018: Due to organizational restructuring, the Public Participation and Visualization Techniques will be continued with Item 1103 (GIS Management).

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$200,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$109,678	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Jeremy Planteen, Branch Manager, 405- 521-2729

1913 Bicycle and Pedestrian Planning

PURPOSE AND SCOPE: To coordinate and develop a bicycle and pedestrian program for the State of Oklahoma in compliance with the provisions of existing federal regulations and FAST ACT provisions and all applicable transportation planning regulations and requirements in compliance with the FHWA, FTA, the four Metropolitan Planning Organizations; (ACOG, INCOG, LMPO, and Frontier MPO), and non-metropolitan areas.

ACCOMPLISHMENTS DURING FFY 2017: Attended seminars and workshops related to bicycle and pedestrian transportation planning and policies in order to maintain, upgrade, and develop needed experience and expertise; attended public meetings to field and answer questions from staff and citizens; monitored state and local legislation regarding bicyclists and pedestrians; participated in the bicycle and pedestrian transportation planning activities of local communities, ACOG, INCOG, LMPO and Frontier MPO; researched bicycle and pedestrian safety, education, and infrastructure; assisted department personnel with bicycle and pedestrian related questions; shared training opportunities, information, and guidance to department and outside personnel; made connections with various outside entities to further bicycle and pedestrian initiatives, education, user safety and awareness; continued the Statewide Bicycle and Pedestrian Advisory committee to further the intentions of this position while working closely with Oklahoma MPOs, RTPOs, state departments, and citizens.

PROPOSED ACTIVITIES FOR FFY 2018: Monitor bicycle and pedestrian issues, developments, regulations, and laws. Develop educational materials and resources for Department personnel regarding bicycle and pedestrian safety, infrastructure design, and transportation. Attend bicycle and pedestrian planning activities of ACOG, INCOG, LMPO and Frontier MPO and other non-metropolitan areas of the State. Participate in bicycle and pedestrian transportation planning initiatives, seminars, workshops and educational programs across the State. Finalize and publish the Oklahoma Bicycle map with cooperation from ODOT staff. Implement bicycle and pedestrian counters as a means to collect and maintain data in accordance with the MAP-21 and FAST Act performance measures. Coordinate the development of a statewide inventory of existing and proposed bicycle and pedestrian facilities. Enhance staff knowledge through courses, seminars, trainings, and conferences hosted by FHWA, LTAP, and others.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$200,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$60,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$80,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1914 Transportation Asset Management Plan

PURPOSE AND SCOPE: To develop a transportation asset management plan (TAMP) for the Oklahoma Department of Transportation. The TAMP is a federal requirement identified in MAP-21 and the FAST Act. The TAMP will incorporate many working areas covering target areas of maintenance, construction, financials, inventory, performance data, and programming through the TAMP Steering Committee, the TAMP Working Group, and TAMP Task Forces. The TAMP will meet requirements of the CFR, which was published on October 24, 2016.

ACCOMPLISHMENTS DURING FFY 2017: Executed Tasks 1 through 5 of contract with Spy Pond Partners LLC for services to assist the ODOT team with the development of the TAMP. Started TAMP development process with meetings to gather and document information on ODOT current practices. Participated in various workshops in the process of developing the TAMP, including topics such as: life cycle management; vision, goals and objectives; performance measures and performance gaps; risk management; finance; and stakeholder outreach. Continued to participate in the TPF-5(335), "2016 through 2020 Biennial Asset Management Conference and Training on Implementation Strategies". Participated in the TPF-5 (326), "Develop and Support Transportation Performance Management Capacity Development Needs for State DOTs".

PROPOSED ACTIVITIES FOR FFY 2018: Continue to manage the consultant contract for ongoing activities towards TAMP development. Execute Task 6 Data Governance and Task 7 Capital Programming to project scope, work plan, and schedule. Continue to participate in various activities as they are available including meetings, workshops, webinars, conferences and peer exchanges. Continue to build on the ODOT TAM web page. Keep informed of best practices in asset management and performance. Implement asset management through action oriented tasks. Monitor the rulemaking process related to performance measures. ODOT expects to have a federally compliant TAMP and plans for improving its asset management implementation and practices by April 2018.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$788,422	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$340,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$350,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning & Performance Branch Manager, 405-521-2705

1915 Performance Measures Coordination

PURPOSE AND SCOPE: The purpose and scope of this task is to coordinate data related to performance measures, metrics (quantifiable indicator of performance), thresholds, and targets, and to develop ODOT's State Biennial Performance Report.

Performance Measures to be covered in the Biennial Report are described in different Subparts of Title 49 as per the FAST Act. Subpart C is related to Pavement Conditions; Subpart D is about Bridge Condition; Subpart E is about System Performance (travel time reliability) of the NHS; Subpart F is about Freight (Truck) Movement on the Interstate System. Related information for each subpart and related measures, metrics, targets, etc. will be reported annually by the related ODOT "Division Owner", through HPMS, the HSIP, or other processes. Additionally safety performance data will be reported through the HSIP process.

ACCOMPLISHMENTS DURING FFY 2017: The first Biennial Performance Report was submitted to FHWA October 1, 2016. Performance Measures Coordinator was assigned to monitor and develop Biennial Performance Report, and to coordinate with subject matter experts at ODOT. Attended workshops and seminars to learn more about federal requirements and develop plans for compliance. Performance Measures Analyst was assigned to implement the NPMRDS, in accordance with the final performance measures rules. Contract year one of three took place for the development of a data storage server and analytical tools for the NPMRDS.

PROPOSED ACTIVITIES FOR FFY 2018: Continue developing and implementing agency plans for compliance with required performance measurement and reporting. Coordinate with subject matter experts on bridge, pavement, travel time reliability, and freight performance measure data collection and preparation. Complete State Biennial Performance Report and submit to FHWA. Attend seminars and workshops on performance measure topics, and reporting techniques.

FINANCIALS	Amount	Fund	Amount	Fund
Programmed Amount FFY 2017	\$500,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$350,000	SPR	\$0.00	STATE
Estimated Cost FFY 2018	\$400,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Laura Chaney, Planning and Performance Branch Manager, 405-521-2705

1916 OK Archeological Survey (OAS) GIS Digitization

PURPOSE AND SCOPE: The project purpose is to develop a Geographic Information System (GIS) to store and maintain locational data and relational databases that are drawn from the State's archaeological records and develop a secure, password-protected, web-based interface to facilitate access to these records by staff and various constituents. Providing this type of web-based access to the OAS' records will greatly enhance the performance of federal and state agency responsibilities under Section 106 of the National Historic Preservation Act. In order to achieve these goals, several critical objectives will be carried out over the course of the three-year project. These include: 1) the coordinated transfer of OAS' geographical and non-geographical paper records to electronic format through scanning, digitization, and FileMaker Pro database development; 2) the development of procedures and mechanisms to store, maintain, and backup these digital data in a secure fashion; 3) the development of content that may be accessed by the general public; and 4) work with the Center for Spatial Analysis to develop and host the secure, password-protected, web-based GIS project. The resulting secure website will provide access to OAS data on a "sliding scale" depending on the end-user and the need to view restricted information. A total budget of \$777,520 is anticipated to be distributed over the course of three programs.

ACCOMPLISHMENTS DURING FFY 2017: Project implementation was started; and designed the project relational data model. Implemented web-based ArcGIS services, digitized and georeferenced data for OAS' copies of the 7.5 minute USGS topographic quadrangle maps.

PROPOSED ACTIVITIES FOR FFY 2018: Several activities initiated in the first year will continue into Phase II of the project, including: 1) implementation of the data management plan, which is being coordinated with OU College of Arts and Sciences and the Center for Spatial Analysis (CSA); 2) clean-up of the archaeological sites database; 3) workflow assessment and updates; 4) research to compile content for the publicly-accessible portion of the website; and 5) continued research and design work on the restricted-access OAS GIS website. Begin the process of capturing the geometry for the SURVEYS data layer, which will continue into Phase III.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$276,682	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$276,682	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$253,639	SPR	\$0.00	STATE

CONTACT INFORMATION

Jeremy Planteen, Branch Manager, 405-521-2729

SPR PART-2

Office of Research and Implementation

SPR Part 2 Financial Summary Sheet

SPR PART 2 - RESEARCH, SPRY-0010(071)RS, JP#01946(70) FEDERAL FISCAL YEAR 2018

		SPR	STATE	LOCAL	TOTAL
GENERAL ITEMS					
2100	Transportation Research Board (TRB)	\$11,000.00			\$11,000.00
2115	Long Term Pavement Performance (LTPP)	\$46,000.00			\$46,000.00
2120	Technical Assistance - Special Studies	\$46,000.00			\$46,000.00
2130	General Research Activities	\$359,000.00			\$359,000.00
2160	OU Interagency Master Agreement for Research and Investigation Services	\$508,000.00			\$508,000.00
2161	ODOT Transportation Library (OTL) Management	\$198,000.00			\$198,000.00
2400	OSU Interagency Master Agreement for Research and Investigation Services	\$508,000.00			\$508,000.00
2700	Product Evaluation Program	\$73,000.00			\$73,000.00
Total General Activities		\$1,749,000.00			\$1,749,000.00
CONTINUING RESEARCH PROJECTS					
2156	Roadside Vegetation Management Training & Consultation	\$187,000.00			\$187,000.00
2157	Roadside Vegetation Management Research	\$73,000.00			\$73,000.00
2260	Shrinkage Induced Deformations in Steel Bridges - Phase 3	\$103,000.00			\$103,000.00
2262	Feasibility Study of GRS Systems for Bridge Abutments in Oklahoma - Phase 2	\$104,000.00			\$104,000.00
2266	The Use of Resist. Testing for Quality Control of Concrete Mixtures - Phase 2	\$98,000.00			\$98,000.00
2268	Use of a Novel Controlled Release Surface Curing Agent for Bridge Decks	\$78,000.00			\$78,000.00
2272	Perf. of Moisture Barriers to Enhance Pavement Perf. Over Swelling Soils	\$104,000.00			\$104,000.00
2274	Development of Concrete Mixtures to Mitigate Bridge Deck Cracking	\$105,000.00			\$105,000.00
2275	Dev. of Aggr. Character-Based Prev. Maint. Using 3D Laser/AIMS Techn.	\$51,000.00			\$51,000.00
2276	Eval. of Ultra-High Perf. Concrete for Use in Bridge Connections Repair	\$92,000.00			\$92,000.00
2277	Compilation of ME Design for Rigid and Flexible Pavements in Oklahoma	\$105,000.00			\$105,000.00
2278	Recycling and Reuse of Materials in Transportation Projects	\$105,000.00			\$105,000.00
Total Continuing Research Projects		\$1,205,000.00			\$1,205,000.00
NEW RESEARCH PROJECTS					
2279	Probabilistic Approach for the Design of Drilled Shafts Socketed in Weak Rock	\$175,000.00			\$175,000.00
2280	Develop. of Rating Tool for Prestressed Concrete Bridges Vulnerable to Shear	\$83,000.00			\$83,000.00
2281	Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges	\$87,000.00			\$87,000.00
2282	Vehicle Classif. and Bluetooth MAC's for Origin-Destination Measurements	\$100,000.00			\$100,000.00
Total New Research Projects		\$445,000.00			\$445,000.00
RESEARCH IMPLEMENTATION PROJECTS					
2300	Interim Research Implementation Projects	\$150,000.00			\$150,000.00
CONTINUING					
2301	Improving the Efficiency and Accuracy of ODOT Temp. Traffic Monitoring System	\$79,000.00			\$79,000.00
2302	Load Test Monitoring of I-235 Bridge Repairs	\$9,000.00			\$9,000.00
2303	Develop. of Intelligent Vehicle Counting and Classification Sensor (iVCCS)	\$109,000.00			\$109,000.00
2304	Rehab. for the Bridge. Appr. Slab of the Blue River Site Using Prec. Concr. Pave.	\$152,000.00			\$152,000.00
NEW					
2305	Implement Balanced Asphalt Mix Design in Oklahoma	\$118,000.00			\$118,000.00
2306	Cont. Friction Measurement Equip. (CFME) for Highway Safety Mgmt. in Oklahoma	\$93,000.00			\$93,000.00
Total Research Implementation Projects		\$710,000.00			\$710,000.00
Grand Total SPRY-0010(071)RS					\$4,109,000.00
POOLED FUND STUDIES					
TPF-5(267)	Accelerated Performance Testing for the NCAT Pavement Test Track 2018-2020	\$450,000.00			\$450,000.00
TPF-5(288)	Western Road Usage Charging Consortium	\$25,000.00			\$25,000.00
TPF-5(297)	Improving Specifications to Resist Frost Damage in Modern Concrete Mixtures	\$17,500.00			\$17,500.00
TPF-5(313)	Technology Transfer Concrete Consortium	\$12,000.00			\$12,000.00
TPF-5(326)	Dev. and Supp. Transp. Perf. Mgmt. Capac. Dev. Needs for State DOTs	\$10,000.00			\$10,000.00
TPF-5(335)	Biennial Asset Management Conference and Training 2016-2020	\$6,000.00			\$6,000.00
TPF-5(357)	Impl. Shakecast Across Multiple State Depts. for Rapid Post Earthquake Response	\$15,000.00			\$15,000.00
TPF-5(364)	Utilization of Laser Induced Breakdown Spectroscopy (LIBS)	\$96,000.00			\$96,000.00
TPF-5(418)	NCHRP FFY 2018	\$710,000.00			\$710,000.00
TPF-5(###)	TRB Core Program Services for a Hwy. RD&T Program FFY 2018 (TRB FY 2019)	\$130,000.00			\$130,000.00
Total Pooled Fund Studies		\$1,471,500.00			\$1,471,500.00

TOTAL RESEARCH FUNDING INCLUDING POOLED FUND STUDIES

\$5,580,500.00

SPR Part 2 Financial Summary Sheet Continued

SPR Part 2 - RESEARCH SPRY-0010(071)RS, JP# 01946(70)

ENDING FFY 2017 RESEARCH PROJECTS

2228	Overtuning Forces at Bridge Abutments - Phase 3
2273	Development of Guidelines for Selection and Eval. of Tack Coats in Oklahoma

PREVIOUSLY COMPLETED RESEARCH PROJECTS

2208	Development and Implementation of an MEPDG for Rigid Pavements - Phase 3
2243	Recommended Fatigue Test for Oklahoma DOT
2252	Development of Inexpensive Vehicle Sensor Node System - Phase 3
2256	Understanding the Behavior of Prestressed Concrete Girders
2260	Shrinkage Induced Deformations in Steel Bridges - Phase 2
2262	Feasibility Study of GRS Systems for Bridge Abutments in Oklahoma - Phase 1
2265	Precast Prestressed Concrete Pavement to Abate Settlement Problems
2266	The Use of Resistivity Testing for Quality Control of Concrete Mixtures - Phase 1

ENDING FFY 2017 IMPLEMENTATION PROJECTS

2300(16-01)	National Performance Management Research Data Set (NPMRDS) - Speed Data Validation for Traffic Performance Measurement
-------------	--

PREVIOUSLY COMPLETED IMPLEMENTATION PROJECTS

2300(16-03)	Oklahoma Public and Tribal Transportation Infrastructure Employee Occupational Safety and Health Training and Evaluation - Phase 1
-------------	--

ACTIVE AND FUNDED POOLED FUND STUDIES

TPF-5(255)	Highway Safety Manual Implementation
TPF-5(267)	Accelerated Performance Testing on the 2012-2017 NCAT Pavement Test Track
TPF-5(269)	Development of an Improved Design Procedure for Unbonded Concrete Overlays
TPF-5(312)	Western Maintenance Partnership
TPF-5(328)	Strain-based Fatigue Crack Monitoring of Steel Bridges

COMPLETED 2017 POOLED FUND STUDIES

TPF-5(063)	Improving the Quality of Pavement Profiler Measurement
TPF-5(099)	Evaluation of Low Cost Safety Improvements
TPF-5(197)	The Impact of Wide-Base Tires on Pavement Damage: A National Study
TPF-5(209)	Support of the Transportation Curriculum Coordination Council (TCCC)
TPF-5(231)	ITS Pooled Fund Program (ENTERPRISE)
TPF-5(278)	Real-Time Quality Control Monitoring and Characterization of Aggregate Materials
TPF-5(360)	TRB Core Program Services for a Highway RD&T Program FFY 2017 (TRB FY 2018)
TPF-5(417)	NCHRP FFY 2017

2100 Transportation Research Board (TRB) Participation

PURPOSE AND SCOPE: This item covers travel expenses and time for ODOT personnel to attend the annual TRB meeting to advance technical development of topics and issues required to support the Office of Research and Implementation's work program.

ACCOMPLISHMENTS DURING FFY 2017: Three (3) ORI staff members attended the annual TRB meeting. Technical areas covered included bridge monitoring, high performance strength concrete, asphalt design and maintenance, State Transportation Innovation Council/Every Day Counts support and development programs, and research program monitoring and development processes.

PROPOSED ACTIVITIES FOR FFY 2018: A request will be made for up to four (4) ORI staff members to attend the 2018 annual TRB meeting.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$15,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$ 2,400	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$11,000	SPR	\$0.00	STATE

CONTACT INFORMATION

State Research Engineer: David Ooten, 405-521-2671

2115 Long Term Pavement Performance (LTPP)

PURPOSE AND SCOPE: The purpose of this project is to maintain LTPP test sites, markings and current status, report maintenance to the FHWA LTPP Consultant Contract Office (LTPP CCO), assist LTPP CCO with data gathering as necessary, and act as general liaison between LTPP CCO and ODOT. Maintain working knowledge related to SHRP product implementation and act as general liaison between FHWA and ODOT for product implementation activities.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 3 of 5) - Performed two rounds of 3D Laser Imaging data collection; facilitated further testing of the new Warm Mix Asphalt experiment; continued to perform annual site investigations, record observations, and report findings; performed inventory of all signs and pavement markings; obtained information from the LTPP CCO for specific continued data collection; arranged for continued testing and monitoring of current SPS and GPS site locations in Oklahoma for FFY 2018; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 4 of 5) - Perform two rounds of 3D Laser Imaging data collection; facilitate further testing of the new Warm Mix Asphalt experiment; continue to perform annual site investigations, record observations, and report findings; perform inventory of all signs and pavement markings; obtain information from the LTPP CCO for specific continued data collection; arrange for continued testing and monitoring of current SPS and GPS site locations in Oklahoma for FFY 2018; submit FFY 2018 Annual Report. Determine long-term disposition of sites falling out of national LTPP study support (see Note).

NOTE: Federal support for LTPP data collection was modified during FFY 2017. Several sites will not be supported for data collection by the FHWA beginning October 1, 2017. Of the 30 test sections in Oklahoma, 21 of these sections will fall out of the national data collection cycle beginning with FFY 2018. Oklahoma will have 11 sites remaining in the study, with 1 of these test sections falling out at the end of FFY 2019, and 1 test section falling out at the end of FFY 2021. Nine (9) test sections will remain in the study after FFY 2021, however, no time frame beyond FFY 2021 is known in regards to national data collection support. At time of submission, the FHWA had not selected the consultant contracting office that will be coordinating these activities.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$45,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$45,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$46,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kelvin Wang, Oklahoma State University, 580-744-5206

Transportation Manager: Bryan Cooper, 405-636-4199

2120 Technical Assistance Special Studies

PURPOSE AND SCOPE: Provide ongoing technical support or special investigations to the Department when a full-scale research project is not warranted or when a quick turnaround is required.

ACCOMPLISHMENTS DURING FFY 2017: Observed and monitored performance of the Every Day Counts (EDC) high friction surface treatment (HFST) EDC-3 site in Mayes County and the new sites on I-40 and I-44 in Oklahoma City (3 field visits), the mine chat site on SH-20 in Mayes County (3 field visits), EDC-2 Geosynthetic Reinforced Soil Bridges initiative (1 field visit), EDC-3 Traffic Incident Management System (TIMS) support through various workshops and attending monthly TIMS Coalition meetings, and a EDC-2 Single Point Urban Interchange (SPUI) field visit; attended EDC-4 Summit in Austin, TX; assisted Division 4 and the Materials Division in monitoring the In-Place Density project in Grant Co. (3 field visits); continued to provide support for the department with assistance and equipment in special investigations including pipe inspection (3 field efforts), landslide repair project monitoring (4 field efforts), a Contech bridge installation (5 field visits), pavement testing, traffic control and any other activities or services as requested.

PROPOSED ACTIVITIES FOR FFY 2018: Observe and monitor performance of the existing HFST sites, along with any other EDC initiative implementations. Continue to provide support for the Department with assistance and equipment in special investigations, storm drain inspections, pavement testing, traffic control and any other activities of services as requested; acquire, calibrate, test and/or compare new equipment or instruments to existing equipment or instruments where necessary; Continue to monitor the In-place Density project with periodic FWD testing and Manual Distress Surveys.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$140,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$90,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$46,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Transportation Manager: Bryan Cooper, 405-636-4199

2130 General Research Activities

PURPOSE AND SCOPE: This activity covers various research activities which are necessary for the operation of a research section but which cannot be accurately included in other projects. Examples of this type of activity include: attending quality task force meetings; writing work plans for emerging research projects which have not been assigned an item number; preparing new and continuing research contracts and contract modifications; research project management; maintaining electronic research project records, i.e., project progress, invoicing, contractual deadlines; reviewing final research reports; meeting with university and private researchers regarding proposed projects; attending industry seminars, conferences, etc.

ACCOMPLISHMENTS DURING FFY 2017: Solicited ODOT subject matter experts, field division personnel, university and private industry staff for new research ideas and problem statements for possible FFY 2018 research project funding; coordinated and carried out the Research Steering Committee (RSC) meeting; received and compiled 38 new research/implementation topic statements; reviewed 11 new research/implementation topic statements for priority ranking; generated and posted 5 FFY 2018 Request for Proposals (RFP's) for research proposal submissions; reviewed 17 new research proposals submitted for possible FFY 2018 project funding; discussed proposed project work with researchers and ODOT subject matter experts; awarded and prepared 12 FFY 2018 continuing research contracts; awarded and prepared 4 new FFY 2018 research contracts; awarded and prepared 4 FFY 2018 continuing research implementation contracts; awarded and prepared 2 new FFY 2018 research implementation contracts; organized initiation and final project meetings; performed technical reviews of final research project reports for formatting and ADA compliance; facilitated project implementation plans and direction; prepared Part 2 of the FFY 2018 SPR Work Program.

PROPOSED ACTIVITIES FOR FFY 2018: Solicit for new research ideas for possible FFY 2019 research project funding; coordinate RSC meeting for review of new FFY 2019 research ideas and proposals; generate and post FFY 2019 RFP's; generate FFY 2019 research project contracts and contract modifications; organize initiation and final project meetings; coordinate and assemble research implementation task forces and committees; facilitate project implementation plans and direction; continue to perform technical review of final research project reports for required formatting and ADA compliance; prepare Part 2 of the FFY 2019 SPR Work Program.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$970,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$700,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$359,000	SPR	\$0.00	STATE

CONTACT INFORMATION

SPR-2 Program Administrator: Bryan Hurst, 405-522-3794

2156 Roadside Vegetation Management (RVM) Training & Consultation

PURPOSE AND SCOPE: This training and consultation initiative is designed to meet the roadside vegetation management (RVM) needs of ODOT and builds upon the previous years of RVM training offered by Oklahoma State University to ODOT. This service and tasks have been designed based upon knowledge of, and being observant of Federal and State Pesticide Laws and Regulations, communications and feedback from ODOT field and headquarters staff, observing areas of continued consultation needs by networking with RVM industry professionals.

ACCOMPLISHMENTS DURING FFY 2017: Conducted and completed 15 Annual Pesticide Applicator Certified Training and Continuing Education Applicator Workshops for all ODOT field divisions; maintained and updated records on 800 ODOT certified applicators; provided consultation to ODOT office and field personnel throughout the year; conducted Sprayer Equipment inspection and calibration workshops; assisted ODOT in maintaining and producing an updated Approved Herbicides and Adjuvants List (AHAL); assisted ODOT in Statewide Herbicide Contract review; performed survey and review of ODOT field divisions herbicide programs; attended national annual conferences and included findings in Certified Training and Continuing Education Applicator Workshops; produced project progress reports; completed and produced FFY 2016 Annual and Final Reports; FFY 2017 Annual and Final Report submissions are pending.

PROPOSED ACTIVITIES FOR FFY 2018: Deliver Annual Pesticide Applicator Certified Training and Continuing Education Applicator Workshops for all ODOT field divisions and maintain records on all ODOT certified applicators; provide as needed consultation to ODOT office and field personnel; coordinate Herbicide Application and Equipment Calibration Workshops for new employees; assist ODOT in updating the Approved Herbicides and Adjuvants List (AHAL); assist with AHAL contract review; perform survey and review of ODOT field divisions herbicide programs; attend national conferences; produce project progress reports; prepare and submit FFY 2018 Annual Research Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$167,060	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$392,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$187,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Dennis Martin, Oklahoma State University, 405-744-5419

Project Sponsor: Brad Mirth, ODOT Maintenance Division Engineer, 405-521-2557

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2157 Herbicide Research Program

PURPOSE AND SCOPE: A progressive Roadside Vegetation Management (RVM) program integrates proper vegetation selection, establishment and maintenance. Placing a well-adapted native or introduced species of vegetation on the roadside is the foundation of a successful program but not the end of the required inputs for successful long term roadside beauty and stabilization. The maintenance portion of the RVM program involves a combination of decisions concerning to mow or not mow, specific mowing heights and frequency of mowing, herbicide use or avoidance for weed control in the specific vegetation system at hand.

ACCOMPLISHMENTS DURING FFY 2017: Continued to perform evaluations of new and generic herbicide formulations and combinations for roadside and cable barrier management and implemented findings in winter training workshops; completed evaluation of adjuvants and recommended herbicides for tank mix compatibility and included findings into the Approved Herbicides and Adjuvants List (AHAL); performed evaluation of herbicide tolerance of new candidate roadside Bermuda grass varieties; constructed research test plots and completed field experiments, data collection and analysis; performed evaluation of select roadside areas containing natural milkweed populations for monarch butterfly utility; produced project progress reports; completed and produced FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to perform evaluations of new and generic herbicide formulations and combinations for roadside and cable barrier management and implement findings in winter training workshops; perform evaluation of tank mix compatibility of adjuvants and herbicides and include findings into the AHAL; continue to evaluate herbicide tolerance of new candidate roadside Bermuda grass varieties; continue to explore select roadside areas containing natural milkweed populations for monarch butterfly utility; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$59,682	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$59,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$73,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Dennis Martin, Oklahoma State University, 405-744-5419

Project Sponsor: Brad Mirth, ODOT Maintenance Division Engineer, 405-521-2557

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2160 The University of Oklahoma/Southern Plains Transportation Center (SPTC)
Master Agreement for Research and Investigation Services

PURPOSE AND SCOPE: This item will support a task-order based contract for the purpose of continuing ODOT supported efforts of SPTC and providing ODOT the opportunity to address topics and needs that were not brought through the formal annual project selection process and/or were identified outside the formal process. It is anticipated that these projects will range in both scope and financial commitment from simple to complex, but generally be limited to a one-year or less completion cycle. Topics could include traditional research topic areas of interest to the Agency, as well as ancillary effort including education and workforce development and technology transfer through, but not limited to, collaboration, leadership training, addressing student retention and diversity, and internship programs.

ACCOMPLISHMENTS DURING FFY 2017: The SPTC continued to provide literature reviews; conducted research through the SPTC Work Program which addresses ODOT's transportation research needs; continued to supply matching funds for other SPTC activities: workforce development, outreach, center support, experiential learning, workforce symposium, student competition, student internship, communications, and technology transfer; continued to support and lead ODOT GIS Internship Program; continued SPTC 15.2 Year 2 work activities; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: Although the SPTC competed for a regional university transportation center and was not selected, through FFY 2018, SPTC will continue to: provide literature reviews; conduct research through the SPTC Work Program which addresses ODOT's transportation research needs; continue to supply matching funds for other SPTC activities: workforce development, outreach, center support, experiential learning, workforce symposium, student competition, student internship, communications, and technology transfer; complete SPTC 15.2 Year 2 work activities; prepare and submit FFY 2018 Annual Report.

Other task order based activities are unknown at the time of the SPR Annual Work Plan submittal. ODOT will develop task orders for services and research needs through interaction with Agency personnel that meet the intent of this item.

This item was formerly reported as item 2160B. As of October 1, 2017, this project is being reported as item 2160.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$1,000,168	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$392,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$508,000	SPR	\$0.00	STATE

CONTACT INFORMATION

OU Contact: Musharraf Zaman, 405-325-2626

Director of Capital Programs: Dawn R. Sullivan, 405-522-6000

2161 Management of the ODOT Transportation Library

PURPOSE AND SCOPE: The Oklahoma Department of Transportation (ODOT) maintains and operates a sound, progressive, and flexible transportation library, which is available to ODOT staff, as well as, local, regional and national users. The goal is to keep ODOT staff and their stakeholders informed of recent developments and innovations in transportation technologies, methodologies and programs. A complementary goal is to increase operational efficiency and reduce cost. The Oklahoma Transportation Library (OTL) seeks to integrate with other transportation libraries nationally while moving toward digital contents and an Internet-based service system.

ACCOMPLISHMENTS DURING FFY 2017: Conducted resource inventory; integrated with Western Transportation Knowledge Network (WTKN) of Libraries; started the development and preparation of the OTL LibGuide; served as a transportation clearinghouse; coordinated printing, binding and distribution services; provided electronic access to ODOT SPR research project final reports; continued cataloging process; conducted literature search related services which assists patrons with collection questions and finding materials within the library and beyond; preparing searches that included lists of topic related titles and/or a compilation of topic related documents; drafting ODOT Research Highlighter completed project summaries that are posted on the ODOT SPR web page; provided traditional library services; developed an online presence; provided additional services such as pick-up and delivery of library materials; conducted OTL Workshop; assisted ODOT with accessibility of final research reports; produced project progress reports; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to conduct resource inventory; continue integration with Western Transportation Knowledge Network (WTKN) of Libraries; maintain and update OTL LibGuide; continue to serve as a transportation clearinghouse for incoming materials as well as distribute ODOT publications; coordinate printing, binding and distribution services; provide electronic access to ODOT SPR research project final reports; continue cataloging process; continue to conduct literature search related services which assist patrons with collection questions and finding materials within the library and beyond; continue to prepare searches that include lists of topic related titles and/or a compilation of topic related documents; continue to draft ODOT Research Highlighter developed from completed project summaries; continue to provide traditional library services and additional services such as pick-up and delivery of library materials and other services as required; develop online presence to allow for easily reachable services using LibGuides; assist ODOT with accessibility of final research reports; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$169,745	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$169,700	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$198,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Project Contact: Musharraf Zaman, The University of Oklahoma, 405-325-5625

Project Manager: Ron Curb, Assistant State Research Engineer, 405-522-3795

2208 Development and Implementation of a Mechanistic and Empirical Pavement Design Guide (MEPDG) for Rigid Pavements - Phase 3

PURPOSE AND SCOPE: The Mechanistic-Empirical Pavement Design Guide (MEPDG) is the new pavement design guide released by the American Association of State Highway and Transportation Officials (AASHTO). AASHTO suggests each state highway agency validates and, if necessary, calibrates the MEPDG design models based on local conditions. ODOT is currently under the process of accepting the MEPDG to replace the 1993 design guide. In the first two phases of this project, a comprehensive research work has been carried out which involved laboratory tests, road section instrumentation and sensitivity analysis. The research revealed valuable information regarding local climate data, concrete material properties, and the performance data of Oklahoma rigid pavements. In view of other states' experience, Oklahoma extended the SPR 2208 project to a Phase 3 that focuses on the local validation/calibration of the MEPDG for Oklahoma rigid pavements and also addresses the uncertainty in the slab/base friction property. The primary objective of Phase 3 is to validate and calibrate the MEPDG for the design of typical Oklahoma rigid pavements. The secondary objectives of the proposed research are (1) to continue to monitor the field performance of the instrumented road section on I-44 and (2) to investigate the slab/base friction property of typical Oklahoma rigid pavement structures.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of Project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Xiaoming Yang, Oklahoma State University, 405-744-5257
Project Sponsor: Kenny Seward, Asst. Materials and Research Div. Engineer, 405-522-4999
Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2228 Overturning Forces at Bridge Abutments and the Interaction
of Horizontal Forces from Adjacent Roadways - Phase 3

PURPOSE AND SCOPE: ODOT has numerous bridges throughout the state where the expansion joints have closed up, roller support bearings tilted, and beams have pushed up against the abutment back wall. Abutments are not performing as expected which has led to frequent and costly repairs that strain limited maintenance budgets. After repairs, some of these bridges experience more movement resulting in further damage. Factors needing further exploration are the thermal expansion of rigid pavements exerting horizontal forces perhaps combining with the embankment forces on the abutments to cause movement of the abutment, premature expansion joint failure, damage to back walls, and tilting of roller bearings.

Due to the numerous bridges that are affected by expansion joint failure and the resulting problems caused to the various bridge elements, there is a need to instrument roadways adjacent to bridges, the embankments, and the abutments themselves to monitor and better understand what is taking place. Results of this research could result in modifications to standard abutment details and may influence the way ODOT approaches repair projects.

Where Phase 2 addressed additional instrumentation, pre and post-repair monitoring, evaluation and recommendations, Phase 3 will address work related to removing sensors out of the way to accommodate ODOT repairs to the SH-3 north and 19th Street bridges, post repair monitoring of instruments, data analysis and recommendations. Pre- and post-repair monitoring of the instruments will provide ODOT valuable information regarding the repairs carried out at these bridges. This will provide ODOT with an opportunity to monitor the behavior of a bridge before and after repairs to understand the effects of the repairs and therefore perform future repairs effectively. Ultimately, repair guidelines for bridges with similar distresses will be developed based on the results of this study.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 2) - Continued to monitor all installed instrumentation; continued to perform data analysis to evaluate the effectiveness of pressure relief joints construction; produced project progress reports; submitted FFY 2016 Phase 3 Annual Report; Final Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: None.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$51,941	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$51,900	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kanthasamy Muraleetharan, The University of Oklahoma, 405-325-4247
 Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606
 Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2243 Recommended Fatigue Test for ODOT

PURPOSE AND SCOPE: Fatigue cracking and rutting are two dominant distresses in flexible pavements. Oklahoma Department of Transportation (ODOT) currently evaluates the rutting potential of asphalt mixes through the Hamburg rut test in accordance to OHD L-55, which is similar to AASHTO T324. However, no standard test procedure is currently available to ODOT for screening of mixes for fatigue resistance, which is extremely important for quality control and quality assurance of flexible pavements. The proposed study will investigate selected test methods and procedures to measure fatigue resistance or fatigue life of different types of asphalt mixes. Mechanistic frameworks, namely dissipated energy, fracture mechanics, and viscoelastic continuum damage, will be utilized to analyze the data, as appropriate. The variability and repeatability of each test method will be evaluated statistically. The results from this study will lead to test methods/protocols and the associated equipment will be recommended that can be used by ODOT for screening of asphalt mixes for their fatigue resistance during the mix design phase.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Musharraf Zaman, The University of Oklahoma, 405-325-5625

Project Sponsor: Kenneth Hobson, ODOT Bituminous Engineer, 405-521-2677

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2252 Development of Inexpensive Vehicle Sensor Node System for
Volume, Turn Movement and Collision Avoidance - Phase 3

PURPOSE AND SCOPE: ODOT is responsible for collecting temporary vehicle counts from thousands of various locations throughout the state each year. As a continuance of Phase 2 of this study, the purpose of Phase 3 of this study is to develop and implement a non-intrusive, inexpensive, portable vehicular traffic monitoring system for temporary installment on the surface of highways, roadways, or roadsides. Sensor design is comprised of solid-state electronics for detecting, counting, and classifying vehicles while eliminating inherent limitations of systems fabricated with loops and hoses. Utilization of the proposed design can be extended to improve work zone safety by reducing installation time and providing real-time traffic monitoring. The system can be integrated with other networks, such as inter-vehicle communication and road-to-vehicle communication for enhancing traffic safety control at intersections.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

Project Sponsor: Aaron Fridrich, Transportation Manager II, 405-736-9466

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2256 Understanding the Behavior of Prestressed
Concrete Girders after Years of Service

PURPOSE AND SCOPE: The proposed project consists of a comprehensive study including both testing and analysis of two real-world AASHTO Type II girders to be obtained during replacement of the I-244 bridge over the Arkansas River in Tulsa after about 47 years in service. It also includes detailed study of composite action in the form of testing the real-world girders and a scaled composite bridge section. This research will provide critical supplemental information to and improve upon previous research focused on the shear capacity of one real-world girder sponsored by ODOT at the University of Oklahoma and answer numerous questions concerning bridge girders put into service during the same time period. It will provide detailed information concerning composite behavior of prestressed girder bridges critical to shear. It also has the potential to provide opportunities for a significant quantity of additional research during the process of determining shear capacity and studying prestress transfer. The results of this research would be used to evaluate the condition and safety of prestressed concrete girders designed for shear using the quarter-point rule described in the AASHTO Standard Specifications (AASHTO 1973) in comparison to the current AASHTO LRFD Specifications (AASHTO 2004). Additionally, improved procedures for using nondestructive methods to determine condition of in-service structural members would be recommended.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Royce Floyd, The University of Oklahoma, 405-325-1010

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2258 Evaluate Densifier-Over-Shotblasting (DOS) Treatment
Performance for Pavements and Bridge Decks

PURPOSE AND SCOPE: With increased demands on aging infrastructure, rapidly increasing truck traffic, and shrinking budgets, transportation agencies are continually being asked to “do more with less” in maintaining pavements and bridges. The proposed research provides a method for combining chemical treatment (densifier) and shotblasting, called Densifier-Over-Shotblasting (DOS), to economically harden the aggregates of concrete and asphalt pavements and bridge decks. The proposed DOS method will make surfaces safer and more durable, reduce maintenance costs and increase service life of pavements and bridge decks. The proposed study will have the following major benefits: (i) specifications of the required characteristics of DOS; (ii) identification of polishing tendency of aggregates that are available in each ODOT division; and (iii) documentation of effective construction practice and Inspector’s guide.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Dominique Pittenger, The University of Oklahoma, 405-325-4536

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2260 Shrinkage Induced Deformations in Steel Bridges
 Made Composite with Concrete Deck Slabs – Phase 3

PURPOSE AND SCOPE: Phase 3 of this study builds upon the findings of Phases 1 & 2 research. The goals of Phase 3 research are to develop data to make stronger conclusions regarding Phase 1 & 2 objectives and to develop instrumentation and techniques for long term monitoring of bridges. The Phase 3 objectives are as follows: 1. Develop new designs and prototypes to ensure proper bracing of formwork and screeds and also provide better elevation controls for new bridge decks, and 2. Develop and demonstrate instrumentation and data acquisition systems for monitoring long term deflections, strains, and temperatures in bridges. Phase 3 is envisioned and developed in order to further the objectives of the research and provide recommendations to ODOT to help mitigate problems with adverse ride quality, or excessive deflections. It is anticipated that overall bridge construction methods and techniques will be improved as a product of this research.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 3) - Submitted FFY 2016 Phase 2 Annual Report; continued literature review; started forensic investigation of known bridges; began construction of prototype to test bracing systems for formwork and bracing; continued construction, monitoring and testing of full-sized prototype bridge; performed laboratory testing, including measurements for compressive strength, tensile strength, elastic modulus and shrinkage; started instrumentation and monitoring of a bridge in the field; start computational analysis of shrinkage and other effects; began to identify causes for excessive or unpredicted deflections; started to develop and refine design and construction methods for ODOT bridges; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 2 of 3) - Continue literature review; continue forensic investigation of known bridges; continue construction of prototype to test bracing systems for formwork and bracing; continue construction, monitoring and testing of full-sized prototype bridge; continue to perform laboratory testing, including measurements for compressive strength, tensile strength, elastic modulus and shrinkage; continue instrumentation and monitoring of a bridge in the field; continue computational analysis of shrinkage and other effects; continue to identify causes for excessive or unpredicted deflections; continue the development of refined design and construction methods for ODOT bridges; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$78,860	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$78,800	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$103,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Bruce Russell, Oklahoma State University, 405-742-7450

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: David Ooten, State Research Engineer, 405-522-2671

2262 Feasibility Study of GRS Systems for Bridge Abutments in
Oklahoma - Phase 2

PURPOSE AND SCOPE: The primary objective of the proposed project is to carry out a feasibility study to identify the types of bridge projects that would be suitable candidates for the use of Geosynthetic Reinforced Soil (GRS) bridge abutments in Oklahoma. The research team will review the state of the art and practice on the GRS technology and develop guidelines for its adoption and implementation in Oklahoma. The primary focus of this study will be on bridges that are built on the low-volume and rural roads, (i.e., off the National Highway System, NHS), which can directly and immediately benefit from a viable and speedy bridge construction technology involving recycled girders and bridge abutment construction materials that are produced locally. However, the research team will explore the circumstances in which GRS abutments could also be adopted for bridges on major roads and highways across the state, (i.e., on-NHS system bridges). The Principal Investigators (PIs), in collaboration with ODOT and FHWA-OK engineers, will provide an assessment of the results of the study which will include expected benefits and actions needed for successful implementation of the study to meet the ODOT goals and those of other state transportation agencies. Phase 2 of this study is to test and quantify the design and construction related factors as a result of using large concrete blocks for the facing of GRS-IBS abutments through large scale laboratory tests and an anticipated field project. This project will modify and adapt the Every Day Counts (EDC) EDC-2 initiative in Oklahoma.

ACCOMPLISHMENTS DURING FFY 2017: Phase 1 - Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: Phase 2 (Yr. 1 of 2) - Prepare test facility; install measurement posts; acquire materials; calibrate sensors; begin construction of access ramp; begin staged construction and instrumentation and surcharge load testing of instrumented concrete masonry unit block, GRS and large block GRS abutment models; begin reduction and analysis of data; begin development of drawings and guidelines for large block abutments; begin monitoring performance of pilot GRS bridge with large block abutments following construction; produce project progress reports, submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$104,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Kianoosh Hatami, The University of Oklahoma, 405-325-5911

Project Sponsor: Shannon Sheffert, ODOT Local Government Division Engineer, 405-521-2553

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2265 Precast Prestressed Concrete Pavement to Abate Settlement Problems under Bridge Approach Slabs

PURPOSE AND SCOPE: The problems encountered in bridge approach embankments have often been found to be due to settlement caused by poor compaction of the soil behind the abutments, expansion of the soil behind the abutment or settlement of the soft soil underlying the embankment. Failure of bridge deck approach slabs have also been due to shoving from the adjacent pavement structure causing slope failure of the surrounding fill areas. Malfunctions associated with transition joints between the slab and the adjacent structure are also a major concern. Although several measures have been attempted, some more extreme than others, the settlement problem seems to persist.

Three objectives are identified for this project:

1. Development of construction specifications and design guidelines for the use of Precast Pre-tensioned Concrete Pavement (PPCP) approach slabs,
2. Development of construction specifications and design guidelines for the use of soil columns and similar technologies to strengthen and reinforcement approach slab fills including embankments, and
3. Development of guidelines to monitor and maintain PPC pavements as approach slab structures.

Guidelines for PPCP approach slabs will address the details of design including slab thickness, joint stiffness, subbase strength, required prestressing and thickness, and joint sealant requirements among other aspects of the design. Guidelines for soil columns and similar technologies will consider the characteristics of the fill materials, such as moisture, density, size distribution, type and other pertinent properties in which to make them less susceptible to consolidation will be addressed.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of project.
This project has moved into the implementation phase under item 2304.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Dan Zollinger, Texas A&M Transportation Institute, 979-845-9918

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2266 The Use of Resistivity Testing for Quality Control of Concrete Mixtures -
Phase 2

PURPOSE AND SCOPE: The objective of Phase 1 of this project was to investigate the potential of resistivity testing in assessing the performance of typical concrete mixtures used in bridge and pavement infrastructure in Oklahoma. The sensitivity and reliability of the method with Oklahoma materials was investigated in order to formulate new guidelines and specification(s) that would allow ODOT to produce high quality concrete. The study evaluated the use of resistivity to evaluate field structures and indicated promise to make great changes to the quality and long term performance of Oklahoma concrete. Based on Phase 1 research activities, in Phase 2, a systematic approach using resistivity testing for Classes A and AA concrete mixture design compliance control during construction will be developed. Within the devised experimental plan, an extensive trial study within ODOT residencies will be conducted. This will help with the validation process of the resistivity method developed and the implementation process within the residencies. Finally, an alternative method will be recommended in the event a sample fails to meet the specification. This aids in evaluating the adequacy of the material constructed onsite. As such, an alternative secondary resistivity testing procedure, in case of failed material compliance test, will be investigated. The results of this study will aid in devising a strategy for easy implementation of the resistivity method within material quality control and compliance activities.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 3) - Performed experimental parametric investigation to model time-resistivity behavior of typical ODOT Class A and Class AA concrete mixtures; established a time-dependent resistivity model to identify the water-to-cement ratio of mixtures and the type of cementitious materials present; evaluated the efficacy of the resistivity model and its application to compliance control of mixture design; performed experimental parametric investigation to model temperature-resistivity behavior of typical ODOT Class A and Class AA concrete mixtures; established a temperature correction factor compatible with the developed resistivity method for compliance control; began the preparation of guidelines for the effective use of the resistivity method; conducted surface resistivity test method training workshop; produced project progress reports; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 2 of 3) - Continue parametric investigations; continue resistivity model development; continue resistivity model trial study; continue temperature parametric investigations; continue to develop temperature correction factor; begin temperature correction factor trial study; begin literature review on in-situ resistivity testing procedures for field evaluation; begin investigation on in-situ resistivity testing; begin investigation on core resistivity testing; produce project progress reports, submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$103,558	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$103,500	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$98,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Julie Hartell, Oklahoma State University, 405-744-5222

Project Sponsor: Kenny Seward, Asst. Materials Division Engineer, 405-522-4999

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2268 Use of a Novel Controlled Release Surface Curing Agent for Bridge Decks

PURPOSE AND SCOPE: The durability of concrete bridge decks is critical to the satisfactory long term performance of the Oklahoma highway infrastructure system. It is currently required in Oklahoma to place wet burlap or blankets within 10 minutes of strike off of the concrete surface. The job of these materials is to minimize moisture loss, promote hydration, reduce permeability, increase strength gain, and minimize cracking. Current wet curing techniques are labor intensive, logistically challenging, and quite costly. Also the placement of these materials too early can cause unwanted deformations or damage in the surface of the concrete that may nullify any benefits from the curing. The objective of the project is to use a novel curing technique that can be rapidly applied to the surface of the fresh concrete and not cause deformations in the concrete surface. This material should show equal or better curing performance than typical wet curing methods and be sustainable and safe for the environment. The specific objectives for this project include:

1. Develop a field application method for the novel curing material,
2. Develop specifications for the quality control and usage of the novel curing material, and
3. Work with contractors in Oklahoma to implement this technology in the field and evaluate the effectiveness.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 3 of 4) - Continued to conduct laboratory studies to evaluate current ODOT curing specifications; continued the usage of novel curing materials in the field and performed effectiveness evaluations; produced project progress reports; submitted FFY 2016 Annual Report; FFY 2017 Annual report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 4 of 4) - Complete laboratory studies to evaluate current ODOT curing specifications; continue to evaluate effectiveness of field curing methods; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$120,823	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$120,800	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$78,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Tyler Ley, Oklahoma State University, 405-744-5257

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2270 Development of an Asphalt Pavement Test Facility at the OSU Unmanned Aerial Vehicle (UAV) Facility

PURPOSE AND SCOPE: The objective of this study is to assist in the construction of the UAV runway to develop a pavement that can be used as a test facility for evaluation of pavement materials including, but not limited to, plant-mixed warm and hot mix asphalt pavements, high RAP and RAS mixes, asphalt surface treatments, pavement preservation treatments, 100% RAP cold mixes and aggregate bases with surface treatments. These mixtures would need to be incorporated into the planned expansion of the facility or placed as an overlay or surface treatment on the planned existing surface. It would be difficult to load the facility to typical highway conditions; therefore, the facility would be best suited for measurement of environmental effects. At the completion of the construction, ODOT would have a facility available through OSU to test and evaluate surface treatments, surface mixes, including high RAP and RAS mixtures, and pavement preservation treatments for a variety of applications.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of Project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Stephen Cross, Oklahoma State University, 405-744-7200

Project Sponsor: Kenneth Hobson, ODOT Bituminous Engineer, 405-521-2677

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2272 Performance of Moisture Barriers to Enhance Pavement Performance over Swelling Soils

PURPOSE AND SCOPE: The Oklahoma Department of Transportation has invested significant amounts of money on several projects to construct low-permeability barriers to prevent moisture changes in swelling soils beneath pavements. However, there has been relatively little post-construction monitoring of these sites to assess the performance and cost-effectiveness of the moisture barriers and associated pavements. Given the high material cost and additional construction cost associated with installing moisture barriers, there is a need to assess performance relative to reductions in moisture infiltration into swelling subgrades. Given the current state-of-the-art knowledge in this field, there is a need for laboratory soil testing, field monitoring, and numerical modeling of the problem. This research will assess the performance of moisture barriers, determine whether these are cost-effective solutions for pavement design over swelling soils, and develop recommendations for enhancing the design of moisture barriers.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 3) - Submitted FFY 2016 Annual Report; continued literature review; identified pavement site(s); started in-depth field studies, instrumentation and soil sampling; began subsurface exploration of test sites; began instrumentation of test sites to collect soil moisture, temperature and suction data; started initial pavement condition survey; performed instrumentation monitoring; began collection of historical weather data; performed various lab testing; began numerical/analytical modeling of moisture movement and soil volume change; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 3 of 3) - Continue literature review; continue in-depth field studies, instrumentation and soil sampling; continue subsurface exploration of test sites; continue instrumentation of test sites to collect soil moisture, temperature and suction data; continue initial pavement condition survey; continue instrumentation monitoring; continue collection of historical weather data; continue various lab testing; continue numerical/analytical modeling of moisture movement and soil volume change; begin data analysis to assess performance of existing moisture barriers; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$52,046	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$52,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$104,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Rifat Bulut, Oklahoma State University, 405-744-5189

Project Sponsor: Josh Randell, ODOT Pavement Design Engineer, 405-521-2390

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2273 Development of Guidelines for Selection and Evaluation
of Tack Coats in Oklahoma

PURPOSE AND SCOPE: Flexible pavements are typically constructed by compacting asphalt mixes in multiple layers. It is important that the pavement structure behave as one system, rather than multiple independent layers. Inadequate interlayer bond leads to distresses such as half-moon-shaped cracks, delamination (debonding), followed by longitudinal wheel path cracking, potholes, fatigue cracks, slippage, and rutting. The quality and integrity of the bond between the asphalt layers, especially the bond between the existing road surface and an overlay is crucial to pavement performance and durability. In order to improve the interlayer bonding of asphalt pavements, tack coat is used frequently. Tack coat involves application of a thin layer of liquid asphalt to promote bonding between the existing pavement and the new layer or between two lifts and provide a waterproofing barrier. This study will aid ODOT in improving its current practice of selection of tack coat type and application rate. The results from this study will be used to develop recommendations and development of quality control measures for tack coats for enhanced performance. Such measures will benefit ODOT by reducing pavement maintenance costs by minimizing tack coat-related failures of pavements.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 2) - Continued literature review; continued to identify and select materials, i.e., tack coats, asphalt mix and field cores; continued to prepare laboratory samples for various testing techniques; continued laboratory performance testing; continued simulated long-term oven aging and surface wearing; continued various samples conditioning; continued determination of superpave PG and rheological properties of tack residues, i.e., DSR and BBR testing; continued analysis of test data; continued database development; produced project progress reports; submitted FFY 2016 Annual report; Final Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: None.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$84,232	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$84,200	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Rouzbeh Ghabchi, The University of Oklahoma, 405-325-2626

Project Sponsor: Kenneth Hobson, ODOT Bituminous Engineer, 405-521-2677

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2274 Development of Concrete Mixtures to Mitigate Bridge Deck Cracking,
Validated Using 3D Bridge Deck Surface Evaluations

PURPOSE AND SCOPE: Cracking in concrete is a significant threat to the long term durability of a bridge deck. These cracks allow outside chemicals direct access to the reinforcing steel within the bridge. These outside chemicals can then cause corrosion, which will in turn cause more cracking and will again lead to penetration of more outside chemicals. In addition to corrosion, these cracks can cause or exacerbate many other deterioration mechanisms, including freeze thaw, alkali-silica reaction, and sulfate attack. Cracking of concrete can cause a vicious cycle that can quickly shorten the life of a bridge. The goals of this project are to use a number of different technologies to help reduce cracking in Oklahoma bridges with economical and practical solutions. It is anticipated that this research will help bring crack-resistant concrete to Oklahoma bridges. This research will not only be completed in the laboratory, but will also be implemented and then evaluated in the field. Furthermore, a specification will be developed that will help ODOT to implement these technologies on their bridges.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 5) - Continued laboratory evaluation of fresh, hardened and durability performance of concrete mixtures; began bridge deck construction to utilize multiple concrete mixtures to cast separate spans; produced project progress reports; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 3 of 5) - Continue bridge construction; begin evaluations of bridge deck cracking; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$100,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$100,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$105,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Tyler Ley, Oklahoma State University, 405-744-5257

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2275 Development of Aggregate Characteristics-Based Preventive Maintenance Treatments Using 3D Laser Imaging and Aggregate Imaging Technology for Optimized Skid Resistance of Pavements

PURPOSE AND SCOPE: Skid resistance of pavements plays a significant role in road safety as the friction between tire and pavement surface is a critical contributing factor in reducing potential crashes. The skid resistance of a pavement surface has been related to two main properties of the pavement: microtexture and macrotexture. Microtexture is mainly dependent on aggregate shape, angularity and texture, while macrotexture is a function of asphalt mix properties, compaction method, and aggregate gradation. Many studies in recent years, such as NCHRP 4-30A and NCHRP 4-34 projects, have focused on evaluating and developing comprehensive test methods to measure aggregate shape, texture and angularity. However, none of these studies has clearly established any relationships between the aggregate properties and the ultimate pavement performance. The most recent developments in 3D laser imaging technology will be used to collect 3D pavement surface texture data at highway speed at 1 mm accuracy. The project also uses several other state-of-the-art laboratory and field data collection instruments, including the Aggregate Imaging System (AIMS) and a portable 3D surface analyzer to collect ultrahigh resolution aggregate morphological characteristics data, including shape, angularity, and surface texture related index properties. Moreover, pavement skid resistance data will be collected using a skid trailer, grip tester, and dynamic friction tester. This study presents a detailed analysis of aggregate characteristics and its relationship to skid resistance of pavements. An understanding of the relation of the aggregate physical properties and implementing the recommended aggregate selection procedure will result in an immediate improvement in pavement performance, especially for pavement safety.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 2) - Continued literature review; continued to perform data analysis; performed pavement preservation life cycle cost analysis; conducted ODOT engineer training; produced project progress reports; submitted FFY 2016 Annual Report; FY17 Annual Report submission is pending.

ODOT has approved a one (1) year project extension for continued data collection.

PROPOSED ACTIVITIES FOR FFY 2018: (1 Yr. Ext) - Perform laboratory characterization of aggregates using the LS-40 3D scanner; perform an additional round of field data collection; update data analysis and skid resistance models; update life cycle cost analysis; prepare a preventive maintenance treatment selection guideline; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$99,223	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$99,200	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$51,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

Project Sponsor: Kenny Seward, Asst. Materials Division Engineer, 405-522-4999

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2276 Evaluation of Ultra-High Performance Concrete for Use in Bridge Connections and Repair

PURPOSE AND SCOPE: Deterioration of bridges can often be related to poor performance of longitudinal connections between concrete members or transverse deck joints. Impacts from traffic and pressure buildup at joints due to expansion joints filled with debris can lead to physical deterioration at the joints. Ultra-high performance concrete (UHPC) has great potential for application in bridge connections and rehabilitation in Oklahoma. It has the potential to be used as a durable replacement/repair material for the areas immediately adjacent to expansion joints or as a connection material to make simply supported precast members continuous for live load, among many other possible applications. The proposed project will consist of evaluating available proprietary UHPC materials and mix designs made with local materials for applicability to bridge joint installation and repair in Oklahoma. Mix designs will be developed using local materials and several methods of obtaining optimal particle packing density. Mixing methods utilizing typically available concrete mixers will be examined to determine required mixing procedures. The proposed work will be combined with information available in the literature to produce draft specifications for UHPC materials, mixing methods, placing methods, and quality control in Oklahoma. Development of specifications guiding the use of locally available constituents in UHPC and for quality control will allow implementation of UHPC in many applications. This project will modify and adapt the Every Day Counts (EDC) EDC-4 initiative in Oklahoma.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 2) - Performed evaluation of appropriate materials for use in UHPC connections; started evaluations on current mixing and placement methods; began the development of specifications for UHPC materials; prepared training materials and presented a training seminar; performed laboratory-scale slab joint testing; removed and replaced one damaged bridge joint using Ductal and monitored joint performance; began cost analysis between UHPC and other methods typically used by ODOT; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 2 of 2) - Continue evaluations on current mixing and placement methods; complete development of specifications for UHPC materials; complete training; perform continuity joint testing; remove and replaced one damaged bridge joint using the UHPC formulation and monitor joint performance; continue cost analysis between UHPC and other methods typically used by ODOT; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$80,034	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$98,400	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$92,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Royce Floyd, The University of Oklahoma, 405-325-1010

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2277 Compilation of Local Studies and Regional Calibration of Pavement ME Design for Rigid and Flexible Pavements in Oklahoma

PURPOSE AND SCOPE: The proposed project focuses on the calibration and implementation of Pavement ME Design for applications in Oklahoma. ODOT has funded several research projects in the past that make the pursuit of the proposed study possible and timely. The data collected from numerous LTPP sites shall also be included. These projects have generated a significant amount of data inputs that are required in a successful Pavement ME Design. The primary objective for the proposed project is to compile information gathered from past studies, supplement as needed, and provide a suitable implementation of the calibration of the Pavement ME Design relative to Oklahoma, divided into two regions (west and east) – and to adjust the distress model coefficients, if necessary, for better prediction of pavement distresses for Oklahoma roadways. The primary product of the proposed study is a locally-calibrated Mechanistic-Empirical Pavement Design Guide (MEPDG) suitable for use in both routine design and special pavement studies in Oklahoma.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 3) - Began literature review; started LTPP data extraction and evaluation; identified test sections and began sampling/data collection; began laboratory testing and material characterization analysis; began comparison of ME pavement distress predictions w/LTPP distress data; began the development of deterioration models; began recommendations of regional calibration coefficients and determined adequacy of modified models; began the elimination of bias and reducing the standard error of the estimate; began database and software interface development; began the development of a local calibration and implementation guideline; began the development of a calibration catalog for calibration plan; started preparations of a procedures manual; began the development of a practitioners guideline; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 2 of 3) - Continue literature review; continue LTPP data extraction and evaluation; continue sampling/data collection; continue laboratory testing and material characterization analysis; continue to compare ME pavement distress predictions with LTPP distress data; continue the development of deterioration models; continue to produce recommendations of regional calibration coefficients and determined adequacy of modified models; continue the elimination of bias and reducing the standard error of the estimate; continue database and software interface development; continue the development of a local calibration and implementation guideline; continue the development of a calibration catalog for calibration plan; continue procedures manual preparations; continue the development of a practitioners guideline; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$100,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$100,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$105,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Maryam Sakhaeifar, Texas A&M University, 979-845-9961
 Project Sponsor: Josh Randell, ODOT Pavement Design Engineer, 405-521-2390
 Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2278 Recycling and Reuse of Materials in Transportation Projects-
 Current Status and Potential Opportunities Including Evaluation of RCA Concrete
 Pavements along an Oklahoma Interstate Highway

PURPOSE AND SCOPE: There are widespread benefits of using recycled and reusable waste materials in construction, especially in transportation projects. ODOT is conducting several technical studies to develop some specification and/or methodology incorporating recycled materials. But technical solutions will not be sufficient unless business consideration of the private sector within the state can be better understood and included in the decision making process. This proposed research project will develop strategies for increasing the use of recycled materials in ODOT transportation construction projects after bringing all the stakeholder perspectives in the decision making. It will be based on available recycled wastes in Oklahoma and neighboring states KS, TX and AR. The second objective of the proposed study is to evaluate the long-term performance of portland cement concrete pavement (PCCP) constructed with recycled concrete aggregate (RCA). A final report will synthesize the results of the recycled materials' availability evaluation and offer insight into the long-term performance of RCA concrete pavements in Oklahoma. Implementation of this information includes knowledge of materials currently available for use and the development of a construction specification(s) to further define the nature and benefits of recycling materials within a construction contract. Developing strategies for technical and business means will assist ODOT to use more recycled and reusable materials in construction and maintenance of transportation projects which ultimately protect and enhance human and natural environment by providing safe, economical and efficient transportation systems in Oklahoma.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 2) - Started a detailed literature review and examined current industry practices; identified and interviewed experienced industry professionals concerning reuse and recycling; began collection and characterization of recycled materials; began the formation of an Industry Focus Group to develop strategies to improve the use of recycled materials; reviewed project construction documents; performed a detailed visual survey of two ODOT RCA pavement sections; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 2 of 2) - Continue to identify and interview experienced industry professionals concerning reuse and recycling; continue the collection and characterization of recycled materials; continue development of an Industry Focus Group; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$99,999	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$99,900	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$105,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Anol Mukhopadhyay, Texas A&M University, 979-458-4618
 Project Sponsor: Josh Randell, ODOT Pavement Design Engineer, 405-521-2390
 Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2279 Probabilistic Approach for the Design of Drilled Shafts Socketed in Weak Rock in Oklahoma

PURPOSE AND SCOPE: The proposed scope of work has been specifically developed to produce rational and defensible methods for design of drilled shafts in weak rock. The scope reflects a comprehensive load test program that will also supplement currently available tests, with the additional benefit of characterizing site-specific foundation variability. Furthermore, it will provide greater confidence in the design methods and resistance factors that will be developed from the proposed work. Results of this study will provide the basis for quantifying the value of site-specific load testing for design and for implementing future improvements to design and construction that are currently being developed by FHWA. The primary objective for the proposed work is to develop rational and practical Load and Resistance Factor Design (LRFD) methods for design of drilled shafts in weak rock formations that are common in Oklahoma.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 3) - Conduct literature review; collect available load test data; perform initial analysis of available load test data to support site selection and field work; select appropriate load testing sites; design field load tests; perform construction and load testing of test shafts; conduct analysis and interpretation of load test measurements; conduct extensive site characterization for new and existing sites; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$175,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Erik Loehr, University of Missouri, 573-882-6380

Project Sponsor: Shon Jesse, ODOT Geotechnical Engineer, 405-522-3414

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2280 Development of Rating Tool for Prestressed Concrete
Bridges Vulnerable to Shear

PURPOSE AND SCOPE: Shear capacity of prestressed concrete girder bridges and load rating of these bridges has been studied over the years to better understand their ultimate behavior related to shear. In light of changes to the code since many older girders were designed and constructed, accurate load rating of bridges for shear is important to prevent adequate bridges from being rated deficient. A large number of bridges in Oklahoma were designed and put into service between 1960 and 1990 using the quarter point rule for shear design from the AASHTO Standard Specifications (e.g., AASHTO 1973) which considered the applied shear at the quarter-span point to be the critical value for the design demand, which often resulted in larger shear reinforcement spacings near the beam ends than what is typical for new construction.

The current AASHTO LRFD Specifications (2015) consider the critical location for shear to be much closer to the support, which can result in a larger design demand and smaller shear reinforcement spacings. The methods for calculating shear capacity included in the AASHTO LRFD Specifications have also evolved considerably over time and a number of additional methods have been proposed by researchers. According to ODOT engineers, many bridges in Oklahoma may have been designed using the quarter point rule for shear, potentially leaving these bridges vulnerable to a lower load rating compared to newer bridges when evaluated using the current LRFD Specifications. As the state of Oklahoma pushes to get the number of structurally deficient bridges down to less than 1% of all highway bridges in Oklahoma by the end of the decade, it is important that additional bridges are not labeled structurally deficient or load posted unnecessarily.

The objectives of the proposed research are intended to extend the results of previous research sponsored by ODOT related to shear in prestressed concrete bridge girders and evaluation of deterioration in in-service bridges in order to create useful tools for providing accurate ratings of older bridges.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 2) - Analyze data from shear tests in Oklahoma and from the literature, identify trends in girder design and capacity; conduct parametric study of various bridge configurations to identify important variables; begin to evaluate methods for assessing condition of aged girders using Bond Transfer Inverse Modeling and using Draw-In Data and Piecewise EI Identification techniques; begin Inspection Data Interpretation; begin rating tool development; produce project progress reports, prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$83,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Royce Floyd, The University of Oklahoma, 405-325-1010

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2281 Evaluating the Performance of Existing Reinforcement for Oklahoma Bridges

PURPOSE AND SCOPE: The increasing use of deicing salts in the United States over the past 65 years has resulted in the steady deterioration of roadway bridge decks due the corrosion of reinforcing steel. The annual cost of this corrosion damage was estimated at \$13.6 billion in 2012 (NACE 2012), a number that only continues to increase. Designing infrastructure to be resistant to corrosion is, therefore, of utmost importance. Many strategies rely on slowing or preventing the penetration of water, oxygen, carbon dioxide, and salt into the concrete. By its nature, however, bridge decks invariably develop of cracks parallel to and directly over the reinforcing bars. These cracks allow corrosive agents to penetrate to the level of reinforcing bars, where chloride contents can be high enough to cause corrosion to initiate in conventional reinforcing steel as early as the first year of service (Lindquist et al. 2006). This behavior makes the use of corrosion resistant/resisting reinforcement mandatory.

The proposed research includes an ongoing literature search to keep abreast of the latest information in the field of reinforcing bar corrosion protection systems, with special emphasis on epoxy-coated, ChrōmX, galvanized, and mild steel reinforcement, where the latter serves as a “control.” Field evaluations will be performed on deck panels taken from the I-35 bridge over Cow Creek and the adjacent control bridge, which contains mild conventional reinforcing steel. Visual observations of the performance of the northbound I-35 bridge over the Chickaskia River, which contains ChrōmX reinforcement, will also be used in the study. The test results and the field observations will be used to estimate the 100-year life cycle cost of bridges containing the four reinforcing steels. Project deliverables include an easy-to-use design table and a final project report describing efforts and results of this study, as well as a color article and technical presentations throughout the course of the study.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 1) - Conduct literature review; perform visual and laboratory evaluation of the existing epoxy-coated reinforcing steel from the deck panels taken from the I-35 bridge over Cow Creek and the adjacent control bridge which used black steel; perform visual observations of the performance of the ChrōmX (MMFX) rebar on the Northbound I-35 Bridge over the Chickaskia River; perform various corrosion measurement tests; perform accelerated lab testing on epoxy-coated, ChrōmX (MMFX), galvanized, and conventional black reinforcing steel and test for effects of UV damage; perform 100-year life cycle cost analysis for bridge decks in Oklahoma containing epoxy-coated, ChrōmX, galvanized, and mild steel; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$87,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: David Darwin, University of Kansas, 785-864-3827

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2282 Vehicle Classification and Bluetooth MAC's for
Origin-Destination Measurements

PURPOSE AND SCOPE: Designing and planning transportation systems is a complex task that requires extensive analysis of public need. Part of this process is determining the underlying characteristics of traffic patterns, including vehicle classification, purpose for travel, origin/destination (O/D), traffic travel time, and vehicle occupancy, among many other factors. Having a full grasp of this information is an important for traffic projection studies and transportation planning and O/D information is foremost among these characteristics. Bluetooth (BT) and WiFi-based technologies are currently used to monitor OD routes of various vehicles. Both are able to capture the unique hardware ID—namely medium address control (MAC) of a BT device in the vehicle whether it is the driver or passenger cellphone or the vehicle's factory installed Bluetooth system.

This project proposes the development of a new device that integrates two systems—namely magnetometer classification and BT identification for monitoring route choices per vehicle class, as well as targeting system deployment and demonstration. The research objectives of this proposal are four-fold. The study includes BT/class prototype design, BT-vehicle assignment algorithm development, system deployment, and accuracy analysis of detected BT-vehicle assignments.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 2) - Conduct comprehensive literature review; develop hardware and communication protocol for BT/class Station; begin highway segmentation investigation; begin vehicle roadway sensor highway layout investigation; begin development of BT signals and vehicle assignment algorithms; begin BT vehicle assignment accuracy evaluation; investigate commercial BT sniffer integration; produce project progress reports; prepare and submit FY18 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$100,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

Project Sponsor: Matthew Blakeslee, ODOT Traffic Management Engineer, 405-522-6713

Project Manager: Teresa Stephens, Research Engineer, 405-522-1062

2300 Research Implementation

PURPOSE AND SCOPE: Implementation is the incorporation of research results into everyday practices of the organization and is a crucial stage in the research process. Research findings from national and regional studies are also considered for implementation. No matter how the research is derived, it is of little importance if it is not implemented. The budget for this item is to provide funds for implementation needs that arise during the course of the FFY18 program that demand support outside the normal project selection process.

ACCOMPLISHMENTS DURING FFY 2017: A total of seven implementation projects were underway during the FFY2017 time frame. The speed data validation for traffic measurement project (NPMRDS-(16-01)) is almost 85% complete, this project validates traffic speed data for the ODOT across multiple road segments. On the project improving the efficiency and accuracy of ODOT temporary traffic monitoring systems 2301, additional Samsungs have been purchased for use along with additional Roadrunners, coverage has now gone from a test location near Tulsa to implementing this system state wide. The load testing and monitoring of the I-235 bridge in Oklahoma City 2302 has now moved into the monitoring phase of the study, load testing was accomplished in the June 2017 timeframe. Development of Intelligent Counting and Classification Sensor 2303 study is progressing well and will be completed on schedule. Part of the project work for the study Rehabilitation for bridge approach slab of the Blue River Site using Precast Concrete 2304 will be carried over to the FFY18 timeframe. The design for the slab has been completed, but an unexpected delay has been encountered due to the fact an environmental impact study is now being required for this site. It is expected that FFY17 money will be used to buy the slab for this project.

PROPOSED ACTIVITIES FOR FFY 2018: There are no known activities for FFY18 at the time of publication. If implementation needs arise that are approved for support during FFY18, implementation work plans will be prepared, a new Item number will be issued, and funds from this Item will be transferred to the new Item.

NOTE: This is the first year that Item 2300 is being used in the noted manner. Previous to this submittal, Item 2300 was used to support multiple implementation projects. Projects that were previously supported in this manner are identified in the Accomplishments section. Implementation projects that have work scheduled for FFY18 have been assigned to a unique Item number.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$160,819	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$160,800	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$150,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2300(16-01) National Performance Management Research Data Set (NPMRDS) -
Speed Data Validation for Traffic Performance Measurement

PURPOSE AND SCOPE: Urban traffic congestion is common and the cause for loss of productivity (due to trip delays) and higher risk to passenger safety (due to increased time in the automobile), not to mention an increase in fuel consumption, pollution, and vehicle wear. The fiduciary effect is a tremendous burden for citizens and states alike. As ODOT seeks ways to alleviate these ill effects, the proposed project aspires to improve performance measurements in an effort to manage current roadway assets, improve traffic flow, and reduce road congestion. The research team will develop “big data analytics” algorithms to organize and analyze very large sets of travel time data to discover hidden patterns and useful information undetected in large dataset, and identify and remove speed data outliers.

Successful development of the proposed models will commence a new method of traffic flow characterization based on “big data analytics”. The developed models will eliminate inaccurate speed measurements in the NPMRDS data and provide ODOT data analysts with proper tools to differentiate free flow from congestions and incorporate speed data into the ODOT traffic performance monitoring system.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 2) – Continue to determine performance measures of highway traffic; processed the entire National Highway System (NHS) and stored information in the speed database; examined speed data integration/processing methods by neighboring states; investigated the availability of suitable and accurate commercial software for ODOT use; investigated RITIS interactive map and data tree and the necessary steps to become a participating user; produced project progress reports; Final Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: None.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$90,745	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$90,700	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

Project Sponsor: Daryl Johnson, ODOT Traffic Analyst Engineer, 405-522-6376

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2300(16-03) Oklahoma Public and Tribal Transportation Infrastructure Employee Occupational Safety and Health Training and Evaluation

PURPOSE AND SCOPE: Workplace injuries and fatalities impact personnel, organizations and the general public. Workers are impacted both emotionally and financially by the incident. Organizations are impacted financially in both tangible and in-tangible ways. Co-workers of the personnel injured or killed can also be personally impacted by the incident. The general public is impacted through costs from the insurance industries and tax liability, so emphasizing worker safety, evaluating methods to provide training and the impacts of training are all critical components in developing an effective program to combat these issues.

This project proposes to continue a program meant to reduce the frequency and severity of public sector highway worker incidents; including those in similar capacities with Tribal Nations. The goal will be to combine both research and implementation to identify areas of emphasis while delivering needed training in which data can be collected for these workers. The objective of the project will be to use a nationally accepted OSHA 10 Hour Construction Industry curriculum which has been modified to reflect issues faced by public sector highway workers to provide both training and evaluation for continued improvement and performance measurement.

ACCOMPLISHMENTS DURING FFY 2017: Submitted Final Report.

PROPOSED ACTIVITIES FOR FFY 2018: End of Project.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$0.00	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Doug Wright, Oklahoma State University, 405-744-6049

Project Contact: Gary Hook, Implementation Engineer, 405-522-1042

2301 Improving the Efficiency and Accuracy of ODOT
Temporary Traffic Monitoring System

PURPOSE AND SCOPE: For many years ODOT has used an exclusively manual process to collect and enter temporary vehicle data (e.g., vehicle count, site information, device used, collection date and time, ODOT operator, and other vital data) into a computer database. This process is slow and inefficient. The outcome of this project intends to replace manual data handling with machine handling, eliminating the potential of data recording and/or entry errors and improving data collection/entry efficiency.

This implementation proposal aims to accomplish several objectives with an overall goal to demonstrate possible advantages achieved using vehicle classification Road Runner 3 (RR3) designed by Diamond Traffic Inc. and the Temporary Count Management System (TCMS) developed by Innovative Traffic Systems & Solutions (ITSS), LLC. Successful development of the proposed temporary classification management system will 1) improve the accuracy and quality of the collected data by minimizing manual handling of the data; 2) data validation check by constructing site specific models based on historical available data; 3) data entry into the OTCIS database for future analysis; 4) make data available immediately after collection by wirelessly transmitting data over a cellular provider network; and 5) improve the efficiency of temporary data collection method by automating many of its processes.

This current proposal will extend the project to support ODOT data collection activities for a full year using the developed system; implement any new software modification requested by ODOT; develop simple machine learning techniques to discover faulty data collection equipment.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 2 of 2) - Continued to conduct various field tests; continued OTCIS Data Base Maintenance; continued to train ODOT personnel; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (1 Yr. Ext.) - Obtain final list of temporary site information from ODOT; develop database scripts to remove sites not identified in the OTCIS database data; develop algorithms to validate database integrity; maintain TCMS Android software application developed by ITSS, LLC; maintain TCMS server and web services developed by ITSS, LLC; develop data mining algorithms for error detection; perform OTCIS database maintenance; conduct technical support and training sessions for ODOT data collectors; produce project progress reports; prepare and submit Final Report.

This item was formerly reported as item 2300(16-02). As of October 1, 2017, this project is being reported as item 2301.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$70,925	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$70,900	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$79,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

Project Sponsor: Aaron Fridrich, Transportation Manager 2, 405-736-9466

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2302 Load Test Monitoring of I-235 Bridge Repairs

PURPOSE AND SCOPE: In response to national issues with grouting errors, FHWA has required all of the state DOTs to inspect their post tensioned grouted tendons. Based on these inspections ODOT discovered some issues the I-235 bridge west of the state capitol. Older methods used during construction of this bridge led to some problems in the post-tensioning ducts. Not until relative recent years have DOT's required the use of thixotropic grouts for post-tensioning. Older grouts did not perform as well as the thixotropic grouts and tended to flow away from the high points leaving only water. Newer designs require additional vents especially at the high points. This project was directed at filling grout voids but stumbled into a few locations that did not have any grout. Due to concerns with section loss of the previously exposed prestressing strands, ODOT restricted permit traffic from travelling over the bridge. However, ODOT calculations show that a posting is not required. The approximate replacement cost for the bridge including the on-ramp is estimated to be \$50 million. As such, health monitoring of the bridge is justified. The research team at OSU can help ODOT in the assessment of these repairs by performing an array of nondestructive tests including live load testing, strain monitoring, and acoustic emissions monitoring.

The objective of the project is to assess and monitor the repairs to the regouted post tensioned tendons in the I-235 bridge. The anticipated benefit of the project is that it will provide insight into the effectiveness of the regouted tendon repairs and monitor their behavior over time. This knowledge will be valuable in future decisions on safety and maintenance of the monitored bridge members.

ACCOMPLISHMENTS DURING FFY 2017: (Yr 1 of 5) - Due to unforeseen FFY 2016 Year 1 delays, ODOT has approved a one year no cost time extension through FFY 2017 to allow for the completion of proposed FFY 2016 work activities. A revised budget was submitted by the PI which effectively modifies FFY 2017 as being Year 1. Scheduled site visit to inspect bridge and determine gauge locations and equipment requirements; identified and measured bridge crack patterns at hinges; obtained detailed bridge plans to guide further load testing and monitoring plan development; ordered load testing equipment and materials; developed load testing protocol; installed gauges; performed initial load test; produced project progress reports; submitted FFY 2016 Annual Report; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr 2 of 5) - Conduct non-load-test monitoring and inspections; produce project progress reports; prepare and submit FFY 2018 Annual Report.

This item was formerly reported as item 2300(16-04). As of October 1, 2017, this project is being reported as item 2302.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$2,370	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$47,100	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$9,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Robert Emerson, Oklahoma State University, 405-744-5259

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2303 Development of Intelligent Vehicle Counting and
Classification Sensor (iVCCS)

PURPOSE AND SCOPE: Traffic monitoring is an integral part of any transportation system network. Providing reliable, real-time traffic surveillance is crucial for such 21st century systems. Timely data facilitates instantaneous decision-making; maximizes existing transportation infrastructure capacity; and improves roadway efficiency, making transportation systems safe, efficient, and more reliable for the anticipated rapidly approaching era of smart cities.

The proposed research aims at developing and implementing a novel intelligent wireless sensor for vehicle counting and classification which integrates state-of-the-art embedded wireless sensor networks (WSN) and smart sensors for implementation of various traffic monitoring applications. Successful development of the proposed wireless sensor node—aimed at accurate vehicle detection, counting, and classifications—will commence a new method of temporary traffic data collection. The new system will eliminate the cumbersome installation and utilization of hoses, thus, improve the quality of collected data and increase the efficiency of temporary data collection. Furthermore, minor hardware and software modifications will ensure the development of a system that will improve work zone safety by monitoring real-time traffic on roadways as vehicles approach work zones.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 1) - Implemented hardware and software adjustments; implemented final sensor node (iVCCS hardware) prototype; implemented and transferred developed algorithms into the finalized iVCCS prototype; validated system functions and optimized performance; investigated more robust aluminum alloy sensor enclosure; developed user-friendly software analysis tool with graphical user interface (GUI) to analyze raw data collected using iVCCS; developed a Webserver on ODOT Cloud; produced project progress reports; FFY 2017 Annual Report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (1 Yr. Ext.) - Investigate power saving techniques suitable for iVCCS; develop and implement power consumption monitoring algorithms; develop and implement iVCCS-suitable power consumption aware algorithms; evaluate power aware algorithms for leveraging various power saving algorithms; design and implement photovoltaic-based and RF coil harvesting circuits; evaluate the harvesting system; finalize aluminum alloy sensor’s enclosure; develop cloud gateway for interfacing the sensor to the cloud; produce project progress reports; prepare and submit Final Report.

This item was formerly reported as item 2300(17-01). As of October 1, 2017, this project is being reported as item 2303.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$92,863	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$92,800	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$109,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Hazem Refai, The University of Oklahoma, 918-660-3243

Project Sponsor: Aaron Fridrich, Transportation Manager 2, 405-736-9466

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2304 Rehabilitation for the Bridge Approach Slab of the Blue
River Site Using Precast Concrete Pavement

PURPOSE AND SCOPE: Field observations performed at the Blue River site on US-70 in Bryan County revealed that serious settlement issues have occurred at the junction between the bridge approach slab (BAS) and the oncoming lanes of asphalt pavement. Other concerning problems worth noting; site grading concentrated runoff flows at the PCC/AC transition; longitudinal cracking; deteriorated joint sealant; differential settlement discovered at the connection between the BAS structure and the attached wing walls; water stains found at the face of the abutment wall. The research team decided to perform replacement of the distressed BAS and asphalt pavement section based on, and following, the design guideline developed for recently completed research project SPR item number 2265, "Precast Pre-stressed Concrete Pavement to Abate Settlement Problems under Bridge Approach Slabs."

The performance of the proposed design solutions through field instrumentation and monitoring will be evaluated which will help to further reassess and modify the design guideline. The research team will perform instrumentation and data collection for the BAS structure for analyzing the performance of the structure. A final report containing detailed information of the construction and evaluation of the performance of the structure will be presented at the end of the project.

ACCOMPLISHMENTS DURING FFY 2017: (Yr. 1 of 1) - Finalized design details; developed design drawings; began precast concrete slabs instrumentation and fabrication; performed slab curing and controlled storage; rehabilitated the BAS based on proposed solution; produced project progress reports; FFY17 Annual report submission is pending.

PROPOSED ACTIVITIES FOR FFY 2018: (1 Yr. Ext.) - Rehabilitate BAS and set up field instrumentation; monitor/analyze data and revise data design guidelines; produce project progress reports; prepare and submit Final Report.

This item was formerly reported as item 2300(17-02). As of October 1, 2017, this project is being reported as item 2304.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$132,278	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$132,200	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$152,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Dan Zollinger, Texas A&M Transportation Institute, 979-845-9918

Project Sponsor: Walt Peters, ODOT Asst. Bridge Division Engineer, 405-521-2606

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2305 Implement Balanced Asphalt Mix Design in Oklahoma

PURPOSE AND SCOPE: Oklahoma Department of Transportation (ODOT) uses a volumetric asphalt mix design method based on AASHTO R35. Like many agencies, ODOT uses the Hamburg Wheel Test (HWT) to screen mixtures for rutting potential; however, they have no current test for evaluating fatigue resistance. There is a national effort to move toward a Balanced Mix Design (BMD) approach for design of asphalt mixtures. BMDs incorporate two or more mechanical tests such as a rutting test and a cracking test to assess how well the mixture will resist common forms of distress. Adopting a BMD design approach in Oklahoma should lead toward a less prescriptive approach to mix design and longer lasting, better performing asphalt pavements.

The objectives of this study are to review the available literature and select the best Semi-Circular Bend (SCB) test for use in a BMD for Oklahoma and to evaluate selected ODOT mixtures to assist with determining test procedures, specifications and special provisions for evaluation and eventual adaptation in a BMD procedure for ODOT. Development of draft specifications and draft supplemental specifications for a balanced mix design procedure for ODOT will move ODOT away from a voids based mix design procedure, allowing more innovative design concepts and producing longer lasting more durable and rut resistant pavements.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 1) - Perform literature review; conduct consultation meetings with ODOT staff to determine the option(s) selected for the direction of the project and to develop and approve the test plan and protocols; perform SCB testing; produce project progress reports; prepare and submit Final Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$118,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Stephen Cross, Oklahoma State University, 405-744-7200

Project Sponsor: Kevin Sutor, Transportation Manager, 405- 521-2677

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2306 Continuous Friction Measurement Equipment (CFME) for
Highway Safety Management in Oklahoma

PURPOSE AND SCOPE: Pavement frictional properties play a significant role in road safety. It has long been recognized that adequate friction between the tire and pavement is a critical factor in reducing crashes and improving roadway safety. Therefore, it is important that Departments of Transportation (DOTs) monitor the friction of their pavement networks frequently and systematically by establishing Pavement Friction Management (PFM) programs.

The aim of this program is to minimize friction-related vehicle crashes by ensuring that pavements provide adequate friction properties throughout their lives. The main objective of this study is to evaluate the capabilities of the Grip Tester, one type of CFME device, and its ability to provide information useful for supporting PFM programs. Fixed slip devices offer a practical alternative for network-level pavement friction data collection at highway speeds. The application of CFME based technology allows network screening to identify locations with low friction or vulnerable accident sites at both the project and network levels, and to determine safety impacts of design changes and effects of engineering treatments.

The developed methodology contributes to the development of enhanced safety performance function to better predict crash rate and the potential establishment of pavement friction management programs in Oklahoma by providing an objective method for the equipment users to compare and process their friction measurements.

ACCOMPLISHMENTS DURING FFY 2017: New project.

PROPOSED ACTIVITIES FOR FFY 2018: (Yr. 1 of 2) - Perform literature review; begin experimental design; perform instrumented field data collection for each selected site to measure pavement surface skid resistance; begin evaluation of CFME Grip Tester friction measurements; begin framework of developing improved crash rate prediction models using CFME data; begin development of data processing and analysis software for CFME; produce project progress reports; prepare and submit FFY 2018 Annual Report.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$0.00	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$93,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Principal Investigator: Joshua Li, Oklahoma State University, 405-744-6328

Project Sponsor: Aaron Fridrich, Transportation Manager 2, 405-736-9466

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

2400 Oklahoma State University Master Agreement for
Research and Investigation Services

PURPOSE AND SCOPE: This item will support a task-order based contract for the purpose of providing ODOT the opportunity to address topics and needs that were not brought through the formal annual project selection process and/or were identified outside the formal process. It is anticipated that these projects will range in both scope and financial commitment from simple to complex, but generally be limited to a one-year or less completion cycle. Topics could include traditional research topic areas of interest to the Agency, as well as ancillary effort including education and workforce development and technology transfer through, but not limited to, collaboration, leadership training, addressing student retention and diversity, and internship programs.

ACCOMPLISHMENTS DURING FFY 2017: Oklahoma State University was not selected for UTC funding and state funding was not initiated in FFY17, therefore, there was no activity under this Item.

PROPOSED ACTIVITIES FOR FFY 2018: ODOT will develop task orders for services and research needs through interaction with Agency personnel that meet the intent of this item.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$500,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$0.00	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$508,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Project Contact: Kelvin Wang, Oklahoma State University, 580-744-5206

Director of Capital Programs: Dawn R. Sullivan, 405-522-6000

2700 New and Equal Product Evaluation Program

PURPOSE AND SCOPE: This project was established to provide ODOT with a means of providing for the (experimental) use, monitoring, evaluation and implementation of products for highway and bridge construction where the products do not meet current ODOT standards and specifications.

ACCOMPLISHMENTS DURING FFY 2017: Streamlined database for New or Equal Product Evaluation and processed requests for product evaluation from vendors; added ChromX 4100 to Approved Products List, to include installation of ChromX 4100 in the SH-58A bridge over the auxiliary spillway at Canton Lake; maintained records of new products where manufacturers made presentations or provided literature; consulted with applicable ODOT division subject matter experts on new product evaluations; continued to consult with product vendors, representatives and firms; Adopted revision of New or Equal Product Evaluation Form with input from Traffic Engineering Division, Roadway Design Division, and Materials Division. Revised Product Evaluation database to reflect revised New or Equal Product Evaluation Form.

PROPOSED ACTIVITIES FOR FFY 2018: Continue to maintain database for New or Equal Product Evaluation, to include records of products submitted to ODOT; coordinate communication between vendors and ODOT representatives; continue to meet with vendor representatives; circulate product literature; provide information to applicable ODOT division subject matter experts; coordinate and facilitate product meetings and presentations for new product evaluation forms; conduct and monitor product performance evaluations; continue the collection of photographic records for current and new product applications as they are implemented.

FINANCIALS	AMOUNT	FUND	AMOUNT	FUND
Programmed Amount FFY 2017	\$10,000	SPR	\$0.00	STATE
Estimated Cost FFY 2017	\$10,000	SPR	\$0.00	STATE
Projected Cost FFY 2018	\$73,000	SPR	\$0.00	STATE

CONTACT INFORMATION

Project Manager: Gary Hook, Implementation Engineer, 405-522-1042

TPF-5 (255) Highway Safety Manual Implementation

PURPOSE AND SCOPE:

AASHTO published the 1st Edition of the Highway Safety Manual in 2010. The primary focus of the HSM is the introduction and development of analytical tools for predicting the impact of transportation project and program decisions on road safety. The HSM provides the best factual information and tools to facilitate roadway planning, design, operations, and maintenance decisions based on precise consideration of their safety consequences.

Goals of the AASHTO Standing Committee on Highway Traffic Safety include:

- Institutionalize the AASHTO Highway Safety Manual (HSM) and its associated analytical tools to make data-driven decisions, advance the science of safety, and to ultimately reduce fatalities and serious injuries.
- Establish and maintain an HSM Implementation Transportation Pooled-Fund Study.

OBJECTIVES:

The objectives of the study are to: advance ongoing efforts by lead states to implement the HSM, expand implementation to all states as well as coordination with projects that develop content for future editions of the HSM including NCHRP Project 17-45 "Enhanced Safety Prediction Methodology and Analysis Tool for Freeways and Interchanges," NCHRP Project 17-54 "Consideration of Roadside Features in the Highway Safety Manual" and Transportation Pooled-Fund Study TPF-5(099) "Evaluation of Low Cost Safety Improvements."

PARTNERS:

Louisiana Transportation Research Center, CA, ID, IL, KS, KY, LA, MI, MO, MS, NC, NJ, NV, OH, OK, OR, PA, UT, WA, WI, WV.

OKLAHOMA INVOLVEMENT:

Accelerate implementation of the HSM. Representative for the Technical Working Group would identify and prioritize specific tasks and products. Specific tasks may include developing: (1) a calibration manual to accompany the HSM that provides practical advice and examples on how best to adapt HSM calibration procedures, (2) technical guidance for developing safety performance functions, and (3) guidance for assembling and managing the data needed for safety analyses. Exchange information, best practices, lessons learned, and remaining challenges in implementing the HSM. These exchanges would feed an annual process through which the Technical Working Group identifies and prioritizes future tasks to be conducted under the study.

Study Period	2012	2013	2014
State Contribution (\$)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: December 2019

POINTS OF CONTACT

Lead: Jerry Roche, (515) 233-7323

ODOT: David Glabas, (405) 521-4157

FHWA: Jerry Roche, (515) 233-7323

TPF-5 (267) Accelerated Performance Testing for the
NCAT Pavement Test Track
2018-2020

PURPOSE AND SCOPE:

State Departments of Transportation (DOTs) funded construction of the National Center for Asphalt Technology (NCAT) Pavement Test Track with the goal of reducing and predicting distresses in flexible pavements. A total of forty-six 200-foot test sections of perpetual pavement were constructed in 2001 on a 1.7 mile oval and have been maintained or reconstructed since 2001. Research cycles are run over three years, with two years of accelerated loading and pavement monitoring resulting in 10 million Equivalent Single Axle Loads (ESALs) of heavy truck traffic applied to the test sections.

OBJECTIVES:

- State sponsors secure material donations, with the pooled fund covering reasonable hauling expenses. NCAT administers competitively bid subcontracts for procuring supply and grade control of subgrades and bases, aggregate hauling, liquid asphalt supply and delivery, plant production, and mix placement.
- Construct new or apply maintenance treatments to the test sections that represent in-service roadways on the open transportation infrastructure. Install both environmental (i.e., multi-depth pavement temperature probes) and response instrumentation (i.e., high speed stress and strain gages) in new or maintained experimental sections.
- Apply accelerated performance truck traffic for two years. Develop performance model based on laboratory testing of basic material and mix performance properties. Use pavement surface condition, pavement load response, precise traffic and environmental logging, and cumulative damage to validate/calibrate new and existing approaches to pavement analysis and design.
- In a highly controlled experiment, use actual pavement management performance data to refine maintenance programs. Correlate field results with laboratory data for both mechanistic and preservation applications. Answer practical questions posed by research sponsors through formal (i.e., reports and technical papers) and informal (e.g., one-on-one responses to sponsor inquiries) technology transfer.

PARTNERS:

AL, CO, FHWA, FL, GA, IL, KY, MD, MI, MN, MS, NY, NC, OK, SC, TN, VA, WI

OKLAHOMA INVOLVEMENT:

Oklahoma currently has one section (N9) programmed for maintenance and continuing monitoring and is involved in two other NCAT group studies – Cracking Group and Pavement Preservation Group. Oklahoma is proposing a new section, N6, for construction and monitoring to address balance mix design research.

Study Period	2018	2019	2020
State Contributions (\$)	450,000	450,000	450,000

ESTIMATED COMPLETION DATE: September 2020

POINTS OF CONTACT

Lead: Michelle Owens, (334) 353-6942

ODOT: Kevin Sutor, (405) 522-4986

FHWA: Christopher Wagner, (404) 562-3693

TPF-5 (267) Accelerated Performance Testing for the
NCAT Pavement Test Track
2012-2017

PURPOSE AND SCOPE:

State Departments of Transportation (DOTs) constructed the National Center for Asphalt Technology (NCAT) Pavement Test Track with the goal of reducing and predicting distresses in their flexible pavements. The Alabama Department of Transportation (ALDOT) funding commitment reduced the cost for other states to sponsor the construction, testing, trucking and evaluation of experimental pavements. The first test phase studied surface mix performance on forty-six 200-foot test sections of perpetual pavement. Adding instruments for high-speed response to each pavement facilitated the study of Mechanistic-Empirical (M-E) pavement design. During each cycle, experimental pavements were subjected to 10 million Equivalent Single Axle Loads (ESALs) of heavy truck traffic.

OBJECTIVES:

- State sponsors secure material donations, with the pooled fund covering reasonable hauling expenses. NCAT administers competitively bid subcontracts for procuring supply and grade control of subgrades and bases, aggregate hauling, liquid asphalt supply and delivery, plant production, and mix placement.
- Construct 200-foot test sections on the existing 1.7 mile NCAT test oval that represent in-service roadways on the open transportation infrastructure. Install both environmental (i.e., multi-depth pavement temperature probes) and response instrumentation (i.e., high speed stress and strain gages) in new experimental sections.
- Once construction is complete, apply accelerated performance truck traffic for two years. Develop performance model based on laboratory testing of basic material and mix performance properties. Use pavement surface condition, pavement load response, precise traffic and environmental logging, and cumulative damage to validate/calibrate new and existing M-E approaches to pavement analysis and design.
- In a highly controlled experiment, use actual pavement management performance data to refine maintenance programs. Correlate field results with laboratory data for both mechanistic and preservation applications. Answer practical questions posed by research sponsors through formal (i.e., reports and technical papers) and informal (e.g., one-on-one responses to sponsor inquiries) technology transfer.

PARTNERS:

AL, CO, FHWA, FL, GA, IL, KY, MD, MI, MN, MS, NY, NC, OK, SC, TN, VA, WI

OKLAHOMA INVOLVEMENT:

Oklahoma currently has one section and is involved in two other studies at NCAT. Oklahoma is involved in section N9 and is in the Cracking Study and the preservation Study. NCAT runs on a three year cycle, which ends this year and states and their sections and projects will be up for renewal in 2018.

Study Period	2012	2013	2014	2015	2016	2017
State Contributions (\$)	400,000	370,000	370,000	360,000	360,000	720,000

ESTIMATED COMPLETION DATE: September 2018

POINTS OF CONTACT

Lead: Michelle Owens, (334) 353-6942
ODOT: Kevin Suitor, (405) 521-2677
FHWA: Christopher Wagner, (404) 562-3693

TPF-5 (269) Development of an Improved Design Procedure for Un-bonded Concrete Overlays

PURPOSE AND SCOPE:

One pavement rehabilitation option that has been gaining popularity in the U.S. recently is un-bonded concrete overlays of existing concrete or composite pavements (UCOCP). While thicker (greater than 7 inches) un-bonded concrete overlays have performed very well in many states, current economic restrictions, as well as an interest in using less materials (sustainability), are guiding agencies toward optimizing concrete overlays. One area of deficiency in the application of un-bonded concrete overlays is the lack of a rational design procedure that addresses all components of the structure and their interaction.

While several design procedures have been formulated by local agencies and the concrete paving industry, few are based on detailed research and actual long term field performance. Overall guidance on the economics and design of such features as pavement widening, super elevations, and safety features (raising guardrails) are covered in publications like the National Concrete Pavement Technology Center's (NCPTC) "Guide to Concrete Overlays" (Harrington, et al. 2008). Similar to the AASHTO method, the MEPDG does not consider friction or bond between the overlay and the interlayer. This again can lead to conservative designs. Characterization of the behavior and performance of the interlayer is critical in the design of un-bonded concrete overlays.

OBJECTIVES:

The primary purpose of this project is to create a unified national design guide for un-bonded concrete overlays of existing concrete and composite pavements. This consists of the following distinct objectives:

1. Study and understand the field performance history of UCOCP as demonstrated by various test sections and in-service pavements.
2. Determine suitable separator layer (interlayer) materials and properties to insure long term performance of UCOCP systems.
3. Develop a design procedure for un-bonded concrete overlays of existing concrete and composite pavements utilizing existing validated performance models, as well as new analytical models derived to address deficient or missing design parameters in existing methods.

PARTNERS:

AZ, CA, CO, HI, ID, MT, ND, NM, NV, OK, OR, TX, UT, WA.

OKLAHOMA INVOLVEMENT:

Project currently on hold, pending contract approval with the Principal Investigator.

Study Period	2012	2013	2014
State Contribution (\$)	20,000	20,000	20,000

ESTIMATED COMPLETION DATE: May 2018

POINTS OF CONTACT

Lead: Tom Burnham, (651) 366-5452

ODOT: Josh Randell, (405) 521-2390

FHWA: Angela Jacobs, (202) 366-0076

TPF-5 (288) Western Road Usage Charging Consortium

PURPOSE AND SCOPE:

Members of this voluntary consortium are interested in collaborative research and development of a potential new transportation funding method that would mean collecting a Road Usage Charge (RUC) from drivers based on actual road usage.

Members of the consortium would choose how they pay without requirements to adopt the system(s) used by other Members. The new funding method would include:

- Readily-available and affordable consumer products and technologies (such as smartphones, in-vehicle navigation systems, and other data-dependent vehicle technologies).
- Funding for roadway maintenance and improvements.

OBJECTIVES:

The Membership of the Western Road Usage Charge Consortium has adopted an organizational Charter and developed a Work Plan. The Consortium Members share the following goals:

- Explore the technical and operational feasibility of a multi-jurisdictional road usage charge system.
- Investigate criteria for acceptance; share experience and lessons learned to foster positive outcomes.
- Develop standards and protocols for how road use charges could best be collected and remitted among the various jurisdictions.
- Develop preliminary operational concepts for how a multi-jurisdictional road usage charge system would be administered.
- Develop a model for regional cooperation and interoperability that can be used in the Western region and potentially across North America.
- Engage the automotive manufacturing and technology sector to encourage the ability for mileage reporting to occur in conjunction with other products and services the sector provides in the marketplace.
- Share knowledge to maximize the preparedness for and efficiency of policy and program development for road usage charging among the members.

PARTNERS:

AZ, CA, CO, HI, ID, MT, ND, NM, NV, OK, OR, TX, UT, WA.

OKLAHOMA INVOLVEMENT:

Oklahoma participates and supports this consortium and incorporates processes and standards into ODOT, as appropriate.

Study Period	2017	2018
State Contribution (\$)	25,000	25,000

ESTIMATED COMPLETION DATE: September 2018

POINTS OF CONTACT

Lead: Randal Thomas, (971) 240-7094
ODOT: Russell Hulin, (405) 521-4768
FHWA: Angela Jacobs, (202) 366-0076

TPF-5 (297) Improving Specifications to Resist Frost Damage in Modern Concrete Mixtures

PURPOSE AND SCOPE:

Concrete can be damaged when it is sufficiently wet (has a high degree of saturation) and when it is exposed to temperature cycles that enable freezing and thawing. Damage due to freezing and thawing often leads to premature deterioration, costly repairs, and premature replacement of concrete infrastructure elements. Providing a consistent air void system in hardened concrete is challenging due to numerous variables during the batching, mixing, and placement that impact how air entraining agents perform in concrete.

OBJECTIVES:

The goal of the research is to produce improved specifications, and test methods; while, improving the understanding of the underlying mechanisms of frost damage. Specifically, this work will seek to develop new test procedures that may be faster and/or more reliable than the existing methods. An important objective of this project would mean establishing new test methods and specifications for fresh and hardened concrete to determine frost durability and field performance.

PARTNERS:

AK, CO, CT, FHWA, IA, ID, IL, IN, KS, MI, MN, ND, NE, NJ, NY, OK, PA, RI, WI.

OKLAHOMA INVOLVEMENT:

Research at Oklahoma State University has shown that current frost damage specifications may not always be adequate for mixtures with some modern water reducers. Results from recent studies suggest that frost damage can be reduced through new tests and improved specifications, leading to extended service life of concrete infrastructure.

Understanding the research on freeze-thaw mechanisms is important for two main groups:

- 1) practicing professionals, and
- 2) graduating undergraduate and graduate students.

Practicing professionals frequently require information in a short time frame to respond to practice-based problems. Developing a strong educational technology transfer program would include a short course that utilizes a DVD/streaming video approach for use by practitioners as needed.

Study Period	2014	2015	2016	2017	2018	2019
State Contributions (\$)	17,500	17,500	17,500	17,500	17,500	17,500

ESTIMATED COMPLETION DATE: February 2019

POINTS OF CONTACT

Lead: Ron Curb, (405) 521-3795

ODOT: Ron Curb, (405) 521-3795

FHWA: Richard Meininger, (202) 493-3191

TPF-5 (312) Western Maintenance Partnership

PURPOSE AND SCOPE:

In the 1980's the Rocky Mountain Maintenance Tour established a highly effective forum for the exchange of information, techniques, policies and strategies for the maintenance of the highway system. Since then, the role of maintenance has shifted from new construction/major rehabilitation to cost effective infrastructure preservation/asset management.

The Western Maintenance Partnership (WMP) previously ran from 2006-2014 as TPF-5(145). Many of the WASHTO states have expressed interest in continuing the WMP. During this 5-year continuation of the WMP, participating agencies will focus on Maintenance, partnering with WASHTO states to share experiences, innovations, expertise and solutions to the complex management of highway assets.

OBJECTIVES:

Continue to provide a partnering forum for promoting effective maintenance strategies. The minimum funding contribution is necessary to:

- Manage the WMP's operations, including management support of WMP.
- Maintain a web site for displaying meeting reports, state guidelines and specifications.
- Implement task orders, as designated by the WMP members.
- Provide travel reimbursement funds for annual meeting.

The minimum funding contribution would include reports of the proceedings from the annual conferences and annual workshops.

During the annual workshop, the WASHTO Committee on Maintenance would present formal training. Sharing technology and field experience would include: policies, practices, specifications, field investigations, applied research, materials, and training.

PARTNERS:

CA, ID, MT, NV, OK, TX, UT, WA.

OKLAHOMA INVOLVEMENT:

This fund primarily serves the WASHTO Standing Committee on Maintenance (SCOM) which is basically the same group of maintenance engineers that make up the Western Maintenance Partnership (WMP). WMP's primary function is to provide funds for an annual scan tour by a WASHTO member State. ODOT recently hosted the event in 2015. This study could run through FY19.

Study Period	2015	2016	2017
State Contribution (\$)	5,000	5,000	5,000

ESTIMATED COMPLETION DATE: June 2019

POINTS OF CONTACT:

Lead: David Stevens, (801) 589-8340

ODOT: Alex Calvillo, (405) 521-2557

FHWA: Arlene Kocher, (202) 366-4612

TPF-5 (313) Technology Transfer Concrete Consortium (TTCC)

PURPOSE AND SCOPE:

Increasingly, state departments of transportation (DOT's) are challenged to design and build longer life concrete pavements that result in a higher level of user satisfaction for the public. Collaboration between experts from state DOT's, Federal Highway Administration (FHWA), academia and industry is important for identifying and examining new concrete pavement research initiatives.

Pooled fund activities and budgets are discussed at the semi-annual meetings. Partners often present proposals for minor research, synthesis studies, and/or training for discussion and voting at the semi-annual meetings. National Concrete Consortium members may propose needed research and/or training, however they may not vote on how to utilize the federal pooled funds. Occasionally e-mail discussions and votes are warranted.

OBJECTIVES:

The Iowa DOT, through the National Concrete Pavement Technology Center (CP Tech Center) at Iowa State University, will serve as the lead state, handling all administrative duties associated with the project. The CP Tech Center will also serve as the lead research institution for the project.

Efforts for the TTCC include these examples:

- Maintain the TTCC pooled fund listserv and website with current activities and deliverables.
- Guide the development of technology transfer materials (tech brief summaries and training materials).
- Contribute to a technology transfer newsletter for the CP road Map project website.
- Publish electronic quarterly reports following lead state guidelines.
- Submit a final report to participants that document the results of the entire project.

The TTCC has designed TPF-5 (313) to foster new technologies and practices by identifying, supporting, facilitating and funding concrete research and technology transfer initiatives. The TTCC is open to any state agency desiring to be a part of new developments in concrete.

PARTNERS:

AL, CA, CO, FL, GA, IA, ID, IL, IN, KS, LA, MI, MN, MO, MT, NC, ND, NE, NV, NY, OH, OK, OR, PA, RI, SD, TN, TX, UT, WA, WI.

OKLAHOMA INVOLVEMENT:

Oklahoma provides data input for the studies; participate in quarterly meetings via conference call; attend annual meetings.

Study Period	2015	2016	2017	2018	2019
State Contribution (\$)	12,000	12,000	12,000	12,000	12,000

ESTIMATED COMPLETION DATE: August 2020

POINTS OF CONTACT

Lead: Peter Taylor, (515) 294-9333

ODOT: Kenny Seward, (405) 521-4999

FHWA: Gina Ahlstrom, (202) 336-4612

TPF-5 (326) Develop and Support Transportation Performance Management
Capacity Development Needs for State DOTs

PURPOSE AND SCOPE:

Moving Ahead for Progress in the 21st Century (MAP-21) establishes a broad performance-based approach to the Federal Highway Program. MAP-21 identifies seven performance areas in which the US DOT, in consultation with their stakeholders, will develop performance measures. Under MAP-21, State Transportation Agencies (STAs), Metropolitan Planning Organizations (MPOs), and public transit providers are required to develop strategies and targets for each of the performance measures established by USDOT. The focus of this pooled-fund project will be to determine and support participating State's, MPO's, and Public Transportation providers Transportation Performance Management (TPM) Capacity Development needs.

OBJECTIVES:

This pooled fund project will focus on research, assess training and educational needs of contributing members, develop and deliver training, and facilitate the sharing and retention of performance management best practices.

Funding will be used to:

- Identify Gaps in TPM Knowledge, Skills and Abilities—Conduct a needs analysis for learning and capacity development of contributing members resulting in a short and long-term capacity building roadmap;
- Develop and Deliver Learning and Capacity Development Resources—Develop training and educational material to meet the gaps identified in the knowledge, skills and abilities;
- Establish a TPM Information Clearinghouse—The TPM Information Clearinghouse will be used to showcase PM best practices, foster collaboration, and serve as a repository for PM resources; and
- Support Knowledge Transfer Among Pooled Fund States.

PARTNERS:

Kentucky Transportation Cabinet, AL, AR, CA, CO, CT, FHWA, HI, IA, MD, MN, MO, MS, NJ, Oahu MPO, OK, PA, RI, TX, UT, WA, WI.

OKLAHOMA INVOLVEMENT:

Participate in monthly/quarterly conference calls; Oklahoma is a voting member of this study.

Study Period	2016	2017	2018
State Contribution (\$)	10,000	10,000	10,000

ESTIMATED COMPLETION DATE: December 2021

POINTS OF CONTACT

Lead: Lori Fisette, (401) 222-6940

ODOT: Matt Swift, (405) 521-2704

FHWA: Michael Nesbitt, (202) 366-1179

TPF-5 (328) Strain-based Fatigue Crack Monitoring of Steel Bridges using
Wireless Elastomeric Skin Sensors

PURPOSE AND SCOPE:

Fatigue cracks have been a major issue for steel bridges in the nation. State DOTs currently rely on a two year inspection period to examine steel bridges for detecting fatigue crack activities. The main objective of this proposal is to provide state DOTs a practical and cost effective long term fatigue crack monitoring methodology using a wireless elastomeric skin sensor network.

OBJECTIVES:

In this three year study, shared cost for Oklahoma is \$25,000/year starting in 2015. The study will have two phases. Study tasks are as follows:

- (1) Crack sensor fabrication
- (2) Small scale Validation
- (3) Wireless Data Acquisition System
- (4) Data Quality Assessment
- (5) Crack Detection Algorithm
- (6) Autonomous Sensor Network
- (7) Small Scale System Validation
- (8) Robustness Test
- (9) Large Scale Validation

PARTNERS:

KS, MN, NC, OK, PA, TX.

OKLAHOMA INVOLVEMENT:

No data input, quarterly conference calls relating to subject. Project end date will be August 2018. ODOT has fully paid in.

Study Period	2015	2016	2017
State Contributions (\$)	25,000	25,000	25,000

ESTIMATED COMPLETION DATE: August 2018

POINTS OF CONTACT

Lead: Susan Barker, (785) 291-3847

ODOT: Wes Kellogg, (405) 522-4819

FHWA: Justin Ocel, (202) 493-3080

TPF-5 (335) 2016 through 2020 Biennial Asset Management Conference and Training on Implementation Strategies

PURPOSE AND SCOPE:

Section 1203 of the MAP-21 stipulates USDOT to promulgate performance measures in the areas of the National Highway Performance Program (NHPP), Highway Safety Improvement Program (HSIP), the Congestion Mitigation and Air Quality Improvement Program (CMAQ), and the National Freight Movement (Freight) within 18 months after the date of enactment of the MAP-21. State Departments of Transportation (DOTs) are tasked with developing performance measures plans, which include asset management plans. The focus of this pooled fund project will be in the area of the NHPP.

OBJECTIVES:

1. Provide communication and information sharing among member states. Discuss research needs and provide research ideas to TRB.
2. Provide a technology and knowledge exchange forum to enhance the practical knowledge of member states concerning asset management implementation.
3. Enhance the working knowledge of the asset management community.

SCOPE OF WORK:

The Iowa DOT will serve as lead state for this Pooled Fund project. The principle tasks are:

1. Coordinate a Technical Advisory Committee meeting (i.e. workshop or webinar) for member states to learn and review issues associated with implementation of asset management. Member states share best practices and strategies for overcoming certain challenges.
2. Coordinate an annual survey of state DOT asset management practices to help states evaluate their asset management status. Support development of content for the conference and training activities.
3. Provide a Biennial Asset Management Conference for member states to exchange information on the challenges to asset management implementation.
4. Training – Post wrap-up “Implementation Strategies” webinar for partner states. Deliverables will include quarterly report updates and survey results as well as a webinar and a final summary report following each conference.

PARTNERS:

AR, CA, CO, CT, IA, IL, LA, MI, MN, MS, NC, ND, NJ, NV, OH, OK, TX, UT, VA, WI.

OKLAHOMA INVOLVEMENT:

Attend annual conference; member of the conference planning committee.

Study Period	2016	2017	2018	2019	2020
State Contribution (\$)	12,000	6,000	6,000	6,000	6,000

ESTIMATED COMPLETION DATE: June 2021

POINTS OF CONTACT

Lead: Brian Worrel, (515) 239-1471
ODOT: Matt Swift, (405) 521-2704
FHWA: Stephen Gaj, (201) 366-1336

TPF-5 (357) Implement Shakecast across Multiple State Departments for Rapid Post Earthquake Response

PURPOSE AND SCOPE:

When an earthquake occurs, the U. S. Geological Survey (USGS) ShakeMap portrays the extent of potentially damaging shaking. As a freely-available, post-earthquake situational awareness application, the ShakeCast system automatically:

- retrieves earthquake shaking data from USGS ShakeMap
- analyzes shaking intensity data against users' facilities (e.g., bridges, buildings, roads) sends notifications of potential impacts
- generates maps and other web-based products for emergency managers and responders

The recently released ShakeCast V3 system utilizes State's existing NBI databases to implement shaking-based inspection priority and impact assessments. ShakeCast is particularly suitable for earthquake planning and response purposes by Departments of Transportation (DOTs).

OBJECTIVES:

Since major earthquakes cross state borders, bringing this technology to all states with seismic hazards is a long-term goal. The project will provide a mechanism to actively engage representatives from state DOTs with the common interests in implementing and expanding the application of ShakeCast technologies to improve emergency response capabilities.

The project is comprised of two primary focus areas:

- (1) Provide support for participating DOTs to deploy operational ShakeCast systems.
- (2) Develop, modify, and customize ShakeCast features to meet the needs of the state DOTs.

Once project representatives meet at the start of the project, annual meetings will be convened to update the participating agency representatives on the status of the project and to provide a forum for information sharing, training, and feedback. This collaborative effort will bring participating DOTs into full ShakeCast operation for post-earthquake assessment of state and local bridge inventories.

PARTNERS:

CA, ID, MO, MS, OK, OR, SC, TX, UT, WA.

OKLAHOMA INVOLVEMENT:

Attended the kickoff meeting for this project Jul 18 – July 21, 2017. ODOT has incorporated ShakeCast into ODOT processes.

Study Period	2016	2017	2018
State Contribution (\$)	15,000	15,000	15,000

ESTIMATED COMPLETION DATE: July 2020

POINTS OF CONTACT

Lead: Loren Turner, (916) 229-7173

ODOT: Walt Peters, (405) 521-2606

FHWA: Wen-Hue, (292) 493-3056

TPF-5 (364) Utilization of Laser Induced Breakdown Spectroscopy (LIBS) for Real-Time Testing and Quality Control Monitoring of Aggregate Materials used in Highway Construction

PURPOSE AND SCOPE:

Phase II of TPF-5(278) is proposed in order to continue and finalize the pooled funded laser scanning research investigation, TPF-5(278), that began on June 1, 2013 with five participating State Agencies: KS, NY, OH, OK, and PA. Phase II extends involvement for additional State Agencies wanting to take part in this study. This solicitation continues the work and success of the NCHRP 150 Proof of Concept Study, the NCHRP 168 prototype development and the current TPF-5(278) which has shown the potential and success of this technology.

OBJECTIVES:

The overall objective is to upgrade QC/QA in the industry by developing a real-time laser scanning system to rapidly classify aggregates used in highway construction. The intent is to employ this classification process to:

- Quantify specific engineering properties (e.g., specific gravity, acid insoluble residue, Microdeval loss, etc.),
- Assess whether an aggregate source will pass or fail a defined engineering property test,
- Identify and/or quantify the presence of deleterious materials (e.g., reactive aggregates, cherts, etc.),
- Determine whether aggregate composition or quality is changing during production, and
- Determine the source material or sources of blended production materials.

An aggregate laser scanning system has the potential to be employed in private and government material testing laboratories, where laser scanning of aggregate samples can be undertaken, providing multiple engineering parametric results in near real time.

PARTNERS:

KS, MDOT SHA, NM, NY, OH, OK.

OKLAHOMA INVOLVEMENT:

Continue development of the laser scanning system, data analysis software and expand testing effort to enlarge the database. Anticipated tasks include:

1. Each agency participates in Sample Collection, Scanning and Modeling of Test Parameters
2. Incorporate methods for modifying Hardware, Software and Data Handling, and Modeling
3. Coordinate and prepare AASHTO Standard of Practice
4. Coordinate Project Management, Reporting and Annual Review Meetings
5. Schedule Technology Transfer Meeting for team members to present their research

Study Period	2018	2019
State Contribution (\$)	96,000	48,000

ESTIMATED COMPLETION DATE: June 2019

POINTS OF CONTACT

Lead: Susan Baker, (785) 291-3847

ODOT: Scott Seiter, (405) 521-2186

FHWA: Richard Meininger, (202) 493-3191

TPF-5 (418) National Cooperative Highway Research Program (NCHRP)

PURPOSE AND SCOPE:

The National Cooperative Highway Research Program (NCHRP) is a national research program carried out through the collaborative efforts of the Federal Highway Administration (FHWA), the National Academy of Sciences, Engineering, and Medicine (NASEM), and the American Association of State Highway and Transportation Officials (AASHTO). Created in 1962 as a means to conduct research in acute problem areas that affect highway planning, design, construction, operation, and maintenance nationwide, the NCHRP is administered by the Transportation Research Board (TRB) and sponsored by the individual State Departments of Transportation (DOTs) of the AASHTO in cooperation with the FHWA.

The NCHRP is a voluntary program funded by the States on an annual basis. Funding for NCHRP comes to 5.5 percent of the 2 percent State planning and research (SP&R) funding set-aside from the Federal-aid highway program. Participation in the NCHRP allows the States to leverage their research funding with that of other States to achieve similar research objectives without duplication of effort. This program affords a unique partnership between State, Federal, and private sector transportation experts.

NCHRP primarily focuses on the following research areas: pavements; economics; operations and control; general materials; illumination and visibility; snow and ice control; traffic planning; forecasting; bituminous materials; specifications, procedures, and practices; law; bridges; equipment; maintenance of highways and structures; general design; roadside development; safety; concrete materials; finance; special projects; testing and instrumentation; vehicle barrier systems; mechanics and foundations; and impact analysis. Information on NCHRP projects can be found at the NCHRP Web site at <http://www.trb.org/NCHRP/Public/NCHRP.aspx>.

OBJECTIVES:

To provide a mechanism for State transportation departments to support the NCHRP.

PARTNERS:

All states participate in this program.

OKLAHOMA INVOLVEMENT:

Serve as NCHRP Project Panel members when called upon, respond to study surveys and provide other support to projects as appropriate.

Study Period	2018
State Contribution (\$)	710,000

ESTIMATED COMPLETION DATE: July 2018

POINTS OF CONTACT

Lead: Jean Landolt, (202) 493-3146
ODOT: David Ooten, (405) 521-2671
FHWA: Jean Landolt, (202) 493-3146

TPF-5 (###) TRB Core Program Services for a Highway RD&T
Program – FFY 2018 (TRB FY 2019)

PURPOSE AND SCOPE:

This solicitation will cover the period of TRB's fiscal year 2019 that begins July 1, 2018, and ends June 30, 2019. Funds committed by participating States will be from their Federal fiscal year 2018 funding.

This pooled fund study permits States to make their contributions to the TRB Core Program instead of sending their contributions to the TRB directly. The TRB Core Program provides support funding for the TRB annual meeting, the committee structure, State visits by TRB, and the TRB publication program.

OBJECTIVES:

To provide a mechanism for State transportation departments to support the TRB's Core Program and Services.

PARTNERS:

All State Departments of Transportation participate in this program.

OKLAHOMA INVOLVEMENT:

Support TRB activities including, but not limited to, TRB State Visit in September 2017, remain abreast and act as appropriate of requests made to TRB State Representative, support ODOT staff who are members of TRB Standing Committee or NCHRP Project Panels, and inform ODOT Staff of TRB webinar and report releases.

Study Period	2018
State Contribution (\$)	130,000

ESTIMATED COMPLETION DATE: July 2018

POINTS OF CONTACT

Lead: Jean Landolt, (202) 493-3146

ODOT: David Ooten, (405) 521-2671

FHWA: Jean Landolt, (202) 493-3146

Note: TPF Number is unknown at time of publication.